

## 臨床研究組壁報發表 Clinical Poster

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Acute Kidney Injury and Critical Care Nephrology	C001-C005
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### 【Clinical】

#### Acute Kidney Injury and Critical Care Nephrology

Chair(s) : 黃道民/ Tao-Min Huang、張智翔/ Chih-Hsiang Chang

- C001 Saline and N-Acetylcysteine-Based Strategies and Other Approaches to Prevent the Risk of Contrast-Associated Acute Kidney Injury Among Patients Undergoing Cardiovascular Angiography: A Network Meta-Analysis  
I-Chen Lin<sup>1</sup>, Wen-Wen Tsai<sup>2</sup>, Vin-Cent Wu<sup>3</sup>, Heng-Chih Pan<sup>4</sup>, Min-Hsiang Chuang<sup>5</sup>, Jui-Yi Chen<sup>6</sup>  
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<sup>2</sup>Department of Neurology, Chi-Mei Medical Center, Tainan, Taiwan  
<sup>3</sup>Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan  
<sup>4</sup>Division of Nephrology, Department of Internal Medicine, Keelung Chang Gung Memorial Hospital, Keelung, Taiwan  
<sup>5</sup>Division of Nephrology, Department of Internal Medicine, Chi Mei Medical Center, Tainan, Taiwan  
<sup>6</sup>Department of Health and Nutrition, Chia Nan University of Pharmacy and Science, Tainan, Taiwan
- C002 Urolithiasis Being A Risk Factor of Acute Kidney Injury in Patient with Urinary Tract Infection without Hydronephrosis  
尿路結石是無腎水腫泌尿道感染患者急性腎損傷的危險因子  
<sup>1</sup> YW Chen, <sup>2</sup> CL Chiang, <sup>2</sup> CY Hsiao  
陳翊維<sup>1</sup>, 江政倫<sup>2</sup>, 蕭志彥<sup>2</sup>  
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<sup>1</sup> 戴德森醫療財團法人嘉義基督教醫院內科部 <sup>2</sup> 腎臟內科
- C003 A Case Report: Carboplatin Induced Acute Tubular Injury  
Carboplatin 引發急性腎小管損傷  
Ming-Tso Yan, Chun-Lin Fu  
顏銘佐, 傅俊霖  
Cathay General Hospital  
國泰醫院

- C005 Characteristics of the Plasma and Urine Extracellular Vesicles in Sepsis-Associated Acute Kidney Injury  
敗血症併急性腎損傷血漿和尿液細胞外囊泡的特徵  
Chih-Chin Kao<sup>1</sup>, Tan-Yu Chang<sup>2</sup>, Yueh-Chu Sio<sup>1</sup>, Ching-Yi Chen<sup>1</sup>, I-jen Chiu<sup>3</sup>, Isabel I-Lin Tsai<sup>2</sup>, Mai-Szu Wu<sup>3</sup>  
高治圻<sup>1</sup>, 張天語<sup>2</sup>, 邵月珠<sup>1</sup>, 陳靜怡<sup>1</sup>, 邱怡仁<sup>3</sup>, 蔡伊琳<sup>2</sup>, 吳麥斯<sup>3</sup>  
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### Glomerular Diseases

Chair(s) : 黃道民/ Tao-Min Huang、張智翔/ Chih-Hsiang Chang

- C006 The Association Between Air Pollutants and the Risk of Primary Glomerulonephritis  
空氣汙染物與原發性腎絲球腎炎風險之相關性  
Kuan-Chieh Wang, Tao-Min Huang, Wen-Chih Chiang, Fan-Chi Chang  
王冠傑, 黃道民, 姜文智, 張芳綺  
Renal Division, Department of Internal Medicine, National Taiwan University Hospital  
台大醫院內科部腎臟科
- C007 Steroid-Resistant Focal Segmental Glomerulosclerosis with Rapidly Progressive Renal Failure: A Case Report and Literature Review  
Yueh-Lung Tsai<sup>1</sup>, Yo-Wen Liang<sup>2</sup>, Yu-Shuo Tang<sup>1</sup>, Chung-Yi Cheng<sup>1,3,4</sup>  
<sup>1</sup>Division of Nephrology, Department of Internal Medicine, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan.  
<sup>2</sup>Division of General Medicine, Department of Internal Medicine, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan.  
<sup>3</sup>Department of Internal Medicine, School of Medicine, College of Medicine, Taipei Medical University, Taipei  
<sup>4</sup>Taipei Medical University Research Center of Urology and Kidney, Taipei
- C008 Simple Equations for Exceling Daily Albuminuria Estimation from Spot Urine: A Focus on Body weight  
利用體重以優化單次尿液的一日白蛋白排泄估算  
Liang-Chun Chen<sup>1</sup>, Zih-Kai Kao<sup>2,3</sup>, Chih-Yu Yang<sup>1,4,5,6,\*</sup>, and Der-Cherng Tarn<sup>1,4,5</sup>  
陳亮灼<sup>1</sup>, 高子凱<sup>2,3</sup>, 楊智宇<sup>1,4,5,6,\*</sup>, 唐德成<sup>1,4,5</sup>  
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<sup>1</sup>台北榮民總醫院內科部腎臟科<sup>2</sup>台北榮民總醫院資訊室<sup>3</sup>國立陽明交通大學生醫光電工程研究所<sup>4</sup>國立陽明交通大學臨床醫學研究所<sup>5</sup>智能藥物系統與智慧生物裝置中心<sup>6</sup>國立陽明交通大學幹細胞研究中心
- C009 Rituximab Add-On Therapy for Individuals with Refractory Lupus Nephritis Not Responded to Other Drugs Therapy  
Jatinkumar Veljibhai Dhanani  
GMERS Medical College, Navsari, India

- C010 Clinical Features and Outcomes of Primary Glomerulonephritis in Taiwan  
臺灣原發性腎絲球腎炎的臨床特徵與預後  
An-Fu Lee<sup>1,2</sup>, Ming-Yen Lin<sup>3</sup>, Pei-Chen Lin<sup>4</sup>, Chi-Chih Hung<sup>3</sup>, Chih-Chuan Yu<sup>1</sup>, Yi-Wen Chiu<sup>3</sup>,  
Daw-Yang Hwang<sup>1,3</sup>  
李安富<sup>1,2</sup>, 林明彥<sup>3</sup>, 林佩蓁<sup>4</sup>, 洪啟智<sup>3</sup>, 余智娟<sup>1</sup>, 邱怡文<sup>3</sup>, 黃道揚<sup>1,3</sup>  
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<sup>1</sup> 國家衛生研究院癌症研究所<sup>2</sup> 國立成功大學附設醫院內科部<sup>3</sup> 高雄醫學大學附設中和紀念醫院腎臟內科<sup>4</sup> 高雄醫學大學口腔衛生學系

- C011 Long-Term Enzyme Replacement Therapy and Renal Outcomes in Patients with Fabry Disease: A Systematic Review and Meta-Analysis  
Chun-Ting Li<sup>1</sup>, Cheng-Jui Lin<sup>1,2,3</sup>, Chih-jen Wu<sup>1,3</sup>  
<sup>1</sup> Division of Nephrology, Department of Internal Medicine, Mackay Memorial Hospital  
<sup>2</sup> Mackay Junior College of Medicine, Nursing and Management, Taipei, Taiwan  
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### Chronic Kidney Disease

Chair(s) : 黃道民/ Tao-Min Huang、張智翔/ Chih-Hsiang Chang

- C012 Analysis of Shared Decision Making in the Choice of Renal Replacement Therapy for End-Stage Kidney Disease Patients: Based on a District Teaching Hospital in Southern Taiwan  
醫病共享決策對於末期腎臟病病人選擇腎臟替代療法之分析:以南部某地區教學醫院為例  
姜林文祺<sup>2</sup>, 李佩蓉<sup>1</sup>, 謝昕好<sup>1</sup>, 戴佩嵐<sup>1</sup>, 吳政哲<sup>2</sup>, 施得恩<sup>2</sup>, 林孟德<sup>2</sup>  
<sup>1</sup> 護理部 郭綜合醫院, <sup>2</sup> 腎臟科 內科部 郭綜合醫院
- C013 Benefits of Increasing the Proportion of Plant Protein Intake on Achieving a Low Protein diet, Acid-base Balance, and Body Composition in CKD Stage 3-5  
提高植物性蛋白攝取比例對於慢性腎臟病3-5期達成低蛋白飲食, 酸鹼平衡, 身體組成的益處  
Bang-Gee Hsu<sup>1,2</sup>, Chih-Hsien Wang<sup>1,2</sup>, Li-Xia Tong<sup>3</sup>, Hung-Hsiang Liou<sup>4</sup>, Yu-Hsien Lai<sup>1,2</sup>,  
Chiu-Huang Kuo<sup>1,5</sup>, Yu-Li Lin<sup>1,2,\*</sup>  
徐邦治<sup>1,2</sup>, 王智賢<sup>1,2</sup>, 童麗霞<sup>3</sup>, 劉宏祥<sup>4</sup>, 賴宇軒<sup>1,2</sup>, 郭秋煌<sup>1,5</sup>, 林于立<sup>1,2,\*</sup>  
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<sup>5</sup> School of Post-baccalaureate Chinese Medicine, Tzu Chi University, Hualien, Taiwan.  
<sup>1</sup> 佛教慈濟醫療財團法人花蓮慈濟醫院腎臟科, <sup>2</sup> 慈濟大學醫學系, <sup>3</sup> 佛教慈濟醫療財團法人花蓮慈濟醫院營養科, <sup>4</sup> 新莊新仁醫院, <sup>5</sup> 慈濟大學學士後中醫學系
- C014 Exploring the Effectiveness of Shared Decision-Making on the Choice of Renal Replacement Therapy and Anxiety Improvement Among Patients with Chronic Kidney Disease  
探討慢性腎臟病人醫病共享決策於腎替代療法選擇及焦慮改善之成效  
Yu-Chuan Hsiao, Ya-Pei Yu, Shu-Er Hsueh, Dian-Shou Chuang, Hsin-Yi Lin  
Chien-hsiu Liu, Ching-I Yu, Lung-Chih Lee, Wen-Chin Lee  
蕭妤娟 游雅珮 薛淑娥 莊滇收 林欣怡 劉建秀 俞靜儀 李隆志 李文欽  
Division of Nephrology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital 高雄長庚紀念醫院內科部腎臟科
- C015 Effectiveness of Using Shared Decision-Making to Intervene in Patients with Poorly Controlled Blood Glucose in Type 2 Diabetes combined with Early Renal Disease.  
運用醫病共享決策介入第2型糖尿病血糖控制不佳個案合併初期腎臟病變之成效  
梁素姿<sup>1</sup>, 楊政議<sup>2</sup>  
<sup>1</sup> 彰化基督教醫院疾病管理整合中心/弘光科技大學 護理系研究所 <sup>2</sup> 弘光科技大學護理系

- C016 The Results of Preventive Services for Adults at a District Hospital  
地區醫院成人預防保健之成效  
王麗萍<sup>1</sup>, 楊靜薇<sup>1</sup>, 陳姿樺<sup>1</sup>, 黃慧娟<sup>1</sup>, 王弘偉<sup>2</sup>, 林煒捷<sup>2</sup>, 郭育淇<sup>2</sup>  
奇美醫療財團法人佳里奇美醫院<sup>1</sup>護理部, <sup>2</sup>腎臟科
- C017 Association between PM2.5 Exposure with Gut Microbiota Abundance and Composition in Chronic Disease Patients  
懸浮微粒(PM2.5)暴露與慢性病患者腸道微生物群豐度及組成的相關性  
Szu-Chia Chen<sup>1,2</sup>, Yi-Hsueh Liu<sup>2</sup>, Yi-Wen Chiu<sup>1</sup>, Jer-Ming Chang<sup>1</sup>  
陳思嘉<sup>1,2</sup>, 劉宜學<sup>2</sup>, 邱怡文<sup>1</sup>, 張哲銘<sup>1</sup>  
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高雄醫學大學附設醫院腎臟內科<sup>1</sup> 高雄市立小港醫院內科<sup>2</sup>
- C018 Discordance Between the Creatinine and Cystatin C-Based Estimated Glomerular Filtration Rate in Predicting Adverse Outcome  
Hung-Chieh Wu<sup>1,2</sup>, Khor-Chyi Sheng<sup>1</sup>, Wei-Jie Wang<sup>1,3</sup>  
<sup>1</sup> Division of Nephrology, Department of Internal Medicine, Taoyuan General hospital, Taoyuan, Ministry of Health and Welfare, Taiwan  
<sup>2</sup> Department of Biotechnology, Ming Chuan University, Taipei, Taiwan  
<sup>3</sup> Department of Biomedical Engineering, Chung Yuan Christian University, Taoyuan, Taiwan
- C019 Effectiveness of Abdominal Bracing Core Exercises as Rehabilitation Therapy for Reducing Abdominal Symptoms in Patients with Autosomal Dominant Polycystic Kidney Disease and Significant Polycystic Liver Disease  
Hyunsuk Kim<sup>1</sup>, Jaeyeong Yoo<sup>1</sup>, Jin eop Kim<sup>1</sup>, Jisu Kim<sup>1</sup>, Sohyun Jeon<sup>1</sup>, Young-jin Song<sup>1</sup>, Kwang-ho Choi<sup>1</sup>, Gwangeon Sim<sup>1</sup>, Myunkyu Cho<sup>1</sup>, Jong-woo Yoon<sup>1</sup> Hyunsuk Kim<sup>1</sup>  
<sup>1</sup>Department of Internal Medicine, Hallym University Medical Center, Chuncheon Sacred Heart Hospital, Chuncheon, Republic of Korea
- C020 Alternative Medicine in Patients with Chronic Kidney Disease  
慢性腎臟病病人使用另類療法之分析  
Shu-Li Wang<sup>1</sup>, Tzu-Hui Chen<sup>1</sup>, Lan-Fang Kung<sup>1</sup>, Pei-Ni Hsiao<sup>1</sup>, Shih-Ming Hsiao<sup>1</sup>, Yi-Wen Chiu<sup>3</sup>  
王淑麗<sup>1</sup>, 陳慈徽<sup>1</sup>, 龔蘭芳<sup>1</sup>, 蕭佩妮<sup>1</sup>, 蕭仕敏<sup>1</sup>, 邱怡文<sup>2</sup>  
<sup>1</sup>Department of Nursing, and <sup>2</sup>Department of Nephrology, Kaohsiung Medical University Hospital, Kaohsiung Medical University  
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### Chronic Kidney Disease

Chair(s) : 陳靖博/ Jin-Bor Chen、王怡寬/ I-Kuan Wang

- C021 Application of Power BI Interactive Data Visualization Software in CKD Case Management  
應用 Power BI 動態可視化工具在慢性腎臟病數據管理成效探討  
Lin Chiang<sup>1</sup>, Ya Ling Chen<sup>1</sup>, Fang Lieng Yeh<sup>1</sup>  
姜菱<sup>1</sup>, 陳雅玲<sup>1</sup>, 葉芳伶<sup>1</sup>  
Tri-Service General Hospital Nephrology  
三軍總醫院腎臟科
- C022 Analysis of Elderly Functional Assessment Performed by Patients with Chronic Kidney Disease  
慢性腎臟病病人執行長者功能評估之分析  
Chi-Ling Hsu<sup>1</sup>, Shu Kuan Kuo<sup>2</sup>, Yueh-Ting Lee<sup>3</sup>, Shang-Chin Liao<sup>4</sup>, Chien-Te Lee<sup>5</sup>  
許琪聆<sup>1</sup>, 郭淑冠<sup>2</sup>, 李岳庭<sup>3</sup>, 廖上智<sup>4</sup>, 李建德<sup>5</sup>  
Kaohsiung Municipal Feng Shan Hospital - Under the management of Chang Gung Medical Foundation  
高雄市立鳳山醫院(委託長庚醫療財團法人經營)



- C023 The Association of Monocyte Count with Renal Outcomes and Mortality in Patients with Chronic Kidney Disease  
慢性腎臟病患者的單核球細胞數與腎臟功能變化和死亡率的相關性  
Tai-Jung Wu<sup>1</sup>, Yu-Hsiang Chou<sup>1,2</sup>, Shuei-Liong Lin<sup>1,2</sup>  
吳岱蓉<sup>1</sup>, 周鈺翔<sup>1,2</sup>, 林水龍<sup>1,2</sup>  
<sup>1</sup> Graduate Institute of Physiology, College of Medicine, National Taiwan University, Taipei, Taiwan, <sup>2</sup> Renal Division, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan  
<sup>1</sup> 台灣大學醫學院生理所, <sup>2</sup> 台灣大學附設醫院內科部腎臟科
- C024 Association of Triglyceride-Glucose Index with Aortic Stiffness in Non-Dialysis Chronic Kidney Disease  
三酸甘油酯-葡萄糖指數與非透析慢性腎臟病患者主動脈硬度的關聯性  
Chi-Chong Tang<sup>1\*</sup>, Yu-Li Lin<sup>1,2</sup>, Bang-Gee Hsu<sup>1,2</sup>  
鄧子聰<sup>1\*</sup>, 林于立<sup>1,2</sup>, 徐邦治<sup>1,2</sup>  
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<sup>1</sup> 佛教慈濟醫療財團法人花蓮慈濟醫院腎臟科, <sup>2</sup> 慈濟大學醫學系
- C025 Improving Smoking Cessation Referral Rates for Chronic Kidney Disease Patients through Interdisciplinary Collaboration  
運用跨團隊合作提升慢性腎病病患戒菸轉介率  
Ling-Ya, Su<sup>1</sup>  
蘇玲雅<sup>1</sup>  
An Nan Hospital, China Medical University, Tainan, Taiwan  
臺南市立安南醫院-委託中國醫藥大學興建經營
- C026 Reason Analysis for End Stage Renal Disease (ESRD) Patients with Pre-establishing Vascular Access Receive First Dialysis at Admission — A Survey from a Medical Center in Southern Taiwan  
末期腎臟病患預先建立血管通路住院透析原因分析-以南部某醫學中心為例  
Lan-Fang Kung<sup>1</sup>, Tzu-Hui Chen<sup>1</sup>, Shu-Li Wang<sup>1</sup>, Shih-Ming Hsiao<sup>1</sup>, Pei-Ni Hsiao<sup>1</sup>, Yu-Ying Huang<sup>1</sup>, Mei-Chuan Kuo<sup>2</sup>  
龔蘭芳<sup>1</sup>, 陳慈徽<sup>1</sup>, 王淑麗<sup>1</sup>, 蕭仕敏<sup>1</sup>, 蕭佩妮<sup>1</sup>, 黃玉瑩<sup>1</sup>, 郭美娟<sup>2</sup>  
<sup>1</sup> Department of Nursing and <sup>2</sup> Department of Nephrology, Kaohsiung Medical University, Kaohsiung Medical University Hospital  
<sup>1</sup> 高雄醫學大學附設醫院護理部, <sup>2</sup> 腎臟內科
- C027 Using the Health Education in Telligent Platform to Stepwise Initiation of Peritoneal Dialysis on Pre-End-Stage Renal Disease Patients  
衛教智能平台運用於末期腎臟病前期病人接受腹膜透析預先植管成效  
Chang Yu Dai, Kao Yin Pu, Wang Shiao Ching  
張鈺韃, 高銀璞, 王曉菁  
Taipei Medical University Hospital for Manager of the Professional Department  
萬芳醫院醫務部醫事組
- C028 Association Between High-Sensitivity Troponin I and Mortality Risk in Individuals with Albuminuria  
Ming-Yan Jiang<sup>1</sup>, Yun-Ting Huang<sup>1</sup>, I-Ning Yang<sup>1</sup>, Jui-Yi Chen<sup>1</sup>, Chih-Chiang Chien<sup>1</sup>, Wei-Chih Kan<sup>1</sup>, Jyh-Chang Hwang<sup>1</sup>, Hsien-Yi Wang<sup>1</sup>  
<sup>1</sup> Renal Division, Department of Internal Medicine, Chi Mei Medical Center

- C029 A Comparative Analysis of Quality of Life in Chronic Kidney Disease Patients Undergoing Different Dialysis Modalities: A Systematic Review and Evidence-Based Nursing Approach  
不同透析模式對慢性腎臟病患者生活品質的影響：橫斷面研究與實證護理之系統性探討  
Sung-Tsai Yun<sup>1</sup>, Wen-Jin Xie<sup>2</sup>, Hsin-Ling Tai<sup>3\*</sup>  
宋采芸<sup>1</sup>, 謝汶瑾<sup>2</sup>, 戴辛翎<sup>3\*</sup>  
<sup>1,2,3</sup> Department of Nursing, National Taipei University of Nursing and Health Sciences,  
<sup>3</sup> Department of Nursing, Taipei Veterans General Hospital  
<sup>1,2,3</sup> 國立台北護理健康大學護理系, <sup>3</sup> 臺北榮總護理部
- C030 Association of Heart Failure, Albuminuria, and Mortality in the U.S. General Population  
Ming-Yan Jiang<sup>1</sup>, Yun-Ting Huang<sup>1</sup>, I-Ning Yang<sup>1</sup>, Jui-Yi Chen<sup>1</sup>, Chih-Chiang Chien<sup>1</sup>,  
Wei-Chih Kan<sup>1</sup>, Jyh-Chang Hwang<sup>1</sup>, Hsien-Yi Wang<sup>1</sup>  
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- C031 Efficacy of Finerenone in Cardiovascular and Renal Protection for Patients with Diabetic Kidney Disease: A Clinical Analysis  
糖尿病腎病變患者使用醛固酮受體拮抗劑 Finerenone 對心腎功能保護的成效分析  
You-Rong He<sup>1</sup>, Jiu-Yun Tian<sup>2</sup>, Hsin-Ling Tai<sup>3\*</sup>  
何侑蓉<sup>1</sup>, 田久芸<sup>2</sup>, 戴辛翎<sup>3\*</sup>  
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<sup>1,3</sup> 國立台北護理健康大學護理系 <sup>2,3</sup> 臺北榮總護理部
- C032 Associations of Peripheral Blood Mononuclear Cell Immunophenotypes with Peripheral Artery Occlusive Disease and Diabetic Foot Syndrome in Chronic Kidney Disease Stage 4-5D Patients  
慢性腎臟病第4至5D期病人的周邊血液單核球細胞免疫分型與周邊動脈阻塞性疾病和糖尿病足症候群的相關性分析  
Hsiao-Ying Liu<sup>1</sup>, Tsung-Lin Lee<sup>1</sup>, Cai-Mei Zheng<sup>1,2</sup>, Chu-Lin Chou<sup>2,3</sup>, Yung-Ho Hsu<sup>2,4</sup>, Mai-Szu Wu<sup>1,2</sup>, Chia-Te Liao<sup>1,2</sup>  
劉小櫻<sup>1</sup>, 李宗霖<sup>1</sup>, 鄭彩梅<sup>1,2</sup>, 鄒居霖<sup>2,3</sup>, 許永和<sup>2,4</sup>, 吳麥斯<sup>1,2</sup>, 廖家德<sup>1,2</sup>  
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- C033 The Relationship Between Kidney Disease Chronicity and Severe Post-Biopsy Hemorrhage in Native Kidney Biopsies  
腎病慢性程度與腎切片後嚴重出血之關係  
Shu-Yu Lin<sup>1</sup>, Ming-Tsun Tsai<sup>1,2</sup>, Chih-Yu Yang<sup>1,2\*</sup>, Chih-Ching Lin<sup>1,2</sup>, Der-Cherng Tarng<sup>1,2</sup>  
林書聿<sup>1</sup>, 蔡明村<sup>1,2</sup>, 楊智宇<sup>1,2\*</sup>, 林志慶<sup>1,2</sup>, 唐德成<sup>1,2</sup>  
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<sup>1</sup> 臺北榮民總醫院內科部腎臟科 <sup>2</sup> 國立陽明交通大學
- C034 Clinical Outcomes and Nursing Recommendations for Renal Replacement Therapies  
腎臟替代療法之間的臨床效益與照護建議探討  
You-Hua Chen<sup>1</sup>, Min-Hsi Li<sup>2</sup>, Ya-Chieh Hsieh<sup>3</sup>, Yi-Chen Lu<sup>4</sup>, You-Yi Li<sup>5</sup>, Yu-Chi Chou<sup>6</sup>,  
Hsin-Ling Tai<sup>7</sup>  
陳宥樺<sup>1</sup>, 李敏熙<sup>2</sup>, 謝雅潔<sup>3</sup>, 呂宜蓁<sup>4</sup>, 李祐儀<sup>5</sup>, 周玉奇<sup>6</sup>, 戴辛翎<sup>7\*</sup>  
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- C035 Content Analysis and Viewing Behavior Study of YouTube Kidney Health Videos  
YouTube 腎臟保健影片之內容分析與觀看行為研究  
Tung-Yun Tai, Hsin-Yi Lai, Hsin-I Huang, Tsung-Lin Wu, Yung-Ni Lee, Tai-shuan Lai, Jeng-Wen Huang  
戴彤芸, 賴心怡, 黃心怡, 吳宗琳, 李倪, 賴台軒, 黃政文  
Department of Internal Medicine-Nephrology, Department of Internal Medicine, National Taiwan University Hospital, Taiwan  
國立臺灣大學醫學院附設醫院內科部
- C036 One Skin Luminance-Based End-stage Kidney Disease Prediction Model in Patients with Chronic Kidney Disease: An External Validation Study  
慢性腎臟病人以膚色亮度為基礎的晚期慢性腎臟病預測模式:一個外部有效性研究  
Cheng-Yin Chung<sup>1,2</sup>, Tzu-Ning Wu<sup>3</sup>, Yu-Tong Wang<sup>3</sup>, Ming-Yen Lin<sup>2</sup>  
鍾承穎<sup>1,2</sup>, 吳紫甯<sup>4</sup>, 王友彤<sup>4</sup>, 林明彥<sup>2</sup>  
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<sup>3</sup>衛生福利部屏東醫院護理科
- C037 Urinary Tract Infection Requiring Hospital Admission Could Induce Subsequently Accelerated Deterioration of Renal Function in Adult CKD Patients  
成年慢性腎病患者發生需住院之泌尿道感染可引起後續之腎功能加速惡化  
Jo-Yen Chao<sup>1</sup>, Deng-Chi Yang<sup>2</sup>, Chih-Yen Hsiao<sup>3</sup>, Chien-Tzu Tseng<sup>4</sup>, Wei-Hung Lin<sup>5</sup>, Te-Hui Kuo<sup>1</sup>, Ming-Cheng Wang<sup>1</sup>  
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成大醫院 <sup>5</sup>內科部 <sup>1</sup>腎臟科, <sup>2</sup>高齡醫學部; <sup>3</sup>嘉義基督教醫院內科部腎臟科; <sup>4</sup>成大醫院斗六分院內科部腎臟科
- C038 The Comparison of the Effect of Intradialytic Exercises on Lower Limb Muscle Strength in Dialysis Patients  
比較透析中運動與不運動對透析病人下肢肌力的影響  
Hsiang-Hui Chiu<sup>1,2,4</sup>, Li-Jung Liang<sup>1</sup>, Su-Er Guo<sup>1</sup>, Lin-fu Huang<sup>3,4</sup>  
邱湘惠<sup>1,2,4</sup>, 梁立容<sup>1</sup>, 郭素娥<sup>1</sup>, 黃鈴富<sup>3,4</sup>  
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- C039 Explore the Relation Between Mental Health and Clinical Outcomes in Advanced Chronic Kidney Disease Patients  
探討晚期慢性腎臟病人的精神健康與臨床指標之相關性  
Shih-Ming Hsiao<sup>1</sup>, Sin-Hua Moi<sup>2</sup>, Pei-Ni Hsiao<sup>1</sup>, Tzu-Hui Chen<sup>1</sup>, Lan-Fang Kung<sup>1</sup>, Shu-Li Wang<sup>1</sup>, Yu-Ying Huang<sup>1</sup>, Mei-Chuan Kuo<sup>3\*</sup>  
蕭仕敏<sup>1</sup>, 魏蕊梓<sup>2</sup>, 蕭佩妮<sup>1</sup>, 陳慈徽<sup>1</sup>, 龔蘭芳<sup>1</sup>, 王淑麗<sup>1</sup>, 黃玉瑩<sup>1</sup>, 郭美娟<sup>3\*</sup>  
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<sup>3</sup>高雄醫學大學附設中和紀念醫院腎臟內科

- C040 Association Between the Serum Irisin and Peripheral Arterial Stiffness According to the Cardio-Ankle Vascular Index in CKD Stage 3-5 Patients  
血清鳶尾素濃度跟非透析第三期到第五期慢性腎臟病患者以心踝血管指數測量週邊動脈硬度有關  
Ho-Hsiang Chang<sup>1</sup>, Yu-Li Lin<sup>1,2</sup>, Chih-Hsien Wang<sup>1,2</sup>, Chiu-Huang Kuo<sup>1,2</sup>, Hung-Hsiang Liou<sup>3</sup>, Bang-Gee Hsu<sup>1,2</sup>  
張賀翔<sup>1</sup>, 林于立<sup>1,2</sup>, 王智賢<sup>1,2</sup>, 郭秋煌<sup>1,2</sup>, 劉宏祥<sup>3</sup>, 徐邦治<sup>1,2</sup>  
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### Chronic Kidney Disease

Chair(s) : 孫樵隱/ Chiao-Yin Sun、李玟儀/ Wen-Yi Li

- C041 Novel Renal Biomarkers in Detecting Phthalate-Associated Nephrotoxicity in Patients with Chronic Kidney Disease  
新型腎臟生物標記於慢性腎臟病患者鄰苯二甲酸鹽相關腎毒性檢測之角色  
Chi-An Hsiao<sup>1</sup>, Wen-Chin Lee, Kai-Fan Tsai\*  
蕭啓安<sup>1</sup>, 李文欽, 蔡凱帆\*  
Division of Nephrology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan  
高雄長庚紀念醫院內科部腎臟科
- C042 Analysis of the Status of Preemptive Dialysis Access Establishment and the Effectiveness of Medical Resource Utilization in First-Time Dialysis Patients  
首次透析病人預先建立透析通路現況與醫療資源利用成效之分析  
Shu-Hua Hsu, Ho-Lin Tsai, Yi-Li Lin, Bang-Gee Hsu  
徐淑華 蔡鶴齡 林于立 徐邦治  
Division of Nephrology, Hualien Tzu Chi Hospital  
佛教慈濟醫療財團法人花蓮慈濟醫院腎臟內科
- C043 In Response to the "2025 Taiwan Kidney Strength Project" Cross-Department Cooperation, Increase the Enrollment Rate of "Early Chronic Kidney Disease."  
響應「2025 腎力計畫」跨處室合作，提升「初期慢性腎臟病」新收案率  
Mei-ER Hsu<sup>1</sup>, Yi-Hsuan Tsai<sup>2</sup>, Pei-Yu Huang<sup>3</sup>, Hsin-yin Lu<sup>4</sup>, Hugo You-Hsien Lin<sup>5</sup>, Ya-Kuei, Yang<sup>6</sup>  
徐美娥<sup>1</sup>, 蔡怡萱<sup>2</sup>, 黃沛妤<sup>3</sup>, 呂欣穎<sup>4</sup>, 林祐賢<sup>5</sup>, 楊雅貴<sup>6</sup>  
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- C044 Revisiting Frequent Premature Atrial Contractions and All-Cause Mortality in Non-Dialysis CKD Population  
重新探討非透析慢性腎病族群中頻繁早期心房收縮與死亡率的關係  
Yun-Ping Chen<sup>1</sup>, Lu-Heng, Lu<sup>1</sup>, Mei-Chuan Kuo<sup>1,2</sup>, Teng-Hui Huang<sup>1</sup>, Ming-Yen Lin<sup>1</sup>, Yi-Ting Lin<sup>2,3,4</sup>, Yi-Wen Chiu<sup>1,2</sup>, Shang-Jyh Hwang<sup>1,2</sup>, Ping-Hsun Wu<sup>1,2,3</sup>  
陳芸平<sup>1</sup>, 盧律衡<sup>1</sup>, 郭美娟<sup>1,2</sup>, 黃騰慧<sup>1</sup>, 林明彥<sup>1</sup>, 林憶婷<sup>2,3,4</sup>, 邱怡文<sup>1,2</sup>, 黃尚志<sup>1,2</sup>, 吳秉勳<sup>1,2,3</sup>  
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<sup>4</sup>Department of Family Medicine, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

- C045 Progression of Chronic Kidney Disease in Diabetic Patients: Insights from a Multi-State Markov Model  
 利用多狀態馬可夫模型分析糖尿病患者的慢性腎臟病進展  
 Fan-Yu Chen<sup>1,2</sup>, Jen-En Tsai<sup>2</sup>, Szu-Yuan Li<sup>1,2</sup>, Chih-Yu Yang<sup>1,2</sup>, Shuo-Ming Ou<sup>1,2</sup>, Kuo-Hua Lee<sup>1,2</sup>,  
 Ming-Tsun Tsai<sup>1,2</sup>, Chyong-Mei Chen<sup>2</sup>, Chih-Ching Lin<sup>1,2</sup>  
 陳範宇<sup>1,2</sup>, 蔡仁恩<sup>2</sup>, 黎思源<sup>1,2</sup>, 楊智宇<sup>1,2</sup>, 歐朔銘<sup>1,2</sup>, 李國華<sup>1,2</sup>, 蔡明村<sup>1,2</sup>,  
 陳瓊梅<sup>2</sup>, 林志慶<sup>1,2</sup>  
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<sup>1</sup>臺北榮民總醫院腎臟科 <sup>2</sup>國立陽明交通大學
- C046 The Efficacy of Kremezin in Delaying Renal Replacement Therapy in Chronic Kidney Disease Patients  
 克裏美淨在延緩慢性腎臟病患者進入腎臟替代治療的療效  
 Chin-Te Tseng<sup>1</sup>, Fan-Yu Chen<sup>1,2</sup>, Szu-yuan Li<sup>1,2</sup>, Chih-Yu Yang<sup>1,2</sup>, Shuo-Ming Ou<sup>1,2</sup>, Kuo-Hua  
 Lee<sup>1,2</sup>, Ming-Tsun Tsai<sup>1,2</sup>, Chyong-Mei Chen<sup>2</sup>, Chih-Ching Lin<sup>1,2</sup>  
 曾競德<sup>1</sup>, 陳範宇<sup>1,2</sup>, 黎思源<sup>1,2</sup>, 楊智宇<sup>1,2</sup>, 歐朔銘<sup>1,2</sup>, 李國華<sup>1,2</sup>, 蔡明村<sup>1,2</sup>,  
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<sup>1</sup>台北榮民總醫院腎臟科 <sup>2</sup>國立陽明交通大學
- C047 Nursing Experience of Caring for A Patient with Diabetic Nephropathy with Below-Knee Amputation  
 照顧一位糖尿病腎病變病人膝下截肢之護理經驗  
 陳錦雲, 王宣惠  
 高雄醫學大學附設中和紀念醫院 血液透析室
- C048 Advanced Stage Lung Cancer Independently Predicts Adverse Renal Outcomes: A Prospective Observational Study in Taiwan  
 台灣前瞻性觀察研究：晚期肺癌患者的腎臟不良預後獨立關聯性  
 Chung-Ting Cheng<sup>1,2,6</sup>, Feng-Ching Shen<sup>1,2</sup>, Lu-Heng Lu<sup>1,2</sup>, I-Ching Kuo<sup>1,2,3</sup>, Sheng-Wen Niu<sup>1,2,3</sup>,  
 Hugo Y. -H. Lin<sup>1,2,3</sup>, Szu-Chia Chen<sup>1,2,4</sup>, Chi-Chih Hung<sup>1,2</sup>, Jen-Yu Hung<sup>2,5</sup>, Yi-Wen Chiu<sup>1,2</sup>,  
 Jer-Ming Chang<sup>1,2\*</sup>, Shang-Jyh Hwang<sup>1,2</sup>  
 鄭仲廷<sup>1,2</sup>, 沈峯慶<sup>1,2</sup>, 盧律衡<sup>1,2</sup>, 郭宜瑾<sup>1,2,3</sup>, 鈕聖文<sup>1,2,3</sup>, 林祐賢<sup>1,2,3</sup>, 陳思嘉<sup>1,2,4</sup>,  
 洪啟智<sup>1,2</sup>, 洪仁宇<sup>2,5</sup>, 邱怡文<sup>1,2</sup>, 張哲銘<sup>1,2\*</sup>, 黃尚志<sup>1,2</sup>  
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<sup>6</sup>高雄醫學大學醫學研究所
- C049 An Analysis of the Effectiveness of Pharmacy Services Provided to Patients with Pre-End-Stage Renal Disease in Pharmacist Outpatient Clinics  
 藥師門診提供末期腎臟病前期病人藥事服務之成效分析  
 吳惠如<sup>1,2</sup>, 黃柏堯<sup>1</sup>, 林瑛鈴<sup>1</sup>, 翁識勛<sup>1</sup>, 黃筱萍<sup>1</sup>, 陳秀珊<sup>1,2,3</sup>  
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<sup>3</sup>高雄醫學大學附設中和紀念醫院
- C050 Effect of Early Health Education in Single Center Nephrology Ward  
 單一醫療中心在腎臟內科病房早期對腎臟相關健康教育的效果  
 Huang, Chi-Feng<sup>1,2</sup> Pan, Chi-Feng<sup>1,2</sup> Lin Cheng-Jui<sup>1,2</sup>  
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## Electrolyte, Acid-Base, and Hypertension

Chair(s) : 孫樵隱/ Chiao-Yin Sun、李玟儀/ Wen-Yi Li

- C051 Association Between Sodium Bicarbonate usage and Major Kidney Events among Patients with Adult Polycystic Kidney Disease: A Cohort Study using TMUCRD  
遺傳性多囊腎病患者使用重碳酸氫鈉與重大腎臟疾病預後關係:TMUCRD 世代研究  
Yen-Chung Lin<sup>1,2</sup>, Yu-Wei Chen<sup>2,3</sup>, Chia-Te Liao<sup>2,3</sup>, Chih-Chin Kao<sup>1,2</sup>, Yi-Wen Wu<sup>1,2</sup>, Alex Phung Anh Nguyen<sup>2</sup>, Nuria Pastor-Soler<sup>4</sup>, Kenneth Hallows<sup>4</sup>, Jean Shih-Chen<sup>4</sup>, Vito Campesse<sup>4</sup>, Mai-Szu Wu<sup>2,3</sup>  
林彥仲<sup>1,2</sup>, 陳佑璋<sup>2,3</sup>, 廖家德<sup>2,3</sup>, 阮逢英<sup>2</sup>, 高治圻<sup>1,2</sup>, 吳逸文<sup>1,2</sup>, Nuria Pastor-Soler<sup>4</sup>, Kenneth Hallows<sup>4</sup>, Jean Shih-Chen<sup>4</sup>, Vito Campesse<sup>4</sup>, 吳麥斯<sup>2,3</sup>  
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- C052 Case Report: Hyponatramia and Inappropriate Secretion of Antidiuretic Hormone Associated with the Use of Imipramine  
使用 imipramine 相關的低鈉血症和抗利尿激素分泌異常症候群  
Tsung-Lin Yang, Chwei-shiun Yang  
楊宗霖, 楊垂勳  
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## Anemia, CKD-MBD, Nutrition, and Metabolism

Chair(s) : 孫樵隱/ Chiao-Yin Sun、李玟儀/ Wen-Yi Li

- C053 Relationships Between Indices of Arm Anthropometry, Bioimpedance, and Laboratory in Maintenance Hemodialysis Patients  
長期血液透析患者中臂人體測量學、生物阻抗及實驗室指標之間的關係  
Jenn Yeu Wang<sup>1,2,3,5,6</sup>, Shu-Chin Chen<sup>3,4</sup>, Ming-Chun Chiang<sup>6</sup>, Yuh-Feng Lin<sup>6,7</sup>, Betau Hwang<sup>2</sup>  
王震宇<sup>1,2,3,5,6</sup>, 陳淑琴<sup>3,4</sup>, 江明純<sup>6</sup>, 林裕峰<sup>6,7</sup>, 黃碧桃<sup>2</sup>  
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- C054 To Explore the Efficacy of Erythropoietin (EPO) in Treating Anemia in Hemodialysis Patients with Cancer  
探討紅血球生成素(EPO)於血液透析合併癌症病人貧血之療效  
Shu-Kuan Kuo<sup>1,2</sup>, Ching-Yi Yu<sup>1</sup>, Wen-Chin Lee<sup>1</sup>, Chien-Te Lee<sup>1,2</sup>  
郭淑冠<sup>1,2</sup>, 俞靜儀<sup>1</sup>, 李文欽<sup>1</sup>, 李建德<sup>1,2</sup>  
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腎臟科 內科部 <sup>1</sup>高雄長庚紀念醫院 <sup>2</sup>高雄市立鳳山醫院
- C055 The Effect of Nutritional Counseling on the Changes of Biochemical Indicators in Diabetes Patients with Kidney Disease  
營養衛教對糖尿病合併腎臟病病人生化指標之影響  
CH Lin<sup>1</sup>, LJT Lu<sup>2</sup>, YJ Lee<sup>3</sup>  
林佳璇<sup>1</sup>, 呂李仁慈<sup>2</sup>, 李洮俊<sup>3</sup>  
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- C056 The Association Between Wet Bulb Globe Temperature with Obesity Indices in A Large Taiwanese Population Study  
 在一大型台灣族群中，綜合溫度熱指數與肥胖指數的關聯性  
 Wei-Yu Su<sup>1,2,3</sup>, Ping-Hsun Wu<sup>2</sup>, Ming-Yen Lin<sup>2</sup>, Chih-Da Wu<sup>4</sup>, Szu-Chia Chen<sup>2,3</sup>, Yi-Wen Chiu<sup>2</sup>, Jer-Ming Chang<sup>2</sup>  
 蘇威宇<sup>1,2,3</sup>, 吳秉勳<sup>2</sup>, 林明彥<sup>2</sup>, 吳治達<sup>4</sup>, 陳思嘉<sup>2,3</sup>, 邱怡文<sup>2</sup>, 張哲銘<sup>2</sup>  
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- C057 Reduce The Incidence of Malnutrition in Peritoneal Dialysis Patients  
 降低腹膜透析病人營養不良發生率  
 曾淑慧, 李惠媛, 宋宜靜, 王立薇  
 佛教慈濟醫療財團法人花蓮慈濟醫院 腎臟內科
- C058 Mild Cognitive Disorder Correlated to Uremia Toxins from Gut in Patients with Chronic Kidney Disease  
 慢性腎臟病患者與腸道尿毒症毒素相關的輕度認知障礙  
 Chen-Mei Chang<sup>1</sup>, Hsun-Hua Lee<sup>3,4</sup>, Chien-Hung Lai<sup>5,6</sup>, Yen-Chung Lin<sup>1,2</sup>  
 張珍美<sup>1</sup>, 李薰華<sup>3,4</sup>, 賴建宏<sup>5,6</sup>, 林彥仲<sup>1,2</sup>  
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- C059 To Explore the Effectiveness of Regular Health Education for Diabetic Nephropathy Patients Using the Uremic Oral Sorbent Ast-120  
 探討使用尿毒症吸附劑的糖尿病腎病變病人定期衛教後之成效  
<sup>1</sup> 葉玟伶, <sup>2</sup> 林曉君  
<sup>1</sup> 童綜合醫療社團法人童綜合醫院營養治療科, <sup>2</sup> 童綜合醫療社團法人童綜合醫院護理部
- C060 Disproportionate Anemia in Chronic Kidney Disease Necessitates Screening for Multiple Myeloma  
 慢性腎臟病人的血色素異常低下宜鑑別多發性骨髓瘤  
 李欣恬, 吳紋綺, 楊智宇, 唐德成  
 臺北榮民總醫院

### **Anemia, CKD-MBD, Nutrition, and Metabolism**

Chair(s) : 林承叡/ Cheng-Jui Lin、吳家麟/ Chia-Lin Wu

- C061 Investigating the Role of Vitamin D in Arterial Stiffness Among Elderly Patients with Non-Dialysis-Dependent Chronic Kidney Disease  
 Y Dayma<sup>1</sup>, M Yaffe<sup>2</sup>  
<sup>1,2</sup> Department of Biology, Massachusetts of Technology, Cambridge, MA

- C062 High Ambient Air Ozone Exposure is Associated with Metabolic Syndrome in A Large Taiwanese Population Study  
在一項大型台灣人群研究，探討高環境空氣臭氧暴露與代謝症候群相關  
Jui-Hsin Chen<sup>1\*</sup>, Chiu-Yueh Chen<sup>1</sup>, Hsiu-Chin Mai<sup>1</sup>, Hao-Ping Wang<sup>2,3,4</sup>, Pei-Yu Wu<sup>2,3,4</sup>, Jiun-Chi Huang<sup>2,3,4</sup>, Szu-Chia Chen<sup>2,3,4</sup>  
陳瑞忻<sup>1\*</sup>, 陳秋月<sup>1</sup>, 麥秀琴<sup>1</sup>, 王皓平<sup>2,3,4</sup>, 吳珮瑜<sup>2,3,4</sup>, 黃俊祺<sup>2,3,4</sup>, 陳思嘉<sup>2,3,4</sup>  
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## Hemodialysis

Chair(s) : 林承勸/ Cheng-Jui Lin、吳家麟/ Chia-Lin Wu

- C063 Improve The Completeness Rate of Barcode Correspondence for Hemodialysis Treatment Equipment  
提升血液透析治療設備條碼對應之完整率  
Hui-Ting Liu, Tsui-Ling Lin, Ching-Wen Li  
劉蕙婷, 林翠玲, 李慶玟  
Department of Nursing, National Taiwan University Hospital, Taipei, Taiwan  
臺大醫院護理部
- C064 Factors Related to The Prevalence of Peripheral Arterial Disease in Routine Hemodialysis Patients in A Hospital in Southern Taiwan  
南部某醫院常規血液透析病患周邊動脈疾病盛行率之相關因素探討  
Ku-Chung Wang<sup>1</sup>, Te-Chuan Chen<sup>2</sup>, Meng-Hsueh Wu<sup>1</sup>, Shu-Kuan Kuo<sup>1</sup>, Yueh-Ting Lee<sup>1</sup>, Shang-Chin Liao<sup>1</sup>, Chien-Te Lee<sup>1</sup>  
王谷鐘<sup>1</sup>, 陳德全<sup>2</sup>, 吳孟學<sup>1</sup>, 郭淑冠<sup>1</sup>, 李岳庭<sup>1</sup>, 廖上智<sup>1</sup>, 李建德<sup>1</sup>  
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Division of Nephrology, Department of Medicine, Kaohsiung Chang Gung Memorial<sup>2</sup>  
高雄市立鳳山醫院-委託長庚醫療財團法人經營<sup>1</sup> 高雄長庚紀念醫院腎臟科<sup>2</sup>
- C065 Efficacy of Daptomycin Lock Therapy in the Treatment of Catheter-Related Bloodstream Infections in Hemodialysis Patients  
達托黴素封存療法在治療血液透析患者導管相關血流感染中的效果  
Tzu-Ying Chen<sup>1</sup>, Hong-Mou Shih<sup>1,2</sup>, Cheng-Jui Lin<sup>1,2</sup>, Yu-Wen Hsueh<sup>1</sup>  
陳姿穎<sup>1</sup>, 施宏謀<sup>1,2</sup>, 林承勸<sup>1,2</sup>, 薛祐文<sup>1</sup>  
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- C066 Uric Acid Associates with Arteriovenous Fistula Stenosis in Hemodialysis Patients  
尿酸濃度對血液透析病人動靜脈瘻管狹窄的影響  
Kai-Ni Lee<sup>1</sup>, Chien-An Chen<sup>1</sup>, Jia-Rong Lin<sup>1</sup>, Chiao-En Ko<sup>2</sup>  
李凱妮<sup>1</sup>, 陳建安<sup>1</sup>, 林佳蓉<sup>1</sup>, 葛蕎恩<sup>2</sup>  
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- C067 The New Flowchart of Hepatitis B Testing in Hemodialysis Patients  
血液透析病患 B 型肝炎檢測之新版流程  
Bei-Zhen Hsu<sup>1</sup>, Pin-Han Hsia<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Tyng-shiuan Gau<sup>1</sup>, Yi-Ting Chen<sup>2,3</sup>, Tung-Hung Su<sup>3,4</sup>, Chih-Kang Chiang<sup>2,3</sup>  
許倍甄<sup>1</sup>, 夏賓含<sup>1</sup>, 劉蕙婷<sup>1</sup>, 高廷瑄<sup>3</sup>, 陳怡婷<sup>2,3</sup>, 蘇東弘<sup>3,4</sup>, 姜至剛<sup>2,3</sup>  
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<sup>3</sup> 台大醫院內科部腎臟科 <sup>4</sup> 台大醫院內科部胃腸肝膽科
- C068 Improving Vascular Access Care Models during Dialysis to Reduce Catheter Dislodgment Events  
改善透析中血管通路照護模式以降低管路滑脫事件  
Ting-Chen Chang<sup>1</sup>, Jiu Yun Tian<sup>2</sup>, Tai Ching Fu<sup>3</sup>, Hsin Yi Wu<sup>4</sup>, Hsin Ling Tai<sup>5</sup>, Jung Fen Lee<sup>6</sup>  
張亭真<sup>1</sup>, 田久芸<sup>2</sup>, 傅苔菁<sup>3</sup>, 吳欣怡<sup>4</sup>, 戴辛翎<sup>5</sup>, 李榮芬<sup>6</sup>  
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台北榮民總醫院血液透析室
- C069 Using a Home Hemodialysis App to Care for a Middle-Aged Male with End-Stage Renal Disease Undergoing Initial Hemodialysis: A Nursing Experience  
運用居家透析 APP 照護一位中年男性末期腎病變初次行血液透析之護理經驗  
Hsiao-Lan Cheng  
鄭曉嵐  
三軍總醫院腎臟內科血液透析室
- C070 Determinants of Intra-graft Stenting in Hemodialysis Patients with Arteriovenous Grafts Under Routine Surveillance  
血液透析病患接受人工瘻管內支架置放之探討  
Tzu-Chen Lin<sup>1,4</sup>, Cheng-Chieh Yen<sup>2</sup>, Hung-Pin Tu<sup>5</sup>, Chiang-Pei Huang<sup>3</sup>, Tsung-Liang Ma<sup>2</sup>, Chih-Yen Hsiao<sup>2</sup>  
林慈珍<sup>1,4</sup>, 顏正杰<sup>2</sup>, 杜鴻賓<sup>5</sup>, 黃瓊珮<sup>3</sup>, 馬宗良<sup>2</sup>, 蕭志彥<sup>2</sup>  
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- C071 Blood Purification in Acute Liver Failure: A Case of Bongkreic Acid Poisoning  
急性肝衰竭中的血液淨化療法：米酵菌酸中毒案例報告  
Liu, Hou-Sheng<sup>1</sup>, Lu, Ang<sup>2</sup>, Wang, Han-En<sup>3</sup>  
劉厚昇<sup>1</sup>, 盧昂<sup>2</sup>, 王涵恩<sup>3</sup>  
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三軍總醫院內科部腎臟內科
- C072 Applying Empirical-Based Methods to Explore the Effectiveness of Vascular Exercise and Home Care for Dialysis Patients  
運用實證手法探討透析患者血管運動及居家照護之成效  
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- C073 The Abdominal Imaging Screening of Hemodialysis  
血液透析患者的腹部影像學篩檢  
Yeh Chen, Huai-Hsuan Chang, Yi-Hsiu Lin, Yu-Wen Chiu, Te-Hui Kuo  
陳燁, 張懷萱, 林怡秀, 邱郁雯, 郭德輝  
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- C074 Clinical Emergency Confirmation Methods for Suspected Artificial kidney Blood Leakage-- Experience Sharing from Regional Hospital  
疑似人工腎臟漏血之臨床緊急確認方式--地區醫院經驗分享  
Yi-Lin LIN, Chiu-Wen HUANG, Huan-Nung CHAO, Feng-Mei WU  
林怡伶, 黃秋雯, 趙桓農, 吳鳳美  
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漢銘基督教醫院 血液透析中心
- C075 Improves Dialysis Clearance Rate (Kt/V) of Hemodialysis Patients in a Medical Center-Based Hemodialysis Unit  
某醫學中心血液透析中心提升透析病人透析清除率(Kt/V)  
Yu-Ting Lin<sup>1</sup>, Tsui-Ling Lin<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Ching-Wen Lee<sup>1</sup>, Yi-Ting Chen<sup>2</sup>, Chih-Kang Chiang<sup>2</sup>  
林玉婷<sup>1</sup>, 林翠玲<sup>1</sup>, 劉蕙婷<sup>1</sup>, 李慶玟<sup>1</sup>, 陳怡婷<sup>2</sup>, 姜至剛<sup>2</sup>  
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<sup>1</sup> 台大醫院護理部 <sup>2</sup> 台大醫院內科部腎臟科
- C076 Establishing an Interprofessional Collaborative Practice Model to Improve Serum Albumin Levels in Maintenance Hemodialysis Patients  
建立跨領域團隊合作照護模式提升長期血液透析病患血清白蛋白數值  
R. M. Pan<sup>1\*</sup>, Y. L. Hsieh<sup>1</sup>, T. L. Lin<sup>1</sup>, H.T. Liu<sup>1</sup>, C. L. Chung<sup>2</sup>, Y.T. Chen<sup>3,4</sup>, C.C. Kang<sup>3,4</sup>  
潘若玟<sup>1\*</sup>, 謝易玲<sup>1</sup>, 林翠玲<sup>1</sup>, 劉蕙婷<sup>1</sup>, 鍾佳倫<sup>2</sup>, 陳怡婷<sup>3,4</sup>, 姜至剛<sup>3,4</sup>  
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- C077 Effects of Levocarnitine on Renal Anemia and Intradialytic Hypotension in Hemodialysis Patients  
肉鹼對血液透析病人腎性貧血及透析中低血壓的影響  
Huai-Hsuan Chang<sup>1</sup>, Yu-Wen Chiu<sup>1</sup>, Yi-Hsiu Lin<sup>1</sup>, Yeh-Chen<sup>1</sup>, Te-Hui Kan<sup>2</sup>  
張懷萱<sup>1</sup>, 邱郁雯<sup>1</sup>, 林怡秀<sup>1</sup>, 陳燁<sup>1</sup>, 郭德輝<sup>2</sup>  
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國立成功大學醫學院附設醫院 護理部<sup>1</sup> 內科部腎臟科<sup>2</sup>
- C078 The Actual Clinical Benefit of Pre-pump Arterial Pressure : An Example of a Medical Center in Northern Taiwan  
幫浦前動脈壓實際使用於臨床之效益---以北部的某醫學中心為例  
Tsui-Ling Lin<sup>1</sup>, Yi-Ling Hsieh<sup>1</sup>, Fong-Shung Huang<sup>2</sup>, Hui-Ting Liu<sup>1</sup>, Ching-Wen Lee<sup>1</sup>  
林翠玲<sup>1</sup>, 謝易玲<sup>1</sup>, 黃鳳雄<sup>2</sup>, 劉蕙婷<sup>1</sup>, 李慶玟<sup>1</sup>  
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<sup>2</sup> Department of Integrated Diagnostics & Therapeutics  
<sup>1</sup> 台大醫院護理部 <sup>2</sup> 台大醫院綜合診療部
- C079 Improvement of the Proportion of Adequate Dialysis in Hemodialysis Patients through the Implementation of Continuous Quality Improvement Projects  
導入連續品質改善計畫提升血液透析病人達適量透析比例  
Hsien-Ya Hsu, Hsuan-Ming Lin  
許雅賢, 林軒名  
臺南市立安南醫院-委託中國醫藥大學興建經營  
An Nan Hospital, China Medical University, Tainan, Taiwan

- C080 Using Cross-Team Intervention to Improve the Effectiveness of Fistula Care  
運用跨團隊介入提升瘻管照護成效  
Yu-Wen Chiu<sup>1,2</sup>, Huai-Hsuan Chang<sup>1,2</sup>, Yeh-Chen<sup>1,2</sup>, Yi-Hsiu Lin<sup>1,2</sup>, Te-Hui Kan<sup>1</sup>  
邱郁雯<sup>1,2</sup>, 張懷萱<sup>1,2</sup>, 陳燁<sup>1,2</sup>, 林怡秀<sup>1,2</sup>, 郭德輝<sup>1</sup>  
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## Hemodialysis

Chair(s) : 賴台軒/ Tai-Shuan Lai、楊如燁/ Ju-Yeh Yang

- C081 Experience of Caring for An Elderly Person Receiving Dialysis Treatment Due to Excessive Body Fluid Volume  
一位老年人因體液容積過量接受透析治療照護經驗  
Hung Chiu Ying\*, Chia-Hsiang Hsiao, Jui-Hsin Chen  
洪秋英\*, 蕭佳湘, 陳瑞忻  
Department of Nursing, Kaohsiung Municipal Siaogang Hospital, Kaohsiung Medical University,  
Kaohsiung Medical University Hospital  
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醫院 護理部<sup>1</sup>
- C082 Improve Patient Weight Accuracy Before and After Dialysis  
提升病人透析前後體重正確性  
邱咨華<sup>1</sup>, 簡珮芳<sup>1</sup>, 許雅詔<sup>1</sup>, 林惠真<sup>1</sup>, 洪蕙庭<sup>1</sup>, 陳瑞忻<sup>2</sup>  
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醫院 護理部護理師<sup>1</sup> 護理部護理長<sup>2</sup>
- C083 The Prevalence of Malnutrition and Frailty in Patients on Maintenance Hemodialysis: A Single  
Dialysis Unit Study  
黃柏諭<sup>1,2</sup>, 黃雅鈺<sup>3,4</sup>, 張雅萍<sup>5</sup>, 陳姿佑<sup>5</sup>, 蔡任弼<sup>1,6</sup>  
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濟醫療財團法人大林慈濟醫院營養治療科, <sup>4</sup>佛教慈濟醫療財團法人斗六慈濟醫院臨床營養  
組, <sup>5</sup>佛教慈濟醫療財團法人斗六慈濟醫院護理單位血液透析室, <sup>6</sup>慈濟大學醫學系
- C084 The Effectiveness of A Nursing Intervention Project on Improving The Manual Applying Pressure  
Rate to Own Fistula in Hemodialysis Patients  
護理改善專案介入後對提升血液透析病人徒手加壓瘻管率之成效  
Li-Shu Chiu<sup>1\*</sup>, pao-Hsuan Hsieh<sup>1</sup>, Chu-Yun Lai<sup>1</sup>, Fang-Yu Chang<sup>1</sup>, Hui-Chen Chang<sup>1</sup>,  
Chih-Hsien Lee<sup>2</sup>  
邱梨淑<sup>1\*</sup>, 謝寶萱<sup>1</sup>, 賴楚云<sup>1</sup>, 張芳瑜<sup>1</sup>, 張慧貞<sup>1</sup>, 李志賢<sup>2</sup>  
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<sup>2</sup> 童綜合醫療社團法人童綜合醫院 心臟血管外科
- C085 Single Center Experience of Plasmapheresis in A Rural Regional Hospital  
Yi-Hsi Lee, Ruei-Syuan Bai, Tsai-Kun Wu, Chang Hsu Chen, Paik-Seong Lim  
李怡錫, 白睿軒, 吳再坤, 陳昶旭, 林柏松  
Division of Renal Medicine, Department of Internal Medicine, Tungs' Taichung Metroharbour  
Hospital

- C086 The Performance of Taiwan National Health Insurance Reimbursement Criteria to Select Eligible Liver Failure Patients Treated with Molecular Adsorbent Recirculation System (MARS): A Retrospective Study  
台灣國民健康保險給付標準在篩選符合分子吸附再循環系統 (MARS) 治療的肝衰竭病人之表現：一項回顧性研究  
Joe Cheng-Chiao Yang<sup>1</sup>, Thomas Tao-Min Huang<sup>1</sup>, Hugh Chin-Hung Chang<sup>2</sup>, Chun-Fu Lai<sup>1</sup>, Chih-Kang Chiang<sup>1,3</sup>, Vin-Cent Wu<sup>1</sup>, Jenq-Wen Huang<sup>1</sup>  
楊程喬<sup>1</sup>, 黃道民<sup>1</sup>, 張進宏<sup>2</sup>, 賴俊夫<sup>1</sup>, 姜至剛<sup>1,3</sup>, 吳允升<sup>1</sup>, 黃政文<sup>1</sup>  
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- C087 Investigating the Prevalence and the Risk Factors of Clonal Hematopoiesis of Indeterminate Potential in Patients with Chronic Hemodialysis  
探討意義未明之克隆性造血在慢性血液透析病人之盛行率與危險因子  
Wei Wang<sup>1</sup>, Chien-Yuan Chen<sup>2</sup>, Shih-I Chen<sup>3</sup>, Chiung-Ying Huang<sup>3</sup>, Chih-Kang Chiang<sup>4,5</sup>, Yung-Ming Chen<sup>4</sup>, Shuei-Liong Lin<sup>4,6</sup>, Yu-Hsiang Chou<sup>4</sup>  
王瑋<sup>1</sup>, 陳建源<sup>2</sup>, 陳世宜<sup>3</sup>, 黃瓊瑩<sup>3</sup>, 姜至剛<sup>4,5</sup>, 陳永銘<sup>4</sup>, 林水龍<sup>4,6</sup>, 周鈺翔<sup>4</sup>  
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- C088 Care Experience of Hemodialysis Women Who Are Pregnant During COVID-19: A Case Report  
血液透析婦女於新冠肺炎期間懷孕之照護經驗：個案報告  
Chih-Yu Lin  
林芝仔  
員林基督教醫院血液透析室
- C089 Improvement of Human Factors Engineering for Treatment Personnel in Hemodialysis Room - Process Reengineering  
血液透析室治療人員作業人因工程改善-流程再造  
Chao-Ching Tseng, Shu-Kuan Kuo, Yueh -Ting Lee, Shang-Chih Liao, Chien-Te Lee  
曾昭卿, 郭淑冠, 李岳庭, 廖上智, 李建德  
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- C090 The Improvement Plan for Electronic Nursing Records of Hemodialysis  
血液透析電子化護理紀錄完整率之改善方案  
黃慧玲, 司雅玲, 林明慧, 黃百后, 鄧夢蘭  
國立台灣大學醫學院附設醫院新竹臺大醫院血液透析中心
- C091 Enhance the Effectiveness of Nursing Guidance for Patients Undergoing Initial Hemodialysis  
提升初期血液透析病人護理指導成效  
錢思怡<sup>1</sup>, 陳秋惠<sup>1</sup>, 黃慧玲<sup>1</sup>, 司雅玲<sup>1</sup>, 林明慧<sup>1</sup>, 黃百后<sup>2</sup>, 陳長江<sup>3</sup>  
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- C092 Uremic Toxin Level and Quality of Life of Switching from Hemodialysis to Expanded Hemodialysis: A Taiwan Controlled Intervention Study  
新式延展性血液透析術對尿毒分子、生活品質的影響  
Yi-Zhen Lu, Hong-Mou Shih, Pei-Chen Wu, Cheng-Jui Lin  
呂宜臻, 施宏謀, 吳培甄, 林承歡  
Division of Nephrology, Department of Internal Medicine, Mackay Memorial Hospital, Taipei, Taiwan  
馬偕紀念醫院 腎臟內科
- C093 Effect of Ice Compress on Improving Fistula Puncture Pain in Hemodialysis Patients  
冰敷改善血液透析病人瘻管穿刺疼痛之成效  
Chung yun-ling<sup>1</sup>, Tu chia-ling<sup>1</sup>, Chang chia-jane<sup>1</sup>, Shiu yu-ting<sup>1</sup>, Cheng hui-chuan<sup>2</sup>  
鍾昫玲<sup>1</sup>, 涂嘉玲<sup>1</sup>, 張佳珍<sup>1</sup>, 許鈺婷<sup>1</sup>, 鄭慧娟<sup>2</sup>  
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臺北榮民總醫院<sup>1</sup>護理師, <sup>2</sup>督導長
- C094 Can Aromatherapy Improve the Sleep Quality of Hemodialysis Patients?  
芳香療法可否改善血液透析病人睡眠品質?  
Pei-Chen Su, Hsin-Lin Peng  
蘇珮禎, 彭杏林  
Tri-Service General Hospital Nephrology  
三軍總醫院腎臟科
- C095 The Effectiveness of Nutritional Consultation for Hemodialysis Patients in Regional Hospital  
地區醫院血液透析患者營養會診成效分析  
黃雅鈺<sup>1,2</sup>, 張雅萍<sup>3</sup>, 黃若玫<sup>3</sup>, 黃振森<sup>4</sup>, 陳品汎<sup>5</sup>  
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- C096 Using Multiple Strategies to Improve the Incidence of Hyperphosphatemia in Hemodialysis Patients  
運用多元策略改善血液透析病人高血磷發生率  
侯杏榮<sup>1,2</sup>, 蘇祐瑩<sup>2</sup>, 蔡捷羽<sup>2</sup>, 鄭培毓<sup>2</sup>, 李昱元<sup>2</sup>  
<sup>1</sup>美和科技大學護理系健康照護研究所  
<sup>2</sup>屏基醫療財團法人屏東基督教醫院-血液透析室
- C097 Impact of Sodium Profiling on Nursing Workload and Hemodynamic Stability in Elderly Patients with Intradialytic Hypotension  
鈉濃度調控對護理工作負荷及高齡透析低血壓患者血行動力穩定的影響  
Hui-Chung Tsai<sup>1</sup>, Chiao-Jung Chen<sup>1</sup>, Ching-I Yu<sup>1</sup>, Wen-Chin Lee<sup>2</sup>, Jin-Bor Chen<sup>2</sup>  
蔡蕙鍾<sup>1</sup>, 陳嬌蓉<sup>1</sup>, 俞靜儀<sup>1</sup>, 李文欽<sup>2</sup>, 陳靖博<sup>2</sup>  
<sup>1</sup>高雄長庚紀念醫院血液透析室, <sup>2</sup>高雄長庚紀念醫院內科部腎臟科
- C098 Correlation between Bioimpedance Analysis and Clinical Assessment in Evaluation of Extracellular Fluid Volume in Patients on Chronic Maintenance Hemodialysis  
Trung Toan Duong<sup>2,3</sup>, Luan Kinh Le<sup>3</sup>, Alex P.A Nguyen<sup>2</sup>, Chia-Te Liao<sup>1</sup>  
<sup>1</sup>Taipei Medical University, Shuangho Hospital <sup>2</sup>Taipei Medical University <sup>3</sup>Cho Ray Hospital, Viet Nam
- C099 To Improve the Cleanliness of the Environment in the Hemodialysis Room by Applying Multiple Teaching Models  
運用多元教學模式提升血液透析室環境清潔成效探討  
Jheng, Pei-Yu, Su, You-Ying, Syu, Li-Wun, Syu, Shu-Jyun, Cai, Jie-Yu  
鄭培毓, 蘇祐瑩, 徐麗雯, 徐淑君, 蔡捷羽  
Pingtung Christian Hospital First Dialysis Room  
屏東基督教醫院第一洗腎室

- C100 Clinical Treatment and Effectiveness of Uremia Skin Itching  
尿毒症皮膚搔癢之臨床處置及成效  
Shan-Chiou Yang, Pao-Hua Wu, Jia-Yan Lee, Ching-I Yu, Yu-Shu Chien, Wun-Cin Lee  
楊善喬, 吳寶華, 李佳諺, 俞靜儀, 簡玉樹, 李文欽  
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## Hemodialysis

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- C101 Balloon-Assisted Maturation Accelerate Maturation of Arteriovenous Fistulae without Affecting Post-Maturation Patency  
球囊輔助促成術能加速動靜脈瘻管成熟而不影響成熟後的通暢度  
Chung-Kuan Wu<sup>1,2,3</sup>, Wei-Cheng Tseng<sup>4,5</sup>, Yen-Yang Chen<sup>6</sup>, Yu-Tong Yen<sup>6</sup>, Patrick Hung-Ju Kao<sup>6</sup>, Chia-Hsun Lin<sup>3,6</sup>  
吳重寬<sup>1,2,3</sup>, 曾偉誠<sup>4,5</sup>, 陳彥仰<sup>6</sup>, 顏羽彤<sup>6</sup>, 高弘儒<sup>6</sup>, 林佳勳<sup>3,6</sup>  
<sup>1</sup>新光吳火獅紀念醫院腎臟內科, <sup>2</sup>新光吳火獅紀念醫院透析血管通路管理中心, <sup>3</sup>輔仁大學醫學院, <sup>4</sup>台北榮民總醫院腎臟內科, <sup>5</sup>陽明交通大學醫學院, <sup>6</sup>新光吳火獅紀念醫院心臟血管外科
- C102 Combinations of Valvular Calcification and Serum Alkaline Phosphatase Predict Cardiovascular Risk Among End-Stage Kidney Disease Patients  
瓣膜鈣化與血清鹼性磷酸酶組合預測末期腎臟病患者的心血管風險  
Chia-Ter Chao<sup>1,2,3</sup>, Min-Tser Liao<sup>4</sup>, Chung-Kuan Wu<sup>5,6</sup>  
趙家德<sup>1,2,3</sup>, 廖敏策<sup>4</sup>, 吳重寬<sup>5,6</sup>  
<sup>1</sup>臺灣大學醫學院附設醫院腎臟科, <sup>2</sup>敏盛綜合醫院腎臟科, <sup>3</sup>臺灣大學醫學院毒理學所, <sup>4</sup>國軍桃園總醫院小兒科, <sup>5</sup>新光吳火獅紀念醫院腎臟內科, <sup>6</sup>輔仁大學醫學院
- C103 Continuous Aspirin Treatment Improves Cardiovascular Events and All-Cause Mortality in Hemodialysis Patients with Peripheral Artery Disease  
持續阿斯匹靈治療改善血液透析合併周邊動脈疾病患者的心血管事件及全因死亡率  
Chung-Kuan Wu<sup>1,2</sup>, Noi Yar<sup>3</sup>, Yun-Yi Chen<sup>4,5</sup>  
吳重寬<sup>1,2</sup>, Noi Yar<sup>3</sup>, 陳韻宜<sup>4,5</sup>  
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- C104 The Assessment of Physical Performance and Frailty in Patients undergoing Hemodialysis  
血液透析患者身體功能與虛弱評估  
Yueh-Ting Lee, Ching-Tan Cheng, Shu-Kuan Kuo, Hua-Rong Zhong, Shang-Chih Liao, Chien-Te Lee  
李岳庭, 鄭晶丹, 郭淑冠, 鍾華榮, 廖上智, 李建德  
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- C105 Reduce the Incidence of Falls Among Hemodialysis Patients  
降低血液透析病人跌倒發生率  
Hsiao-Chia Hui, Shu-Kuan Kuo, Yueh -Ting Lee, Shang-Chih Liao, Chien-Te Lee  
蕭家慧, 郭淑冠, 李岳庭, 廖上智, 李建德  
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- C106 Improve the Urea Reduction Ratio in Hemodialysis Patient  
提升血液透析病人尿素氮清除合格率  
Chiung-Wen Chang<sup>1</sup>, Yu-Ying Wu<sup>1</sup>, Ying-Chen Hung<sup>1</sup>, Wan-Yu Lu<sup>1\*</sup>, Kai-Ling Yang<sup>2</sup>, Huey-Liang Kuo<sup>2</sup>  
張瓊文<sup>1</sup>, 吳昱瑩<sup>1</sup>, 黃盈禎<sup>1</sup>, 呂婉玉<sup>1\*</sup>, 楊凱玲<sup>2</sup>, 郭慧亮<sup>2</sup>  
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- C107 Evaluation of the Effectiveness of Using FreeStyle Libre 2 (GCM) to Monitor Blood Glucose in Hemodialysis Patients with Type 2 Diabetes  
運用 FreeStyle Libre 2 (GCM) 監測血液透析合併第 2 型糖尿病病人血糖之成效評估  
Ho-Shin-Yi, Mei-Chi Lian, Yu-Ying Huang  
何欣怡, 連美琪, 黃玉瑩  
Nursing Department, Chung Ho Memorial Hospital, Kaohsiung Medical University  
高雄醫學大學附設中和紀念醫院護理部
- C108 Reducing the Incidence of Arteriovenous Fistula Percutaneous Trans-Luminal Angioplasty in Hemodialysis Patients  
降低血液透析病人動靜脈瘻管血管氣球擴張術發生率  
Shu-Chen Lee, Yu-Fen Ting, Shu-Kuan Kuo, Yueh -Ting Lee, Shang-Chih Liao, Chien-Te Lee  
李淑貞, 丁郁芬, 郭淑冠, 李岳庭, 廖上智, 李建德  
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- C109 Applying Multi-disciplinary Education Program to Improve Waste Classification Awareness and Implementation Rate Among Hemodialysis Patients and Their Families  
應用多元衛教提升血液透析病人及家屬的廢棄物分類認知及執行率  
Ying-Fan Huang, Chi-Ping Yeh, Nian-Yueh Wang, Shu-Kuan Kuo, Shu-Fen Su, Ching-I Yu,  
Chia-An Chou, Wei-Hung Kuo, Wen-Chin Lee  
黃映凡, 葉季萍, 王念悅, 郭淑冠, 蘇淑芬, 俞靜儀, 周嘉安, 郭韋宏, 李文欽  
Hemodialysis Center, Division of Nephrology, Kaohsiung Chang Gung Memorial Hospital  
高雄長庚紀念醫院腎臟科 血液透析室
- C110 Reduce the Anxiety Index of New Hemodialysis Patients about Duct Puncture  
降低血液透析新病人對瘻管穿刺之焦慮指數  
Shu-Chen Lee, Shu-Kuan Kuo, Yueh-Ting Lee, Shang-Chih Liao, Chien-Te Lee  
李淑貞, 郭淑冠, 李岳庭, 廖上智, 李建德  
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- C111 Using Innovative Interactive Nursing Guidance to Improve the Self-Management Care Project of Early Hemodialysis Patients  
運用創新式護理指導提升初期血液透析病人自我管理照護之專案  
Yu-Yun Wang, Ya-Feng Huang, Shu-Ping Huang  
王宥勻, 黃雅楓, 黃淑萍  
Kaohsiung Municipal Ta-Tung Hospital hemodialysis room  
高雄巿市立大同醫院 護理部血液透析室
- C112 Reduce the Arteriovenous Fistula Obstruction Rate in Dialysis Patients  
降低透析病人動靜脈瘻管阻塞率  
Huang Mei-Na<sup>1</sup>, Jhang Jing-Wun<sup>1</sup>, Yang Kai-ling<sup>2\*</sup>, Wang Jie-Sian<sup>2</sup>  
黃美娜<sup>1</sup>, 張競文<sup>1</sup>, 楊凱玲<sup>2\*</sup>, 王捷賢<sup>2</sup>  
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- C113 Identification of Gut Microbiome Signatures Linked to the Serotonin Pathway in Tryptophan Metabolism Among Hemodialysis Patients  
血液透析患者色氨酸代謝中與血清素途徑相關的腸道微菌特徵表現  
Ping-Hsun Wu<sup>1,2</sup>, Tien-Hsiang Kuo<sup>2</sup>, Po-Yu Liu<sup>3</sup>, Yi-Wen Chiu<sup>1,2</sup>, Yi-Ting Lin<sup>2,5</sup>, Mei-Chuan Kuo<sup>1,2</sup>  
吳秉勳<sup>1,2</sup>, 郭天祥<sup>2</sup>, 劉勃佑<sup>3</sup>, 邱怡文<sup>1,2</sup>, 林憶婷<sup>2,4</sup>, 郭美娟<sup>1,2</sup>  
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- C114 Reduce the Incidence of Coagulation with Continuous Renal Replacement Therapy  
降低連續性腎臟替代療法套組凝固發生率  
丁凡棋, 洪以貞, 蘇淑芬, 俞靜儀, 邱鼎育, 李文欽  
高雄長庚紀念醫院 內科部腎臟科
- C115 Evidence-Based Nursing Strategies for Thrombosis Prevention in Dialysis Vascular Access  
實證照護中的透析血管通路血栓預防策略探討  
Yi-Xuan Hsiao<sup>1</sup>, Ji-Jen Chen<sup>2</sup>, Tzu-Hsuan Tsao<sup>3</sup>, Hsin-Ling Tai<sup>4\*</sup>  
蕭翊熏<sup>1</sup>, 陳紀綦<sup>2</sup>, 曹紫宣<sup>3</sup>, 戴辛翎<sup>4\*</sup>  
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- C116 Impact of Insulin Dose Adjustment on Glycemic Control in Hemodialysis Patients with Type 2 Diabetes: Evidence-Based Nursing Recommendations  
調整胰島素劑量對血液透析合併第 2 型糖尿病患者血糖控制的影響與實證照護建議  
Zhu-Le Lin<sup>1</sup>, Jiu-Yun Tian<sup>2</sup>, Hsin-Ling Tai<sup>3\*</sup>  
林筑樂<sup>1</sup>, 田久芸<sup>2</sup>, 戴辛翎<sup>3\*</sup>  
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- C117 Evidence-Based Nursing Application of Chewing Gum for Reducing Thirst in Hemodialysis Patients  
探討血液透析病人咀嚼口香糖是否能改善口渴症狀的實證護理應用  
Chih-Hua Liu<sup>1</sup>, Jia-Yu Li<sup>2</sup>, Jih-Rou Yang<sup>3</sup>, Yi-Xuan Chen<sup>4</sup>, Min-Yu Li<sup>5</sup>, Hsin-Ling Tai<sup>6\*</sup>  
劉芝華<sup>1</sup>, 李家萬<sup>2</sup>, 楊芷嫻<sup>3</sup>, 陳憶萱<sup>4</sup>, 李敏仔<sup>5</sup>, 戴辛翎<sup>6\*</sup>  
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- C118 Efficacy of Taurolidine-Heparin Lock Solution in Reducing CRBSI in HD Patients  
使用 Taurolidine 與肝素封管技術降低血液透析導管感染的實證分析  
Zhu-Le Lin<sup>1</sup>, Yi-En Chen<sup>2</sup>, Yu-Chen Chen<sup>3</sup>, Po-Yu Zhan<sup>4</sup>, Yi-Tung Chen<sup>5</sup>, Hsin-Ling Tai<sup>6\*</sup>  
林筑樂<sup>1</sup>, 陳以恩<sup>2</sup>, 陳渝臻<sup>3</sup>, 詹博宇<sup>4</sup>, 陳一彤<sup>5</sup>, 戴辛翎<sup>6\*</sup>  
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- C119 Left-Sided Valvular Heart Diseases Predict Outcomes in Patients with End-Stage Renal Disease Receiving Hemodialysis  
左側瓣膜性心臟病預測末期腎病患者的預後  
Wan-Ching Lee<sup>1</sup>, Ying-Hwa Chen<sup>2,3</sup>, Fan-Yu Chen<sup>1,3</sup>, Szu-Yuan Li<sup>1,3</sup>, Chih-Yu Yang<sup>1,3</sup>, Shuo-Ming Ou<sup>1,3</sup>, Kuo-Hua Lee<sup>1,3</sup>, Ming-Tsun Tsai<sup>1,3</sup>, Chyong-Mei Chen<sup>4</sup>, Chih-Ching Lin<sup>1,3</sup>  
李宛靜<sup>1</sup>, 陳嬰華<sup>2,3</sup>, 陳範宇<sup>1,3</sup>, 黎思源<sup>1,3</sup>, 楊智宇<sup>1,3</sup>, 歐朔銘<sup>1,3</sup>, 李國華<sup>1,3</sup>, 蔡明村<sup>1,3</sup>, 陳瓊梅<sup>4</sup>, 林志慶<sup>1,3</sup>  
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- C120 Reduce the Rate of Acute Intra-Dialytic Complications Among Outpatient Dialysis Patients  
降低門診透析病患透析中發生急性合併症之比率  
Chen Hui Chen<sup>1</sup>, Ruei Yuan Yang<sup>2</sup>, Da Wei Lin<sup>2</sup>, Hsin Ya Tu<sup>1</sup>, Peilong Tshie<sup>1</sup>, Chang Hsiao Chien<sup>1</sup>  
陳惠貞<sup>1</sup>, 楊睿淵<sup>2</sup>, 林大維<sup>2</sup>, 塗馨雅<sup>1</sup>, 謝佩蓉<sup>1</sup>, 張曉芊<sup>1</sup>  
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## Hemodialysis

Chair(s) : 徐邦治/ Bang-Gee Hsu、張滋榮/ Horng-Rong Chang

- C121 Exploring Risk Factors and Preventive Strategies for Vascular Access Thrombosis in Hemodialysis Patients  
探討血液透析病人血管通路血栓形成的危險因子及預防策略  
Chen-Yu Ho<sup>1</sup>, Li-Hsuan Chen<sup>2</sup>, Yu-Hsin Wu<sup>3</sup>, Chia-Yi Lin<sup>4</sup>, Hsin-Ling Tai<sup>5\*</sup>  
何鎮宇<sup>1</sup>, 陳莉誼<sup>2</sup>, 吳予芯<sup>3</sup>, 林佳儀<sup>4</sup>, 戴辛翎<sup>5\*</sup>  
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- C122 Use of Lower Limb Exercise Training During Dialysis to Improve Sarcopenia in Hemodialysis Patients  
運用透析中下肢運動訓練改善血液透析病人肌少症  
周文婷, 徐麗雯, 陳欣琪, 徐淑君, 蘇祐瑩, 鄭培毓  
屏基醫療財團法人屏東基督教醫院-血液透析室
- C123 The Effectiveness of Applying Quality Control Circle Methods to Reduce Medication Administration Error Events in The Hemodialysis Room  
運用品管圈手法降低血液透析室常規針劑藥物漏打之給藥異常發生率  
Ya-Feng Huang<sup>1</sup>, Tung-Chiao Hsieh<sup>2</sup>, Yu-Yun Wang<sup>3</sup>, Pi-Jung Chen<sup>4</sup>, Hsiao-Ping Shih<sup>5</sup>  
黃雅楓<sup>1</sup>, 謝東喬<sup>2</sup>, 王宥勻<sup>3</sup>, 陳碧蓉<sup>4</sup>, 施曉萍<sup>5</sup>  
Kaohsiung Municipal Ta-Tung Hospital hemodialysis room  
高雄市立大同醫院 護理部血液透析室
- C124 Care Experience of A Patient with Chronic Renal Failure Undergoing Hemodialysis for the First Time  
一位慢性腎臟衰竭病人初次接受血液透析之照護經驗  
Huang Hsiang Ching, Wang Hsuan Hui  
黃香菁, 王宣惠  
高雄醫學大學附設中和紀念醫院 血液透析室
- C125 Nursing Experience of A Hemodialysis Patient with Peripheral Arterial Disease Receiving Re-Amputation  
照顧一位血液透析病人罹患周邊動脈疾病再次截肢之護理經驗  
Mu Jin Ru, Wang Hsuan Hui  
穆衿汝, 王宣惠  
高雄醫學大學附設中和紀念醫院 血液透析室

- C126 Trends in Vascular Access Occlusion in Hemodialysis: Insights from a Six-Year Experience at a Medical Center  
血液透析通路阻塞的長期趨勢分析：來自醫學中心的六年縱向經驗  
Zi-Cheng Huang<sup>1</sup>, Ying-Hsuan Lin<sup>2</sup>, Yu-Chun Lai<sup>2</sup>, Chieh-Hsin Huang<sup>2</sup>, Yu-Huan Chiu<sup>2</sup>, Wei-Ren Lin<sup>2</sup>, Chia-Chun Lee<sup>2</sup>, Te-Hui Kuo<sup>2</sup>, Chin-Chung Tseng<sup>2</sup>, Kuan-Hung Liu<sup>2</sup>  
黃子誠<sup>1</sup>, 林盈萱<sup>2</sup>, 賴昱鈞<sup>2</sup>, 黃絮歆<sup>2</sup>, 邱裕桓<sup>2</sup>, 林威任<sup>2</sup>, 李佳駿<sup>2</sup>, 郭德輝<sup>2</sup>, 曾進忠<sup>2</sup>, 劉冠宏<sup>2</sup>  
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- C127 Improve Long-Term Dialysis Catheter Patency Rate in Outpatient Hemodialysis Patients  
提升門診血液透析病人長期性透析導管通暢率  
Chang-Ming Fang, Fan-Ci Ting, Shu-Kuan Kuo, Ching-Yi Yu, Yu-Cheng Lai, Wen-Chin Lee  
張明芳, 丁凡棋, 郭淑冠, 俞靜儀, 賴育城, 李文欽  
Hemodialysis Unit, Division of Nephrology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital  
腎臟科 內科部 高雄長庚紀念醫院
- C128 Intermittent Pneumatic Compression of Upper Arm Vessels Significantly Beneficially in Maintaining Patency of Hemodialysis Arteriovenous Fistula  
間歇性上臂血管加壓顯著改善透析用動靜脈瘻管功能  
Po-Rong Tseng, Ming-Tso Yan  
曾柏榮, 顏銘佐  
Division of Nephrology, Cathay General Hospital  
國泰綜合醫院腎臟科
- C129 Did the Mode of Vancomycin Administration Reach the Therapeutic Effect in Hemodialysis Patients?  
血液透析患者萬古黴素給藥方式是否達到治療效果  
Yang, Yu-Ling<sup>1</sup>, Huang, Chi-Feng<sup>2,3</sup>  
<sup>1</sup> MacKay Memorial Hospital Tamsui Branch, Intensive Care Unit  
<sup>2</sup> MacKay Memorial Hospital Tamsui Branch, Department of Nephrology  
<sup>3</sup> MacKay Medical College, Department of Medicine
- C130 Serum Phenylacetylglutamine is A Potential Risk Factor for Aortic Stiffness in Patients with Chronic Hemodialysis  
血清苯乙醯谷氨醯胺濃度是血液透析患者中樞動脈硬度的潛在危險因子  
Hsiao-Teng Chang<sup>1</sup>, Yu-Li Lin<sup>1,2</sup>, Chih-Hsien Wang<sup>1,2</sup>, Yu-Hsien Lai<sup>1,2</sup>, Hung-Hsiang Liou<sup>3</sup>, Bang-Gee Hsu<sup>1,2</sup>  
張孝騰<sup>1</sup>, 林于立<sup>1,2</sup>, 王智賢<sup>1,2</sup>, 賴宇軒<sup>1,2</sup>, 劉宏祥<sup>3</sup>, 徐邦治<sup>1,2</sup>  
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- C131 Music Therapy as an Intervention for Depression Among Hemodialysis Patients: Clinical Implications and Outcomes  
音樂治療作為血液透析患者抑鬱的輔助療法：臨床效益分析  
You-Rong He<sup>1</sup>, Jiu-Yun Tian<sup>2</sup>, Hsin-Ling Tai<sup>3\*</sup>  
何侑蓉<sup>1</sup>, 田久芸<sup>2</sup>, 戴辛翎<sup>3\*</sup>  
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- C132 Reducing Arteriovenous Fistula Puncture Failure Rates in Hemodialysis Using Team Resource Management Techniques  
運用團隊資源管理手法降低血液透析動靜脈瘻管穿刺失敗率  
Yuan-Yang Hsu<sup>1,2</sup>, Hsin-Yu Liao<sup>1,2</sup>, Hsiao-Ting Liao<sup>1,2</sup>, Mei-Chen Chou<sup>1,2</sup>, Ya-Ping Chang<sup>1,2</sup>  
許鴛鴦<sup>1,2</sup>, 廖欣瑜<sup>1,2</sup>, 廖曉婷<sup>1,2</sup>, 周美珍<sup>1,2</sup>, 張雅萍<sup>1,2</sup>  
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<sup>1</sup>佛教斗六慈濟醫院護理單位血液透析 <sup>2</sup>佛教大林慈濟醫院護理部
- C133 Exploring the Learning Outcomes of Using a Multimodal Teaching Approach to Train Dialysis Nurses in Focused Ultrasound Skills  
運用多元教學模式培訓透析護理師重點式超音波導引穿刺技能之學習成效探討  
Wen-Feng Xu<sup>1,2</sup>, Nai-Chi Kuo<sup>1,2</sup>, Hsin-Yu Liao<sup>1,2</sup>, Ya-Ping Chang<sup>1,2</sup>  
許紋鳳<sup>1,2</sup>, 郭乃綺<sup>1,2</sup>, 廖欣瑜<sup>1,2</sup>, 陳姿佑<sup>1,2</sup>, 張雅萍<sup>1,2</sup>  
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- C134 Sharing Experiences in Predictive Care Through Various Strategies to Enhance the Safety of Hemodialysis Patients  
運用多元策略提高血液透析病人安全的預測性護理經驗分享  
Kun-Fong Su, Hsin-Ling Tai, Chiung-Yu Shih, Jung-Fen Lee  
Department of Nursing, Taipei Veterans General Hospital
- C135 Improvement Strategies for Bacterial Colony Count in Newly Established Reverse Osmosis Water System That Do Not Meet Standards  
新建 RO 水系統菌落數未符合規範之改善策略  
Yi-Chun Sung<sup>1</sup>, Li-Yun Chang<sup>2</sup>, Chiu-Hui Tsai<sup>3</sup>, Jia-Nian Wang<sup>3</sup>, Chia-Yin Lin<sup>4</sup>, Wen-Wei Tsai<sup>6</sup>, Yu-De Tsai<sup>5</sup>  
宋藝君<sup>1</sup>, 張立昫<sup>2</sup>, 蔡秋蕙<sup>3</sup>, 王嘉年<sup>3</sup>, 林家吟<sup>4</sup>, 蔡文偉<sup>6</sup>, 蔡毓德<sup>5</sup>  
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<sup>2</sup>高雄醫學大學附設高醫岡山醫院腎臟科主治醫師  
<sup>3</sup>高雄醫學大學附設高醫岡山醫院護理部血液透析室護理師  
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<sup>5</sup>高雄醫學大學附設高醫岡山醫院感染內科主治醫師  
<sup>6</sup>高雄醫學大學附設高醫岡山醫院工程事務室組長
- C136 Introduction of Standard Operating Procedure and Development of Specialty-Specific Technical Evaluation Mechanism in Hemodialysis Units Enhancing the Consistency of Nursing Care in "Verbal, Written, and Practical" Aspects  
血液透析單位導入標準作業流程制定專科性技術評核機制  
提升護理人員說、寫、作一致之照護品質  
劉玉倩<sup>1</sup>, 莊美楓<sup>1</sup>, 徐婉媛<sup>1</sup>, 郭伶雅<sup>1</sup>, 洪君怡<sup>1</sup>, 蘇映潔<sup>1</sup>, 陳珍緯<sup>1</sup>, 郭德輝<sup>2</sup>, 曾進忠<sup>2</sup>  
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## Peritoneal Dialysis and Telehealth

Chair(s) : 徐邦治/ Bang-Gee Hsu、張滋榮/ Horng-Rong Chang

- C137 Reduce the Incidence of Peritonitis in Peritoneal Dialysis Patients  
降低腹膜透析病人之腹膜炎發生率  
Pin-Han Hsia, Hui-Ting Liu, Ching-Wen Li  
夏賓含, 劉蕙婷, 李慶玟  
台大醫院護理部
- C138 Experience of Using Urokinase in Peritoneal Dialysis Relapsing Peritonitis  
Urokinase 運用於腹膜透析 Relapsing Peritonitis 之經驗  
蔣美蘭<sup>1</sup>, 陳琬君<sup>2</sup>  
屏東基督教醫院腹膜透析室
- C139 Use Diversified Education to Reduce the Incidence of Peritonitis in Peritoneal Dialysis  
運用多元化衛教以降低腹膜透析腹膜炎發生率  
卓秋萍<sup>1</sup>, 蔡淑朵, 藍珮瑛, 簡鈺瑛, 吳明月, 洪靜蘭, 方慧雅, 黃惠暄<sup>2</sup>, 王憲奕<sup>3</sup>  
奇美醫療財團法人奇美醫院<sup>1</sup>護理師<sup>2</sup>護理長<sup>3</sup>內科部副部長
- C140 Using Body Composition Analysis to Improve Fluid Overload in Peritoneal Dialysis Patients  
運用身體組成分析改善腹膜透析病人體液過多之成效  
盧尤娟<sup>1</sup>, 林彥君<sup>1</sup>, 何妙純<sup>1</sup>, 黃百后<sup>2</sup>  
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## Peritoneal Dialysis and Telehealth

Chair(s) : 周鈺翔/ Yu-Hsiang Chou、曾偉誠/ Wei-Cheng Tseng

- C141 Effectiveness of Using Decision Aids to Control Serum Phosphorus in Peritoneal Dialysis Patients  
運用決策輔助工具表於腹膜透析病人血磷控制之成效  
林彥君<sup>1</sup>, 盧尤娟<sup>1</sup>, 何妙純<sup>1</sup>, 黃百后<sup>2</sup>  
<sup>1</sup>台大醫院新竹台大分院 腹膜透析室護理師<sup>2</sup>台大醫院新竹台大分院 血液透析中心護理長
- C142 A Survey on Medical Attendance for Peritoneal Dialysis: A Case Study of a Medical Center in Northern Taiwan  
腹膜透析就醫情況調查：北部某醫學中心為例  
Jiu-Yun Tian<sup>1</sup>, Hui-Ping Hsiao<sup>2</sup>, Yi-Ching Chang<sup>3</sup>, Li-Chuan Chen<sup>4</sup>, Pei-Ying Chen<sup>5</sup>, Suh-Huey Ke<sup>6</sup>, Hui-Wen Kao<sup>7</sup>, Meei-Chyi Guo<sup>8</sup>, Hsin-Ling Tai<sup>9</sup>, Jung-Fen Lee<sup>10</sup>  
Department of Nursing, Taipei Veterans General Hospital, Taipei, Taiwan
- C143 Experience and Outcomes of Video Conferencing for Peritoneal Dialysis Visits  
腹膜透析視訊訪視經驗及成果分享  
Wan-Ru Liao<sup>1</sup>, Juei-Hsin Hsu<sup>1</sup>, Ching-I Cheng<sup>1</sup>, Shu-Neng Chueh<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Yi-Ting Chen<sup>2</sup>, Chih-Kang Chiang<sup>2</sup>, Jeng-Wen Huang<sup>3</sup>  
廖婉如<sup>1</sup>, 徐睿忻<sup>1</sup>, 鄭靜宜<sup>1</sup>, 闕淑能<sup>1</sup>, 劉蕙婷<sup>1</sup>, 陳怡婷<sup>2,3</sup>, 姜至剛<sup>2,3</sup>, 黃政文<sup>3</sup>  
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<sup>3</sup> Division of Nephrology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan  
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- C144 Analyzing Risk Factors and Prevention Strategies for Peritonitis in Elderly Peritoneal Dialysis Patients  
分析老年腹膜透析病患發生腹膜炎的危險因子及預防策略  
Chiu-Ping Liao<sup>1</sup>, Pin-Han Hsia<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Yi-Ting Chen<sup>2</sup>, Chih-Kang Chiang<sup>2</sup>  
廖秋萍<sup>1</sup>, 夏賓含<sup>1</sup>, 劉蕙婷<sup>1</sup>, 陳怡婷<sup>2</sup>, 姜至剛<sup>2</sup>  
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- C145 Care Experience in Assisting Peritoneal Dialysis Patients to Adapt to Hemodialysis  
協助腹膜透析病人適應血液透析之照護經驗  
Chia-Hsiang Hsiao, Jui-Hsin Chen  
蕭佳湘, 陳瑞忻  
Department of Nursing, Kaohsiung Municipal Siaogang Hospital, Kaohsiung Medical University,  
Kaohsiung Medical University Hospital  
高雄市立小港醫院(委託高雄醫學大學經營) 高雄醫學大學 高雄醫學大學附設中和紀念醫  
院 護理部
- C146 Clinical Efficacy of Daptomycin in Treating Peritoneal Dialysis-associated Peritonitis – Preliminary  
Clinical Insights  
Daptomycin 在治療腹膜透析相關腹膜炎之臨床療效-臨床初探研究  
Yu-Wen Chan<sup>1</sup>, Hong-Mou Shih<sup>1</sup>, Cheng-Jui Lin<sup>1,2,3</sup>  
詹毓文<sup>1</sup>, 施宏謀<sup>1</sup>, 林承歡<sup>1,2,3</sup>  
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- C147 Analysis of Hand Hygiene Awareness and Techniques Among Peritoneal Dialysis Patients  
腹膜透析病人手部衛生認知及技術現況調查  
Wan-RU Laio<sup>1</sup>, Woan-Jean Lin<sup>1</sup>, Chiu-Ping Liao<sup>1</sup>, Yu-Jun Zhan<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Yi-Ting Chen<sup>2</sup>,  
Chih-Kang Chiang<sup>2</sup>  
廖婉如<sup>1</sup>, 林琬真<sup>1</sup>, 廖秋萍<sup>1</sup>, 詹羽君<sup>1</sup>, 劉蕙婷<sup>1</sup>, 陳怡婷<sup>2</sup>, 姜至剛<sup>2</sup>  
<sup>1</sup>Department of Nursing, National Taiwan University Hospital, Taipei, Taiwan  
<sup>2</sup>Division of Blood purification, Department of Integrated Diagnostics & Therapeutics, National  
Taiwan University Hospital, Taipei, Taiwan
- C148 Using Board Game to Improve Peritoneal Dialysis Quality Care  
運用桌遊提升腹膜透析照護品質  
Li -Chuan kuo<sup>1</sup>, Ying-Wen Chi<sup>1</sup>, Pei-Chen Su<sup>1</sup>, Hsin-Lin Peng<sup>1</sup>  
郭琍娟<sup>1</sup>, 紀穎雯<sup>1</sup>, 蘇珮禎<sup>1</sup>, 彭杏林<sup>1</sup>  
Tri-Service General Hospital Nephrology  
三軍總醫院腎臟科
- C149 The Impact of Mortality Salience on Learning Attitudes of Peritoneal Dialysis Patients: A Terror  
Management Theory Perspective  
死亡突顯對腹膜透析病患學習態度之影響：恐懼管理理論之觀點  
Ying-Wen Chi<sup>1</sup>, Li-Chuan kuo<sup>1</sup>, Pei-Chen Su<sup>1</sup>, Hsin-Lin Peng<sup>1</sup>  
紀穎雯<sup>1</sup>, 郭琍娟<sup>1</sup>, 蘇珮禎<sup>1</sup>, 彭杏林<sup>1</sup>  
Tri-Service General Hospital Nephrology  
三軍總醫院腎臟科
- C150 Whether Evaluation of Dialysate Exchange Techniques Can Improve the Incidence of Peritonitis  
換液技術評值是否可以改善腹膜炎發生率  
Mei-Chih Hu\*, Lan-Yen Chen, Ching-Wei Wang, Yueh-Feng Tsai, Li-Chiung Yang,  
Ting-Yi Wang, Li-Hsueh Huang  
胡美枝\*, 陳蘭燕, 王景薇, 蔡岳峰, 楊麗瓊, 王婷翊, 黃麗雪  
Dialysis Center, Tainan Sin Lau Hospital, Tainan, Taiwan  
台南新樓醫院 透析中心
- C151 Improve the Qualification Rate of Serum Hemoglobin in Peritoneal Dialysis Patients  
提升腹膜透析病人血色素合格率  
Wen Pei-Chun<sup>1</sup>, Wang Shu-Ying<sup>1</sup>, Liao Chia-Ching<sup>1</sup>, Yang Kai-ling<sup>2</sup>, Wang I-kuan<sup>2</sup>, Lai  
Ping-Chin<sup>2</sup>  
溫珮均<sup>1</sup>, 王淑英<sup>1</sup>, 廖家靖<sup>1</sup>, 楊凱玲<sup>2</sup>, 王怡寬<sup>2</sup>, 賴彬卿<sup>2</sup>  
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- C152 Evidence-Based Investigation on the Role of Potassium Supplementation in the Prevention and Treatment of PD-Related Peritonitis  
 鉀離子補充對腹膜透析相關腹膜炎的預防與治療的實證探討  
 Tai-Kun Liao<sup>1</sup>, Yin-Chi Huang<sup>2</sup>, Shu-Chen Lin<sup>3</sup>, Hsin-Ling Tai<sup>4\*</sup>  
 廖泰昆<sup>1</sup>, 黃茵琪<sup>2</sup>, 林書甄<sup>3</sup>, 戴辛翎<sup>4\*</sup>  
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<sup>1,2,3,4</sup> 國立臺北護理健康大學護理系, <sup>4</sup>臺北榮總護理部
- C153 The Effectiveness of Tc-99m Peritoneal Scintigraphy and CT Peritoneal Radiography in the Diagnosis and Treatment of Mechanical Complications of Peritoneal Dialysis  
 探討 Tc-99m peritoneal scintigraphy 與 CT peritoneal radiography 於腹膜透析機械性合併症診斷治療之成效  
 Pei-Jung Wu<sup>1</sup>, Hsueh-Chi Chou<sup>1</sup>, Mei-Hsien Wu<sup>1</sup>, Hui-Ying Lin<sup>1</sup>, Hsin-Chun Tsai<sup>1</sup>, Yung-chu Yang<sup>1</sup>, Hsiu-Lien Hsu<sup>1</sup>, Jing-Wen Wang<sup>1</sup>, Chen-Wei Chen<sup>1</sup>, Chia-Chun Lee<sup>2</sup>, Chin-Chung Tseng<sup>2</sup>, Jo-Yen Chao<sup>2</sup>  
 吳佩蓉<sup>1</sup>, 周雪琦<sup>1</sup>, 吳美賢<sup>1</sup>, 林惠瑛<sup>1</sup>, 蔡幸鏞<sup>1</sup>, 楊詠筑<sup>1</sup>, 徐秀蓮<sup>1</sup>, 王淨紋<sup>1</sup>, 陳珍緯<sup>1</sup>, 李佳駿<sup>2</sup>, 曾進忠<sup>2</sup>, 趙若雁<sup>2</sup>  
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- C154 Quality Improvement to Reduce the Average Time for per-Visit Preparations in Peritoneal Dialysis  
 縮短腹膜透析回診前置作業平均時間之品質改善  
 Wan-Chen Chang<sup>1</sup>, Chia-Hsin Chen<sup>1</sup>, Hsiao-Chuan Fang<sup>1</sup>, Shu-Li Yuan<sup>1</sup>, Chiu-Kuei Chen<sup>1</sup>, Wei-Chuan Huang<sup>1</sup>, Chiang-Pei Huang<sup>1</sup>, Hsiag-Chun Chen<sup>1</sup>, Yueh-Han Hsu<sup>2</sup>  
 章婉真<sup>1</sup>, 陳佳歆<sup>1</sup>, 方曉娟<sup>1</sup>, 袁淑麗<sup>1</sup>, 陳秋桂<sup>1</sup>, 黃薇娟<sup>1</sup>, 黃瓊珮<sup>1</sup>, 陳香君<sup>1</sup>, 徐約翰<sup>2</sup>  
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 戴德森醫療財團法人嘉義基督教醫院 腹膜透析室<sup>1</sup> 腎臟科<sup>2</sup>
- C155 Home Visits are Associated with Peritonitis  
 居家訪視與腹膜炎相關性  
 Lan-yen Chen<sup>1\*</sup>, Mei-chih Hu<sup>1</sup>, Ting-Yi Wang<sup>1</sup>, Li-chiung Yang<sup>1</sup>, Yueh-Feng Tsai<sup>1</sup>, Li-Hsueh Huang<sup>1</sup>, Ching-Wei Wang<sup>1</sup>  
 陳蘭燕<sup>1\*</sup>, 胡美枝<sup>1</sup>, 王婷翊<sup>1</sup>, 楊麗瓊<sup>1</sup>, 蔡岳峰<sup>1</sup>, 黃麗雪<sup>1</sup>, 王景薇<sup>1</sup>  
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- C156 Encapsulating Peritoneal Sclerosis Outcomes: Significance of the Nutritional Parameter Variations  
 營養狀況對腹膜硬化症的預後影響  
 Chih-Ying Chien<sup>1</sup>, Jinn-Yang Chen<sup>1,2</sup>, Chiao-Lin Chuang<sup>2,3</sup>, Ming-Tsun Tsai<sup>1,2</sup>, Szu-Yuan Li<sup>1,2</sup>, Chih-Ching Lin<sup>1,2</sup>  
 簡志穎<sup>1</sup>, 陳進陽<sup>1,2</sup>, 莊喬琳<sup>2,3</sup>, 蔡明村<sup>1,2</sup>, 黎思源<sup>1,2</sup>, 林志慶<sup>1,2</sup>  
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<sup>3</sup>Division of General Medicine, Department of Internal Medicine, Taipei Veterans General Hospital, Taipei, Taiwan  
 台北榮總腎臟科

- C157 Microbiologic Analysis of Peritoneal Dialysis-Related Peritonitis in Cathay General Hospital: A Single Medical Center Experience  
國泰醫院腹膜透析相關腹膜炎菌種分析:單一醫學中心經驗  
傅俊霖, 顏銘佐, 蔡仲敏, 蔡慧玲  
Cathay General Hospital  
國泰醫院
- C158 Peritoneal Dialysis in Acute Coronary Syndrome with Pulmonary Edema: A Single-Center Retrospective Analysis of Clinical Feasibility  
急性冠心症患者合併肺水腫之腹膜透析治療-單中心可行性分析  
YB Chern<sup>1</sup>, SY Hung<sup>2,3</sup>, YC Lee<sup>2,3</sup>  
陳彥伯<sup>1</sup>, 洪士元<sup>2,3</sup>, 李宜哲<sup>2,3</sup>  
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- C159 The Potential Causes of Hypoalbuminemia in Peritoneal Dialysis Patients – A Cross-Sectional Study in A Medical Center in Southern Taiwan  
腹膜透析病患白蛋白低下之潛在原因分析:一南臺灣醫學中心之橫斷性研究  
Kuan-Chiao Huang, Chia-Chun Lee, Kuan-Hung Liu, Yu-Tzu Chang, Te-Hui Kuo, An-Bang Wu, Tsai-Chieh Ling, Chih-Hen Yu, Wei-Ren Lin, Junne-Ming Sung, Ming-Cheng Wang, Chin-Chung Tseng, Jo-Yen Chao  
黃冠喬, 李佳駿, 劉冠宏, 張育誌, 郭德輝, 吳安邦, 凌采潔, 余志恆, 林威任, 宋俊明, 王明誠, 曾進忠, 趙若雁  
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成大醫院內科部腎臟科
- C160 Analysis of A Nurse-Provided On-Call Peritoneal Dialysis Support – Experience from A Medical Center in Southern Taiwan  
南部某醫學中心腹膜透析緊急事件呼叫之現況分析  
Hsin-Chun Tsai<sup>1</sup>, Hsueh-Chi Chou<sup>1</sup>, Pei-Jung Wu<sup>1</sup>, Mei-Hsien Wu<sup>1</sup>, Hui-Ying Lin<sup>1</sup>, Yung-Chu Yang<sup>1</sup>, Hsiu-Lien Hsu<sup>1</sup>, Jing-Wen Wang<sup>1</sup>, Chen-Wei Chen<sup>1</sup>, Chin-Chung Tseng<sup>2</sup>, Ming-Cheng Wang<sup>2</sup>, Jo-Yen Chao<sup>2</sup>  
蔡幸鏗<sup>1</sup>, 周雪琦<sup>1</sup>, 吳佩蓉<sup>1</sup>, 吳美賢<sup>1</sup>, 林惠瑛<sup>1</sup>, 楊詠筑<sup>1</sup>, 徐秀蓮<sup>1</sup>, 王淨紋<sup>1</sup>, 陳珍緯<sup>1</sup>, 曾進忠<sup>2</sup>, 王明誠<sup>2</sup>, 趙若雁<sup>2</sup>  
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### Peritoneal Dialysis and Telehealth

Chair(s) : 洪思群/ Szu-Chun Hung、陳怡婷/ Yi-Ting Chen

- C161 Comparisons of Clinical Outcomes of Peritoneal Dialysis Patients Before and After Using Remote Patient Monitoring System  
腹膜透析病人使用遠端監測 RPM-APD 前後之臨床結果概況比較  
Hsueh-Chi Chou<sup>1</sup>, Wang-Jing Wen<sup>1</sup>, Pei-Jung Wu<sup>1</sup>, Mei-Hsien Wu<sup>1</sup>, Hui-Ying Lin<sup>1</sup>, Hsin-Chun Tsai<sup>1</sup>, Yung-Chu Yang<sup>1</sup>, Hsiu-Lien Hsu<sup>1</sup>, Chen-Wei Chen<sup>1</sup>  
Chin-Chung Tseng<sup>2</sup>, Jo-Yen Chao<sup>2</sup>  
周雪琦<sup>1</sup>, 王淨紋<sup>1</sup>, 吳佩蓉<sup>1</sup>, 吳美賢<sup>1</sup>, 林惠瑛<sup>1</sup>, 蔡幸鏗<sup>1</sup>, 楊詠筑<sup>1</sup>, 徐秀蓮<sup>1</sup>, 陳珍緯<sup>1</sup>, 曾進忠<sup>2</sup>, 趙若雁<sup>2</sup>  
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- C162 Experience in Caring for Peritoneal Dialysis Hernia Patients in A Medical Center in Southern District  
南區某醫學中心腹膜透析疝氣病人之照護經驗  
Yung-chu Yang<sup>1</sup>, Hsueh-Chi Chou<sup>1</sup>, Pei-Jung Wu<sup>1</sup>, Mei-Hsien Wu<sup>1</sup>, Hui-Ying Lin<sup>1</sup>, Hsin-Chun Tsai<sup>1</sup>, Hsiu-Lien Hsu<sup>1</sup>, Jing-Wen Wang<sup>1</sup>, Chen-Wei Chen<sup>1</sup>, Chin-Chung Tseng<sup>2</sup>, Jo-Yen Chao<sup>2</sup>, An-Bang Wu<sup>2</sup>  
楊詠筑<sup>1</sup>, 周雪琦<sup>1</sup>, 吳佩蓉<sup>1</sup>, 吳美賢<sup>1</sup>, 林惠瑛<sup>1</sup>, 蔡幸鏞<sup>1</sup>, 徐秀蓮<sup>1</sup>, 王淨紋<sup>1</sup>, 陳珍緯<sup>1</sup>, 曾進忠<sup>2</sup>, 趙若雁<sup>2</sup>, 吳安邦<sup>2</sup>  
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- C163 Case Discussion of Intra-Abdominal Catheter Disconnection in A Peritoneal Dialysis Patient  
一位腹膜透析病人腹腔內斷管案例討論  
徐秀蓮<sup>1</sup>, 周雪琦<sup>1</sup>, 吳佩蓉<sup>1</sup>, 吳美賢<sup>1</sup>, 林惠瑛<sup>1</sup>, 蔡幸鏞<sup>1</sup>, 楊詠筑<sup>1</sup>, 王淨紋<sup>1</sup>, 陳珍緯<sup>1</sup>, 曾進忠<sup>2</sup>, 趙若雁<sup>2</sup>, 吳安邦<sup>2</sup>  
Hsiu-Lien Hsu<sup>1</sup>, Hsueh-Chi Chou<sup>1</sup>, Pei-Jung Wu<sup>1</sup>, Mei-Hsien Wu<sup>1</sup>, Hui-Ying Lin<sup>1</sup>, Hsin-Chun Tsai<sup>1</sup>, Yung-Chu Yang<sup>1</sup>, Jing-Wen Wang<sup>1</sup>, Chen-Wei Chen<sup>1</sup>, Chin-Chung Tseng<sup>2</sup>, Jo-Yen Chao<sup>2</sup>, An-Bang Wu<sup>2</sup>  
國立成功大學醫學院附設醫院 <sup>1</sup>護理部、<sup>2</sup>內科部腎臟科  
<sup>1</sup>Department of Nursing; <sup>2</sup>Division of Nephrology, Department of Internal Medicine; National Cheng Kung University Hospital, Tainan, Taiwan
- C164 Making Good Use of Video Media for Remote Health Education to Reduce the Incidence of Peritonitis in Patients on Peritoneal Dialysis  
善用視訊媒體遠端衛教以降低腹膜透析病人腹膜炎發生率  
Lin, Yin-Jin<sup>1</sup>, Chi, Po-Jui<sup>2</sup>  
林吟錦<sup>1</sup>, 紀伯叡<sup>2</sup>  
Peritoneal Dialysis Team Leader, E-DA Dachang Hospital、Director of Nephrology Department, E-DA Dachang Hospital  
義大大昌醫院腹膜透析組長<sup>1</sup>, 義大大昌醫院腎臟科主任<sup>2</sup>

### **Kidney Transplantation and Regeneration**

Chair(s) : 洪思群/ Szu-Chun Hung、陳怡婷/ Yi-Ting Chen

- C165 Clinical Effects of Belatacept in Kidney Transplant Recipients: Evidence-Based Nursing Considerations  
Belatacept 對腎移植患者的臨床效果及護理實證探討  
Yu-Zhen Lai<sup>1</sup>, Chi-Shiuan Liu<sup>2</sup>, Yun-Ling Liang<sup>3</sup>, Hsin-Ling Tai<sup>4\*</sup>  
賴鈺臻<sup>1</sup>, 劉騏萱<sup>2</sup>, 梁耘綾<sup>3</sup>, 戴辛翎<sup>4\*</sup>  
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<sup>4</sup> Department of Nursing, Taipei Veterans General Hospital  
<sup>1,2,3,4</sup> 國立台北護理健康大學護理系, <sup>4</sup>臺北榮總護理部
- C166 Increased Serum Indoxyl Sulfate Level is A Risk Factor for Aortic Stiffness in Patients with Kidney Transplantation  
血清硫酸吲哚酚濃度升高是腎臟移植患者中樞動脈硬度的危險因子  
Yu-Chi Chang<sup>1</sup>, Hsiao-Hui Yang<sup>2,3</sup>, Yen-Cheng Chen<sup>2,3</sup>, Bang-Gee Hsu<sup>1,2</sup>  
張宇祺<sup>1</sup>, 楊筱惠<sup>2,3</sup>, 陳言丞<sup>2,3</sup>, 徐邦治<sup>1,2</sup>  
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## **Pediatric, Geriatric, Hospice, and Other Nephrology**

Chair(s) : 洪思群/ Szu-Chun Hung、陳怡婷/ Yi-Ting Chen

- C167 Using Cross-Team Shared Care of Home Hospice Care to Help End-Stage Peritoneal Dialysis Patients Good Death  
運用跨團隊共照協助末期腹膜透析病患居家安寧善終  
何妙純<sup>1</sup>, 林彥君<sup>1</sup>, 盧尤娟<sup>1</sup>, 黃百后<sup>2</sup>  
<sup>1</sup>台大醫院新竹台大分院 腹膜透析室護理師 <sup>2</sup>台大醫院新竹台大分院 血液透析中心護理長
- C168 Patient Attitudes Toward End-of-Life Preference: DNR and Hospice Care in End-Stage Renal Disease  
末期腎病患者對生命末期治療偏好的態度：DNR 和安寧療護  
Kuo, Chan Shiuian<sup>1,2</sup>, Lee, Shiu-yu C. Katie<sup>2</sup>, Lai, Chun-Fu<sup>3</sup>, Min-Ling Wang<sup>1</sup>, Hui-Ting Liu<sup>1</sup>, Ching-Wen Lee<sup>1</sup>, Chih-Kang Chiang<sup>3</sup>, Jenq-Wen Huang<sup>3</sup>  
<sup>1</sup> Department of Nursing, National Taiwan University Hospital, <sup>2</sup> Department of School of Nursing, National Taipei University of Nursing and Health Science <sup>3</sup> Department of Department of Internal Medicine, National Taiwan University Hospital
- C169 Improving a Friendly Dialysis Environment for Elderly Dalysis Patients  
提升高齡透析病人友善之透析環境  
Wen-Lien Fang, Shu-Kuan Kuo, Yueh -Ting Lee, Shang-Chih Liao, Chien-Te Lee  
方文蓮, 郭淑冠, 李岳庭, 廖上智, 李建德  
Hemodialysis Unit, Division of Nephrology, Department of Internal Medicine, Kaohsiung Municipal Feng Shan Hospital-Under the management of Chang Gung Medical Foundation  
血液透析室 腎臟科 內科部 高雄市立鳳山醫院(委託長庚醫療財團法人經營)
- C170 Analysis of the Current Status of Case Management for Chronic Kidney Disease Patients Transitioning to Palliative Care  
慢性腎臟病人個案管理結案進入安寧緩和照護現況分析  
Pei-Lin Lin<sup>1</sup>, Chih-Ying Huang<sup>1</sup>, Ping-Fang Chiu<sup>2</sup>, Chih-Hao Lin<sup>3</sup>  
林沛伶<sup>1</sup>, 黃智英<sup>1</sup>, 邱炳芳<sup>2</sup>, 林志豪<sup>3</sup>  
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- C171 Risk Assessment of Urinary Tract Stones in Patients with Spinal Cord Injury: A Retrospective Cohort Study in Taiwan  
Kuo-Ting Chang<sup>1,5</sup>, Mei-Hua Cheng<sup>2</sup>, Shu-O Chiang<sup>3</sup>, Wei-Jie Wang<sup>4,5</sup>  
<sup>1</sup>Translational Medicine Center, Taoyuan General Hospital, Ministry of Healthy and Welfare, Taoyuan, Taiwan  
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<sup>3</sup>ESTAT Statistical Consulting Co., Ltd., Taipei, Taiwan  
<sup>4</sup>Division of Nephrology, Department of Internal Medicine, Taoyuan General Hospital, Ministry of Healthy and Welfare, Taoyuan, Taiwan  
<sup>5</sup>Department of Biomedical Engineering, Chung Yuan Christian University, Chungli, Taiwan

## **Infection Control and Vaccination in Kidney Diseases**

Chair(s) : 洪思群/ Szu-Chun Hung、陳怡婷/ Yi-Ting Chen

- C172 Factors Associated with Immune Humoral Response Following Receipt of a COVID-19 Vaccine among Patients Undergoing Dialysis  
透析病人接種新冠疫苗後免疫體液反應相關因素分析  
Wan-Chuan Tsai, Ju-Yeh Yang, Hon-Yen Wu, Yen-Ling Chiu, Mei-Fen Pai, Kuei-Ting Tung, Kai-Hsiang Shu, Shih-Ping Hsu, Yu-Sen Peng  
蔡萬全, 楊如燁, 吳泓彥, 邱彥霖, 白玫芬, 董奎廷, 徐愷翔, 徐世平, 彭渝森  
Division of Nephrology, Department of Internal Medicine, Far Eastern Memorial Hospital  
亞東紀念醫院腎臟內科

- C173 Immune Humoral Response and Breakthrough COVID-19 Infection Disease Severity Following Reception of COVID-19 Vaccines among Patients Undergoing Dialysis  
 探討透析患者接種新冠疫苗後的免疫體液反應及突破性感染後疾病嚴重度  
Po-Ting Chen<sup>1</sup>, Mei-Fen Pai<sup>2</sup>, Kuei-Ting Tung<sup>2</sup>, Hon-Yen Wu<sup>2</sup>, Yen-Ling Chiu<sup>2</sup>, Ju-Yeh Yang<sup>2</sup>, Kai-Hsiang Shu<sup>2</sup>, Shih-Ping Hsu<sup>2</sup>, Yu-Sen Peng<sup>2</sup>, Wan-Chuan Tsai<sup>2</sup>  
 陳柏廷<sup>1</sup>, 白玫芬<sup>2</sup>, 董奎廷<sup>2</sup>, 吳泓彥<sup>2</sup>, 邱彥霖<sup>2</sup>, 楊如燁<sup>2</sup>, 徐愷翔<sup>2</sup>, 徐世平<sup>2</sup>, 彭渝森<sup>2</sup>, 蔡萬全<sup>2</sup>  
<sup>1</sup>Department of Internal Medicine, <sup>2</sup>Division of Nephrology, Far Eastern Memorial Hospital  
<sup>1</sup> 亞東紀念醫院內科部, <sup>2</sup> 亞東紀念醫院腎臟內科
- C174 Analysis of the Current Status of Latent Tuberculosis Prevention and Treatment Strategies in Outpatient Hemodialysis Patients  
 門診血液透析病人潛伏性肺結核防治與治療策略現狀分析  
Long-Nu Chen, Shu-Kuan Kuo, Ching-Tan Cheng, Yueh -Ting Lee, Shang-Chih Liao, Chien-Te Lee  
 陳龍女, 郭淑冠, 鄭經丹, 李岳庭, 廖上智, 李建德  
 Hemodialysis Unit, Division of Nephrology, Department of Internal Medicine, Kaohsiung Municipal Feng Shan Hospital-Under the management of Chang Gung Medical Foundation  
 血液透析室 腎臟科 內科部 高雄市立鳳山醫院(委託長庚醫療財團法人經營)
- C175 Dysregulated Immunity and Wound Microbiota Interactions are Associated with Outcomes of Diabetic Foot Syndrome in Chronic Kidney Disease Stage 4-5D Patients  
 慢性腎臟病第4至5D期病人的免疫失調與糖尿病足症候群傷口微生物群相之間的交互作用和其預後相關  
Yu-Tsung Yin<sup>1</sup>, Tsung-Lin Lee<sup>1</sup>, Cai-Mei Zheng<sup>1,2</sup>, Chu-Lin Chou<sup>2,3</sup>, Yung-Ho Hsu<sup>2,4</sup>, Mai-Szu Wu<sup>1,2</sup>, Chia-Te Liao<sup>1,2</sup>  
 尹玉聰<sup>1</sup>, 李宗霖<sup>1</sup>, 鄭彩梅<sup>1,2</sup>, 鄒居霖<sup>2,3</sup>, 許永和<sup>2,4</sup>, 吳麥斯<sup>1,2</sup>, 廖家德<sup>1,2</sup>  
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- C176 Effect of Circadian Rhythms on COVID-19 Vaccine Efficacy in Hemodialysis Patients  
 晝夜節律對血液透析患者新型冠狀病毒疫苗免疫效能的影響  
 Ching-Chiao Huang, Tsai-Chieh Ling, Chia-Lin Wu, Chien-Yao Sun, Wei-Ren Lin, Chieh-Hsin Huang, Yu-Tzu Chang  
 黃靖喬, 凌采潔, 吳嘉玲, 孫健耀, 林威任, 黃潔歆, 張育誌  
 Department of Internal Medicine, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University

## Artificial Intelligence, Digital Health, and Data Science

Chair(s) : 洪思群/ Szu-Chun Hung、陳怡婷/ Yi-Ting Chen

- C177 Preliminary Evaluation of Generative AI Assistance in Clinical Nephrology: Assessing ChatGPT-4, Gemini Pro, and Bard in Patient Interaction and Renal Biopsy Interpretation  
Jau-Fong Huang<sup>1</sup>, Shih-Yi Lin<sup>1,2</sup>, Chang-Cheng Jiang<sup>1,2</sup>, Kin-Man Law<sup>3</sup>, Ying-Yu Hsu<sup>4</sup>, Pei-Chun Yeh<sup>5</sup>, Huey-Liang Kuo<sup>1,2</sup>, Shu-Woei Ju<sup>1,2</sup>, Chia-Hung Kao<sup>5,6</sup>.  
黃兆逢<sup>1</sup>, 林詩怡<sup>1,2</sup>, 江長城<sup>1,2</sup>, 羅建文<sup>3</sup>, 徐英祐<sup>4</sup>, 葉佩純<sup>5</sup>, 郭慧亮<sup>1,2</sup>, 朱書緯<sup>1,2</sup>, 高嘉鴻<sup>5</sup>.  
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<sup>6</sup> Department of Nuclear Medicine and PET Center, China Medical University Hospital, Taichung, Taiwan  
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- C178 Nursing Experience for Using Smart Medicine Care of Hemodialysis Patients Taking Low-Dose <sup>131</sup>I  
運用智慧科技照護服用碘 131 血液透析病人之護理經驗  
Sin-Ru Chai<sup>1</sup>, Hsin-Lin Peng<sup>2</sup>  
柴馨茹<sup>1</sup>, 彭杏林<sup>2</sup>  
Tri-Service General Hospital Nephrology  
三軍總醫院腎臟內科
- C179 Assessment of Large Language Models in Kidney Disease Patient Questions: Performance, Readability, and Error Analysis  
Ya-Wen Chuang<sup>1</sup>, Ying-Chih Lo<sup>2</sup>, Chun-Yi Wu<sup>1</sup>, Xinsong Du<sup>2</sup>, Li Zhou<sup>2</sup>  
莊雅雯<sup>1</sup>, 羅盈智<sup>2</sup>, 吳軍毅<sup>1</sup>, Xinsong Du<sup>2</sup>, Li Zhou<sup>2</sup>  
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<sup>2</sup> 美國麻薩諸塞州波士頓哈佛醫學院布萊根婦女醫院普通內科與初級醫療科
- C180 A North Taiwan General Hospital uses Power BI to Present the Care Results of Pharmacists Participating in the Pre-ESRD Health Education Program  
某區域教學醫院以 Power BI 呈現藥師加入 Pre-ESRD 照護衛教計畫之照護成效  
陳美鈴<sup>1</sup>, 潘佳佳<sup>1</sup>, 蔡信宏<sup>2</sup>, 常宏傳<sup>1</sup>  
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## Artificial Intelligence, Digital Health, and Data Science

Chair(s) : 陳金順/ Jin-Shuen Chen、郭克林/ Ko-Lin Kuo

- C181 Exploring the Use of Large Language Models for Automated Analysis of Hypotension During Dialysis in Electronic Medical Records  
利用大型語言模型進行電子醫療紀錄中透析低血壓自動化分析的探索  
Ju-Yeh Yang<sup>1</sup>, Chih-Yu Jian<sup>2</sup>, Chih-Chung Hsu<sup>2</sup>  
楊如燁<sup>1</sup>, 簡志宇<sup>2</sup>, 許志仲<sup>2</sup>  
<sup>1</sup> Division of Nephrology, Department of Internal Medicine, Far Eastern Memorial Hospital, <sup>2</sup> Institute of Data Science, National Cheng Kung University  
<sup>1</sup> 亞東紀念醫院內科部腎臟科, <sup>2</sup> 成功大學數據科學研究所

- C182 Clinical Outcomes of A Cutting-Edge Artificial Intelligence-Driven System for Real-time Intradialytic Hypotension Prediction  
一尖端人工智慧即時透析期間低血壓預測系統之臨床預後分析  
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林承叡<sup>1,2,3</sup>, 陳盈穎<sup>1</sup>, 施宏謀<sup>1</sup>, 陳琇惠<sup>4</sup>, 蘇慧芳<sup>5</sup>, 吳志仁<sup>1,3</sup>  
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<sup>5</sup> 中山醫學大學醫學院 <sup>6</sup> 彰化基督教醫院內科腎臟科
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- C187 Digital Thermostatic Dialysate Fluid Monitoring Device  
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- C188 The Association Between Dioxins with Obesity-Related Indices in A Large Taiwanese Population Study  
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黃俊祺<sup>1,2</sup>, 蘇威宇<sup>2</sup>, 吳秉勳<sup>2</sup>, 吳珮瑜<sup>1,2</sup>, 陳思嘉<sup>1,2</sup>, 張哲銘<sup>2</sup>, 邱怡文<sup>2</sup>  
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Roland Helmizar<sup>1,2</sup>, Wisda Widiastuti<sup>2</sup>  
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### **Trending Topic 2024: Cardiorenal metabolic syndrome, Diabetic kidney disease, and Hypertensive kidney disease**

Chair(s) : 陳金順/ Jin-Shuen Chen、郭克林/ Ko-Lin Kuo

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王睿<sup>1</sup>, 趙家德<sup>2,3</sup>, 黃政文<sup>2</sup>  
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- C191 Balancing Risks and Benefits: The Impact of Spironolactone on Renal Outcomes in Type 2 Diabetes  
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- C192 Influence of Heat Stress on Metabolic Syndrome and Cardiometabolic Risk Factors in a Large Taiwan Population Cohort  
 探討熱傷害對代謝症候群與心血管代謝風險因子的影響  
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 Division of Nephrology, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan  
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- C193 Learn New Knowledge about Sugar Control -Using Board Games to Increase Knowledge about Type 2 Diabetes Nephropathy  
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 張家菁<sup>1</sup>, 王淑美<sup>2</sup>  
<sup>1,2</sup> 高雄市立大同醫院(委託財團法人私立高雄醫學大學經營)護理部
- C194 Cost-Effectiveness Analysis of SGLT2 Inhibitors in Patients with Diabetic Nephropathy  
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 王宣惠<sup>1</sup>, 許弘毅<sup>2</sup>  
<sup>1</sup> 高雄醫學大學附設中和紀念醫院護理部 <sup>2</sup> 高雄醫學大學醫務管理暨醫療資訊學系教授
- C195 Diabetes and Chronic Kidney Disease Integrated Care: Experience Sharing  
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 楊琇如<sup>1</sup>, 杜季芳<sup>1</sup>, 林家如<sup>1</sup>, 王廷仔<sup>1</sup>, 孫兆良<sup>2</sup>, 葉芳菁<sup>2</sup>, 蔡嘉仁<sup>1</sup>, 許琪聆<sup>3</sup>, 李建德<sup>3</sup>  
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- C196 Lower Estimated Glomerular Filtration Rates Enhance Occurrence of Metabolic Syndrome and Insulin Resistance in Aged People with Early Chronic Kidney Disease  
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 張瑞廷<sup>1,2,3</sup>, 梁耀仁<sup>4</sup>, 呂至剛<sup>1,2,3</sup>  
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<sup>4</sup> 輔仁大學生命科學系
- C197 Circulating short Chain Fatty Acids and Kidney Outcomes in Type 2 Diabetes Mellitus  
 第二型糖尿病病患其血清短鏈脂肪酸與腎臟預後之相關性  
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 蔡惠如, 余品劭, 吳秉勳, 蔡宜純  
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C198 Explore Analysis Complete Cell Count and Cerebral White Matter Hyperintensity in Patients with Chronic Kidney Disease  
Yu-Hsin, Liu<sup>1</sup>, Feng-Ching Shen<sup>1</sup>, Wen-Ching Chen<sup>2</sup>, Hsiu-Fen Lin<sup>2</sup>, Teng-Hui Huang<sup>1</sup>, Ming-Yen Lin<sup>1,3</sup>, Shih-Ming Hsiao<sup>1</sup>, Fan-Pei Gloria Yang<sup>4,5,6</sup>, Mei-Chuan Kuo<sup>1,7</sup>, Yi-Wen Chiu<sup>1,7</sup>, Shang-Jyh Hwang<sup>1,7</sup>, Ping-Hsun Wu<sup>1,3,7,8\*</sup>, Yi-Ting Lin<sup>3,7,8,9\*</sup>  
劉宇馨, 沈峯慶, 陳玟晴, 林秀芬, 黃騰慧, 林明彥, 蕭仕敏, 楊梵悖, 郭美娟, 邱怡文, 黃尚志, 吳秉勳, 林憶婷  
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## **Saline and N-Acetylcysteine-Based Strategies and Other Approaches to Prevent the Risk of Contrast-Associated Acute Kidney Injury Among Patients Undergoing Cardiovascular Angiography: A Network Meta-Analysis**

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### **Background:**

While hydration is currently the most evidence-supported strategy for preventing contrast-associated acute kidney injury (CA-AKI) in patients undergoing cardiovascular angiography, the potential benefits of combining a saline and N-acetylcysteine (NAC) based strategy with additional pharmacologic interventions remain uncertain. This study aims to assess the efficacy of saline-based strategies incorporating NAC in combination with other pharmacologic agents for the prevention of CA-AKI.

### **Methods:**

We conducted a search for randomized controlled trials (RCTs) in PubMed, Embase, and the Cochrane library from the inception to 26th January 2024. RCTs involving adults undergoing cardiovascular angiography were analyzed, comparing the effects of saline and NAC-based strategies combined with additional agents compared to saline. The primary outcome assessed was the risk of CA-AKI, which was defined as either a  $\geq 25\%$  relative increase or a  $\geq 0.5$  mg/dL increase in baseline creatinine 2 to 5 days post-contrast exposure, or an increase of  $\geq 0.3$  mg/dL or a serum creatinine increase of  $\geq 1.5$ - $1.9$  times baseline within 3 days of contrast medium administration by KDIGO guideline. The comparative effectiveness of different strategies for preventing CA-AKI was visually represented through a network diagram and forest plot, with the treatments ranked by P-score in a league table. Subgroup analyses was conducted by chronic kidney disease (CKD), contrast osmolarity, contrast volume, and the year of publication.

### **Results:**

We included 74 trials with 16,461 patients, 2,341 AKI events (14.2%), comparing 14 different interventions based on hydration and NAC. Compared with hydration using saline alone, the combination of hydration, and oral NAC (odds ratio [OR] 0.78, 95% confidence interval [CI] 0.63 to 0.97; p score = 0.25; high-quality evidence); hydration with intravenous NAC (OR 0.72, 95% CI 0.52 to 0.99; p score = 0.30; high-quality evidence); hydration with oral NAC and statin (OR 0.48, 95% CI 0.29 to 0.77; p score = 0.53; high-quality evidence) are significantly prevented CA-AKI.

### **Conclusions:**

This network meta-analysis highlights that the combination of hydration with oral or intravenous NAC is more effective than hydration alone in preventing CI-AKI. Additionally, hydration with oral NAC and a statin significantly outperforms hydration with oral NAC alone in preventing CI-AKI.

### **Key words:**

contrast associated acute kidney injury, combined strategy, saline, N-Acetylcysteine, network meta-analysis



## **Urolithiasis being a risk factor of acute kidney injury in patient with urinary tract infection without hydronephrosis**

**尿路結石是無腎水腫泌尿道感染患者急性腎損傷的危險因子**

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**Background:** Urinary tract infection (UTI) with acute kidney injury (AKI) is associated with substantial mortality. The purpose of this study was to identify whether urolithiasis without hydronephrosis is a risk factor for the development of AKI in patients with UTI.

**Methods:** This retrospective study recruited urinary tract infection cases that image study confirmed without hydronephrosis from an acute care hospital between January 2006 and September 2023. The patients were divided into two groups based on the presence or absence of AKI.

**Results:** Of 1542 participants, 170 (11.02%) developed AKI. Multivariable logistic regression analyses indicated that age [odds ratio (OR) 1.02, 95% confidence interval (CI): 1.00 - 1.03, P=0.008], white blood cell count (OR 1.08, 95% CI: 1.05 - 1.11, P<0.001), afebrile (OR 1.53, 95% CI 1.06 - 2.23, P=0.025), uroseptic shock (OR 3.52, 95% CI: 2.39-5.17), P<0.001), and urolithiasis (OR 2.01 (95% CI 1.25-3.24), P=0.004) were associated with an increased risk of AKI, while baseline eGFR (OR 0.99, 95% CI: 0.98 - 1.00, P=0.006) was associated with a decreased risk of AKI in UTI patients who absent of hydronephrosis.

**Conclusions:** Urolithiasis is a risk factor for AKI among UTI patients without hydronephrosis

**Keywords:** Urinary tract infection; acute kidney injury; urolithiasis

**A Case report: Carboplatin induced acute tubular injury**

**Carboplatin 引發急性腎小管損傷**

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**Abstract:**

Platinum-based antineoplastic agents are effective but diverse toxicities especially nephrotoxicity make physicians concerning over the use. Carboplatin, as a derivative of Cisplatin, has less nephrotoxicity. Most cases of carboplatin induced renal injury were reported to be reversible and histologically acute interstitial nephritis. Herein, we present a 71-year-old man with urothelial carcinoma, suffered from deteriorated renal function after five cycles of chemotherapy with Carboplatin and Gemcitabine.

Acute tubular necrosis(ATN) due to carboplatin was proved histologically. Notably, his renal failure finally progressed to dialysis dependent end stage kidney disease despite the withdrawal of carboplatin. Closely follow-up of renal function was crucial in patients with carboplatin-based regimen even though.

**Keyword:** Carboplatin, acute tubular injury

## Characteristics of the plasma and urine extracellular vesicles in sepsis-associated acute kidney injury

### 敗血症併急性腎損傷血漿和尿液細胞外囊泡的特徵

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### Background and Objective

Sepsis-associated acute kidney injury (S-AKI) frequently occurs in critically ill patients and is linked to poor outcomes. Early detection of AKI in sepsis is crucial for prompt treatment and prevention of further kidney damage. Serum creatinine, however, is a late marker as its levels rise only after significant kidney damage has occurred. Hence, our study aimed to explore extracellular vesicles (EVs) in plasma and urine, utilizing proteomics analysis to identify potential early biomarkers for S-AKI detection.

### Methods

In this study, two cohorts were examined. Cohort 1 included 29 sepsis patients (19 with S-AKI and 10 with sepsis alone), while Cohort 2 comprised 52 patients (29 with S-AKI and 23 with sepsis only). EVs were isolated from plasma and urine using size exclusion chromatography (SEC), and their presence was validated through western blot, nanoparticle tracking analysis (NTA), and transmission electron microscopy (TEM). The EVs were then precipitated with acetone and subjected to digestion with urea, dithiothreitol (DTT), iodoacetamide (IAA), and trypsin prior to liquid chromatography-mass spectrometry (LC-MS) analysis. Volcano plot analysis conducted using MetaboAnalyst 6.0 identified differentially expressed proteins (DEPs), while gene enrichment analysis was performed with FunRich software (v3.1.3) and pathway analysis using the Kyoto Encyclopedia of Genes and Genomes (KEGG).

### Results

We identified 20 DEPs in the plasma EV dataset and 10 DEPs in the urine EV dataset. Gene enrichment analysis revealed that the DEPs from both datasets predominantly originated from exosomes, lysosomes, and the extracellular region. Several proteins, including FABP4, LYZ, and CHI3L1, were found to be upregulated in the S-AKI group. Additionally, pathway analysis showed that DEPs from both datasets were significantly enriched in the complement and coagulation cascade pathways.

### Conclusion

These findings highlight the potential of EVs as biomarkers and therapeutic targets in S-AKI, providing valuable insights into the underlying pathophysiology and suggesting possible avenues for therapeutic intervention in this critical condition.

**Keywords:** acute kidney injury, proteomics, extracellular vesicles, biomarkers

## The Association Between Air Pollutants and the Risk of Primary Glomerulonephritis

### 空氣汙染物與原發性腎絲球腎炎風險之相關性

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#### Background :

Recent studies have demonstrated that air pollution is linked to the deterioration of kidney function and an increased risk of developing chronic kidney disease. However, there is still limited knowledge about the association between air pollution and primary glomerulonephritis. This study aimed to evaluate the effect of air pollutants on the risk of primary glomerulonephritis.

#### Methods :

We collected renal biopsy data from the Taiwan Society of Nephrology database between January 2021 and June 2023. Transplant kidney biopsies and those with inadequate specimen for pathological diagnosis were excluded. Air pollution data between 2021 and 2023 were collected from Taiwan Air Quality Monitoring Database. A multivariate logistic regression analysis was conducted to assess the odds ratios for primary glomerulonephritis and each specific subtypes, stratified by quartiles of air pollutant concentrations.

#### Results :

A total of 5,006 biopsies were included in the analysis. Comparing the highest to the lowest quartile, the odds of developing primary glomerulonephritis increased with higher concentrations of ozone (OR 1.828, 95% CI 1.415-2.361,  $P < 0.001$ ) and total hydrocarbons (OR 1.655, 95% CI 1.158-2.367,  $P = 0.006$ ). As for specific subtypes of primary glomerulonephritis, there is a significant increase in the odds of minimal change disease (MCD) across quartiles of fine particulate matter (OR 1.470, 95% CI 1.017-2.125,  $P = 0.04$ ), ozone (OR 2.040, 95% CI 1.322-3.148,  $P = 0.001$ ), 8-hour moving average of ozone (OR 1.641, 95% CI 1.135-2.373,  $P = 0.009$ ), methane (OR 1.550, 95% CI 1.110-2.165,  $P = 0.010$ ) and total hydrocarbons (OR 2.036, 95% CI 1.091-3.799,  $P = 0.025$ ).

#### Conclusions :

Our study revealed that exposure to higher concentrations of ozone and total hydrocarbons increase the risk of primary glomerulonephritis and MCD. Additionally, higher concentrations of fine particulate matter and methane are associated with an increased risk of MCD.

#### Key words :

Air pollution, primary glomerulonephritis, minimal change disease

## **Steroid-Resistant Focal Segmental Glomerulosclerosis with Rapidly Progressive Renal Failure: A Case Report and Literature Review**

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**Focal segmental glomerulosclerosis (FSGS)** is a common cause of nephrotic syndrome, characterized by podocyte injury and subsequent proteinuria, which leads to focal scarring (sclerosis) within the glomeruli. FSGS is categorized into primary, genetic, and secondary forms, each with distinct therapeutic and prognostic implications. Genetic mutations affecting the integrity of the glomerular filtration barrier have been identified as key contributors to the pathogenesis of FSGS.

We present the case of a 29-year-old male with a rapidly progressive and fulminant form of steroid-resistant FSGS, resulting in severe renal failure. Despite aggressive immunosuppressive therapy, the patient developed life-threatening pulmonary edema secondary to renal failure and ultimately required long-term hemodialysis.

This report also includes a comprehensive review of current literature on the management of steroid-resistant FSGS, with a focus on emerging treatment strategies. According to the 2021 KDIGO Glomerular Disease guidelines, cyclosporine or tacrolimus is recommended as the first-line treatment over glucocorticoid monotherapy in adults with steroid-resistant primary FSGS.

Rituximab, which has demonstrated a podocyte-stabilizing effect, prevents podocyte apoptosis by maintaining sphingomyelin phosphodiesterase acid-like 3b protein and sphingomyelinase activity. Rituximab is suggested for relapsing cases, especially after prior cyclophosphamide use or when patients seek to avoid calcineurin inhibitors. However, evidence for rituximab use in FSGS is limited, primarily derived from small case series, warranting further investigation.

In conclusion, optimizing treatment for steroid-resistant FSGS remains challenging, with ongoing research needed to validate emerging therapies and improve patient outcomes.

Key words:

Steroid-resistant FSGS, secondary FSGS, genetic FSGS, Rituximab

## Simple Equations for Exceling Daily Albuminuria Estimation from Spot Urine: A Focus on Body weight

### 利用體重以優化單次尿液的一日白蛋白排泄估算

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#### Background :

Spot urine albumin-creatinine ratio (UACR) serves as a proxy for daily albuminuria. Despite efforts to enhance the accuracy of estimated albumin excretion ratio (eAER), the specific impact of various factors remains unexplored.

#### Methods :

This hospital-based study examined the explanatory power of various factors and compared total R<sup>2</sup> values across different sets of factors to identify the optimal eAER model.

#### Results :

Analysis of 304 24-hour urine samples showed median value of 0.538 g (IQR, 0.091–2.080 g), and identified UACR and body weight as relevant factors with noteworthy partial R<sup>2</sup> values in estimating daily albuminuria. A novel model using only UACR and body weight matched the performance of previous models employing additional variables (total R<sup>2</sup> = 0.922), surpassing the model excluding body weight. An ROC curve analysis identified 78.1 kg as the best cutoff to predict underestimation of daily albuminuria by UACR in the heavier half of our patient cohort (AUC: 0.865). For individuals with body weight < 78.1 kg (0-75.4th percentile), daily albuminuria (g) could be estimated as UACR alone with total R<sup>2</sup> of 0.968. Conversely, for those ≥ 78.1 kg (75.5-100th percentile), the estimation formula yielded  $-3.885 + 1.538 \times \text{UACR} + 0.045 \times \text{body weight (kg)}$ , with total R<sup>2</sup> of 0.942.

#### Conclusions :

For individuals weighing ≥ 78.1 kg (≥75.5th percentile of our study), combining UACR and body weight for daily albuminuria calculations enhances explanatory power over using UACR alone, simplifying clinical application by excluding other variables.

#### Key words :

body weight, daily albuminuria estimation, estimated albumin excretion rate (eAER), spot urine, urine albumin-creatinine ratio (UACR)

# Rituximab add-on therapy for individuals with refractory lupus nephritis not responded to other drugs therapy

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**Background:** Lupus nephritis (LN) carries a high risk of poor prognosis, particularly in those who are resistant to standard treatments. To overcome their insufficient response, newer modalities of therapy are required.

**Objectives:** This study aimed to evaluate the efficacy and safety of Rituximab (RTX) as induction therapy followed by maintenance therapy in patients with resistant LN.

**Methods:** A total of 24 patients with resistant LN, either failing initial induction therapy or experiencing severe relapse after remission, were included. RTX was administered as add-on therapy with immunosuppressant medications. Primary outcomes assessed based on KDIGO criteria were, renal response, disease progression, relapses, and infections.

**Results:** The median age of patients was 28 years (IQR 24.5-42), with a male-to-female ratio of 11:1. All patients had active LN, with 91.3% exhibiting proliferative LN. Baseline creatinine was 1.075 mg% (IQR 0.7-1.38), and the mean urine protein-to-creatinine ratio (UPCR) was 4.9 (IQR 2.8-6.65). Among patients receiving RTX, 66.6% had failed initial induction therapy, while 33.3% experienced severe relapse during maintenance therapy. RTX yielded a favourable renal response at six months, with 91.7% of patients responding [20.8% complete response (CR), 70.8% partial response (PR)]. At 12 months, 58.3% maintained a renal response (25% CR, 33.3% PR). Approximately one-third of patients relapsed within a year. Fourteen patients (58.3%) continued with RTX as maintenance therapy, using two different treatment regimens. At six months, Regimen-1 (500 mg every six months) resulted in a partial response in 43% and a relapse in 57%. Regimen 2 (1 g dose per year) achieved a complete response in 28.5% and a partial response in 71.5%, with no relapses reported. At median follow-up of 29 months, adverse renal outcomes occurred in 29.16% of patients with progression to advanced CKD or ESRD. The infection prevalence was 16%.

**Conclusions:** Rituximab demonstrated efficacy and safety as induction therapy for resistant LN. But the response diminished after one year, emphasizing the necessity for optimal maintenance therapy.

Figure 1: Response to Rituximab as induction therapy

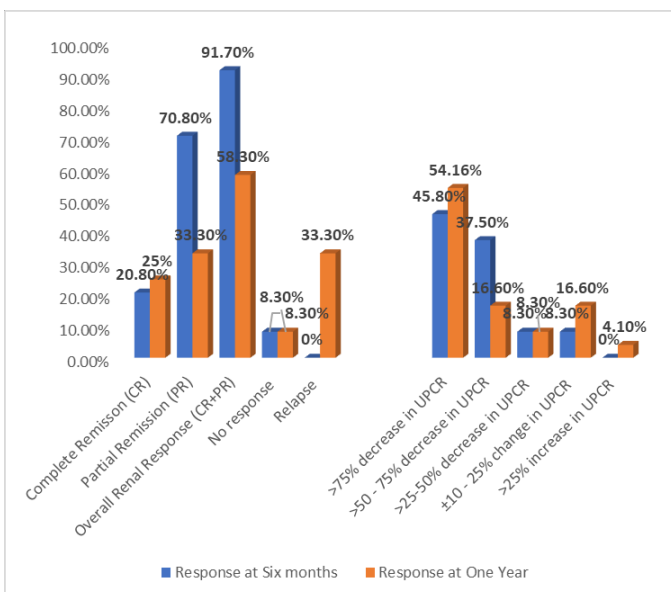


Table 1: Response to rituximab as maintenance after induction for resistant LN

	months	months	months	months	months
Rituximab 500mg	N=7	N=7	Response to RTX at six months	N=3	Response to RTX 500 mg at 12 months
	PR - 5	RTX 500mg	PR 3(43%)	RTX 500 mg	PR 3(100%)
	CR - 2		Relapse- 4(57%)		Relapse 0(0%)
	Relapse- 0				Relapse 1(50%)
Regime 2:	Six months	12 months	18 months	24 months	30 months
Rituximab 1 gm yearly	N=7	N=7	Response to RTX 1-2 gm at six months	N=5	Response to RTX 1-2 gm at 12 months
	PR - 5	PR - 1	RTX 1 gm	PR-5 (71.4%)	PR- 2 (40%)
	CR-2	CR-1		CR - 2(40%)	RTX 1 gm
	Relapse- 0	Relapse- 5		CR - 2(40%)	Relapse 1(20%)
			CR 2 (24.8%)		CR - 1 (50%)

## Clinical features and outcomes of primary glomerulonephritis in Taiwan 臺灣原發性腎絲球腎炎的臨床特徵與預後

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### Background :

End-stage kidney disease (ESKD) requires kidney replacement therapy, causing a huge healthcare burden worldwide. The prevalence of ESRD in Taiwan is one of the highest among the world, and glomerulonephritis (GN) is the second leading cause of ESRD in Taiwan. It is critical to explore early prognostic factors in each subtype of GNs.

### Methods :

We conducted a cohort study to follow up participants with biopsy-confirmed glomerulonephritis in Kaohsiung Medical University Hospital in 2000-2023. A total of 878 biopsy-proven primary GN including IgAN, MCD, MN and FSGS were included. Patients with UPCR and follow-up with time window of 1 year were further analyzed. Proteinuria remission status were defined as: complete remission (CR); partial remission (PR) and no response (NR).

### Results :

Of 671 patients entered the final analysis, FSGS had the lowest final eGFR value and the most rapid renal deterioration. MCD with the highest final eGFR and minimal eGFR decline. Patients with FSGS had the lowest renal survival rate, followed by IgAN, MN and MCD. In multivariable analysis, model 1 showed FSGS with the highest risk. Model 2 adjusted with clinical covariates showed FSGS still with the greatest risk. Model 3 adjusted with proteinuria remission status and showed NR and relapse status were associated with renal survival.

### Conclusions :

In conclusion, the importance of this study is that we presented a long-term follow-up of renal disease progression and proteinuria status in a large primary GN cohort. In general, we provided more insight to the nature course of GN and risk factors contributing to development of ESRD.

### Key words :

Primary glomerulonephritis, glomerular filtration rate, proteinuria



## Long-term enzyme replacement therapy and renal outcomes in patients with Fabry disease: a systematic review and meta-analysis.

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**Background:** Despite enzyme replacement therapy (ERT), renal function in patients with Fabry disease continues to deteriorate, and complications occur over time. This meta-analysis aimed to review and synthesize data on renal outcomes after long-term ERT for Fabry disease by patients' baseline renal function.

**Methods:** PubMed, Cochrane CDSR, and other databases were searched until October 13, 2023. using the keywords combinations of Fabry disease and ERT. Randomized controlled trials (RCTs), prospective and retrospective studies were eligible for inclusion. The primary outcome was the yearly change of the estimated glomerular filtration rate (eGFR) and Urine Protein and Creatinine Ratio (UPCR). The secondary outcome was the occurrence of clinical events, including cardiac, renal, and neurologic events.

**Results:** Twenty-two studies with a total of 1992 patients were included. The mean follow-up duration was from 53 weeks to 8.1 years. Meta-analysis showed no significant differences in yearly eGFR change between baseline eGFR > 60 versus < 60 in general ( $p = 0.914$ ) or among males ( $p = 0.356$ ). Annual eGFR decline was significantly greater in patients with baseline urine protein and creatinine ratio (UPCR) > 0.5 than < 0.5 (standardized mean difference [SMD] = -2.020, 95%CI: -3.670 to 7.380). The risk of clinical events was significantly higher in patients with baseline eGFR < 60 than > 60 (hazard ratio [HR] = 4.256, 95%CI: 2.872 to 6.306).

**Conclusions:** The earlier ERT is used, especially in male, the better the kidney protection effect. When kidney function is affected, the use of ERT is still necessary to effectively slow down kidney function deterioration.

**Keywords:** Fabry disease, enzyme replacement therapy (ERT), glomerular filtration rate (GFR), nephropathy, meta-analysis

# Analysis of Shared Decision Making in the Choice of Renal Replacement Therapy for End-Stage Kidney Disease Patients : Based on a District Teaching Hospital in Southern Taiwan 醫病共享決策對於末期腎臟病病人選擇腎臟替代療法之分析： 以南部某地區教學醫院為例

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## Background :

當晚期慢性腎臟病病人進入末期腎臟病階段, 由醫病共享決策介入讓病人了解未來腎臟替代療法之選擇, 且讓病人與家屬依其個別需求和醫療人員共同討論, 訂定適合的透析治療模式, 希望藉由提早建立長期透析管路, 減少緊急透析導管置入風險。此篇論文研究目的是分析南部某地區教學醫院執行此決策現況。

## Methods:

當病人腎絲球過濾率小於 15mL/min/1.73m<sup>2</sup>就啟動醫病共享決策照護諮詢, 若病人選擇透析治療, 讓病人充分瞭解治療模式及提早建立長期透析管路之重要性。

## Results :

從 2023/08/01 至 2024/08/01 期間共有 68 位接受醫病共享決策照護諮詢, 平均年齡 70.9 歲, 男性 38 人 (55.88%), 女性 30 人 (44.12%), 選擇血液透析者 35 人 (51.5%), 選擇腹膜透析者 2 人 (2.9%), 維持慢性腎臟病照護者 26 人 (38.2%), 它院追蹤者 2 人 (2.9%), 死亡 3 人 (4.4%)。進一步探討開始血液透析治療者 (共 8 人), 有 3 位 (37.5%) 接受緊急雙腔靜脈導管置入, 進行血液透析治療, 平均住院天數 15 天, 而另外 5 位 (62.5%) 直接由預先建立動靜脈瘻管, 進行血液透析治療, 不須要住院。

## Conclusions :

分析此結果顯示介入醫病共享決策, 提早建立長期血液透析管路, 可避免緊急透析導管放置相關危險性及併發症, 並減少住院天數, 讓病人更平順的進入血液透析治療, 期望此治療模式可擴展推及至腹膜透析, 有效幫病人規劃預先植管與後續照護, 希望所有選擇透析治療病人都能順利平安走向下一階段。

**Key words :** 血液透析、醫病共享決策

## Benefits of Increasing the Proportion of Plant Protein Intake on Achieving a Low Protein diet, Acid-base Balance, and Body Composition in CKD stage 3-5

### 提高植物性蛋白攝取比例對於慢性腎臟病 3-5 期達成低蛋白飲食、酸鹼平衡、身體組成的益處

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#### Background:

Accumulating evidence shows that a vegetarian diet offers renal protection and enhances metabolic health in patients with chronic kidney disease (CKD). However, switching from an omnivorous diet to a vegetarian one can be a challenge for many CKD patients. Increasing the proportion of plant protein in their diet could be a more feasible approach. This cross-sectional study explored the effects of increased plant protein intake on achieving a low-protein diet and its association with metabolic parameters, body composition, and muscle strength in non-dialysis CKD stages 3-5.

#### Methods:

A total of 377 patients with CKD stages 3-5 were evaluated for daily dietary intake using a quantitative food frequency questionnaire. Plant protein intake percentage was calculated as (daily plant protein intake / total protein intake) × 100%. A low protein diet (LPD) was defined as consuming daily protein less than 0.8 g/kg of body weight, and potential renal acid load (PRAL) was estimated. Serum biochemistry data, including bicarbonate, potassium, calcium, phosphorus, and albumin were measured. Additionally, anthropometric data, body composition and handgrip strength were also assessed in a subgroup of 260 patients using multifrequency bioimpedance spectroscopy and handgrip dynamometry. Lean tissue index (LTI) and fat tissue index (FTI) were calculated by dividing lean mass and fat mass (kg) by height squared (m<sup>2</sup>), respectively.

#### Results:

The mean age of the study population was 68.5 ± 12.1 years, and 69.5% of them adhered to a LPD. A 10% increase in plant protein intake was associated with a 20% increase in the likelihood of achieving a LPD (Odds ratio [OR] = 1.20, 95% confidence interval [CI] = 1.06–1.37, *p* < 0.005). In addition, increased plant protein intake was associated with lower PRAL ( $\beta$  = -1.09 per 10% increase, 95% CI = -1.63–0.56, *p* < 0.001), and higher serum bicarbonate levels ( $\beta$  = 0.24 per 10% increase, 95% CI = 0.02–0.45, *p* = 0.032). However, it was not associated with serum potassium, calcium, or phosphorus levels. In the subgroup of 260 patients, a 10% increase in plant protein intake was associated with a lower BMI ( $\beta$  = -0.82, 95% CI = -1.05–0.59, *p* < 0.001), lower FTI ( $\beta$  = -0.71, 95% CI = -1.01–0.40, *p* < 0.001), reduced waist circumference ( $\beta$  = -2.10, 95% CI = -2.79–1.41, *p* < 0.001) and hip circumference ( $\beta$  = -1.25, 95% CI = -1.75–0.74, *p* < 0.001), lower waist-to-hip ratio ( $\beta$  = -0.91, 95% CI = -1.44–0.38, *p* = 0.001), and waist-to-height ratio ( $\beta$  = -1.25, 95% CI = -1.70–0.80, *p* < 0.001). There was no significant association with LTI or handgrip strength.

#### Conclusions:

Increased plant protein intake is associated with a higher achievement rate of LPD, reduced dietary acid load, alleviated metabolic acidosis, and may improve adiposity parameters without compromising lean mass or handgrip strength.

**Keywords:** plant protein intake, low protein diet, potential renal acid load, metabolic acidosis, body composition, adiposity

## Exploring the effectiveness of shared decision-making on the choice of renal replacement therapy and anxiety improvement among patients with chronic kidney disease

### 探討慢性腎臟病人醫病共享決策於腎替代療法選擇及焦慮改善之成效

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#### 背景

當慢性腎臟病患者進入疾病晚期時，需要面臨多種腎臟替代療法，醫病共享決策(shared decision making, SDM)強調醫療團隊和病人以臨床證據和醫學專業為基礎，透過多元結構式工具和雙向溝通，共同商定對病人最有利的醫療決策。

#### 方法

本研究運用自製「當我腎功能持續變差，我有哪些治療選擇」的短片，再加上結構化表單並附上 QR code，提供病人和家屬醫療資訊。資料收集期間自 2023 年 1 月 1 日至 2023 年 12 月 31 日為止，採橫斷式研究法，以「我是否清楚有哪些治療方式的選擇」和「我是否清楚各種替代療法有什麼不同」兩題，評估病人對腎臟病替代療法的認知程度。其次以李克特量表(Likert scale)評估病人的焦慮程度，5 分為「相當多」、1 分則為「完全沒有」。排除資料不全及拒絕參加的病人，最後以 129 位慢性腎臟病第五期病人的資料進行分析。

#### 結果

在 129 位病人當中，男性有 74 位、佔 57%，平均年齡為 66 歲，eGFR 平均為 5.8 mL/min/1.73m<sup>2</sup>。意向方面，HD 有 55 人、佔 42.6%，PD 有 45 人、佔 34.9%，腎移植有 3 人、佔 2.3%，安寧的有 2 人、佔 1.6%，無法決定的有 24 人、佔 18.6%。在認知方面，98%的病人及家屬可清楚治療方式與替代療法的不同。在焦慮程度方面，在參與醫病共享決策前、後的分數從 4 分下降至 3.4 分，顯示焦慮有一定程度的緩解。

#### 結論

利用多元結構式的醫病共享決策教材，可增進病人和家屬對後續治療模式的認知理解，進而減少病人的焦慮和擔憂及對未來治療不確定性。

#### 關鍵字

醫病共享決策、腎臟病替代療法、慢性腎臟病

## Effectiveness of Using Shared Decision-Making to Intervene in Patients with Poorly Controlled Blood Glucose in Type 2 Diabetes combined with Early Renal Disease.

### 運用醫病共享決策介入第 2 型糖尿病血糖控制不佳個案合併初期腎臟病變之成效

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#### 一、背景：

台灣洗腎人口位居全球首位，且每 8 位成年國人即有一人可能有腎臟病，因其初期症狀不明顯，容易被忽略而演變成末期腎臟病。而糖尿病患者血糖控制不佳為主要危險因子之一。如何幫助糖尿病患者穩定控制血糖，降低併發症的發生，避免腎功能降低，成為醫護人員可以努力的目標。臨床中，常見許多糖尿病個案因忽視慢性病控制的重要性、缺乏對藥物正確的認知、醫病間無效性溝通等因素，導致無效性醫療造成器官不可逆的病變，包含腎臟病，造成醫護人員治療與照護個案的挑戰。醫病共享決策是以病人為中心的臨床醫療執行過程，被認為有助於提升病人參與治療計畫。因此，本研究藉由透過醫病共享決策之介入措施，讓個案共同參與醫療處置，改善控糖意願，提升對藥物的認知及用藥順從度，強化對初期腎病變風險的重視及認知，並檢視各項相關之成效指標。

#### 二、方法：

本研究在 2023 年 8 月 1 日至 2024 年 7 月 31 期間，於中部某醫學中心新陳代謝科門診針對第 2 型糖尿病患者，其糖化血色素大於 7.5%、口服 3 種以上抗糖尿病藥物持續治療半年、未曾接受過針劑治療、診斷初期腎臟病 (stage: 0-3A 為主) 為研究對象。醫師評估個案的需求同時啟動 SDM 流程，轉介至糖尿病中心，個案管理師透過個別訪談了解個案的醫療選項意願及困境，依個別需求，運用共享決策介入方式，並使用衛教相關影片及控糖單張、針劑注射示範模具及醫策會公版 PDAs 輔助工具、辦理病友會活動等。此外檢驗病患血糖，血脂，血壓及腎功能等生理指標，收集之資料以 SPSS Statistics 28.0 套裝軟體作統計分析。

#### 三、結果：

研究對象共 74 人，男性佔 33 人(45.2%)、女性佔 41 人(54.8%)；年齡 66.25±11.65 歲；平均病齡 16.45±7.51 年；教育程度以高中居多。治療選項以口服藥為 46 人(63.02%)、口服藥加針劑注射為 28 人(37.8%)；決策者以個案為主佔 63 人(84.94%)。共享決策介入，平均糖化血色素從 8.89±1.13% 下降為 8.07±1.03%、平均空腹血糖值從 180.38 mg/dL±58.28 下降至 137.93±31.66 mg/dL；平均肌酸酐值從 0.97±0.37 mg/dL 下降至 0.96±0.39 mg/dL；平均腎絲球過濾率值從 76.34±31.3 ml/min/1.73m<sup>2</sup> 增加至 77.31±29.09ml/min/1.73m<sup>2</sup>；平均蛋白尿值從 207.38±414.69 mg/dL 下降至 171.86±340.33 mg/dL；平均低密度膽固醇值 83.84 ±24.51 mg/dL 下降至 75.73±18.9 mg/dL；平均收縮血壓值從 134.51±17.38mmHg 下降至 113.5±15.9mmHg，且以上皆達統計上顯著差異( $p<0.001$ )。

#### 四、結論：

本研究結果顯示顯示運用共享決策介入第 2 型糖尿病血糖控制不佳個案合併初期腎臟病變具有一定之成效，特別是病人在糖化血色素、空腹血糖值、肌酸酐值、腎絲球過濾率、蛋白尿值、低密度膽固醇值、收縮壓多個生理指標都有明顯改善，本研究結果可作為臨床推廣使用醫病共享決策之參考。建議於病人就診初期盡早融入共享決策，提升病識感及正確控糖觀念，正視延緩腎功能惡化的重要性，避免快速演變為末期腎臟病，達到有效的醫療品質。

#### 關鍵字

醫病共享決策、第 2 型糖尿病、血糖控制不佳、初期腎臟病變

## The Results of Preventive Services for Adults at a District Hospital 地區醫院成人預防保健之成效

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**背景：**為了防治慢性腎臟病 (chronic kidney disease, CKD) 依公衛之三段五級為概念，在疾病未發生前，以健康危險因子做為評估工具篩選出高危險群，再針對高危險群，將CKD重要成因予以預防宣導並施以防治計畫。因此，國健署一再推行醫療機構鼓勵年滿 40 歲的民眾參與『成人預防保健 (簡稱：成健)』，以期找出CKD的高危險群，提昇國人腎臟之健康。

**方法：**本研究選取 2023 年 1 月至 12 月於家庭醫學科門診執行成健的民眾，進行問卷資料填寫、實驗室數據檢驗分析，並探討腎絲球過濾率 (Glomerular Filtration Rate, eGFR) 分期與影響因子之關係。最後，以描述性及統計性資料分析呈現。

**結果：**觀察期間，完整執行成健民眾共 464 位，以女性居多有 289 位 (62.3%)、男性 175 位，年齡介於 40~95 歲 (其中受檢者以 41~73 歲居多數)，有抽菸人數為 48 位，罹患高血壓、糖尿病和高血脂比率分別為 35.3%：24.4%：50.4%，有 227 人 (48.9%) 至少患得其中“一高”，BMI 介於 16~36 (平均  $24.6 \pm 3.8$ )  $\text{kg}/\text{m}^2$ ，eGFR 介於 10~136  $\text{ml}/\text{min}/1.73\text{m}^2$ ，CKD  $\geq$  stage 3 共有 20 位 (4.1%)，出現蛋白尿比率為 23.5%；經本研究發現以 CKD stage 2 居多 (59.7%)，當中的女性占 188 位、肥胖人數佔 34.3%、抽菸比率為 8.3%、有蛋白尿者佔 76.2%；經統計分析顯示：eGFR 和年齡、BMI 存在顯著的負相關 ( $P < .05$ )。

**結論：**早期 CKD 並無明顯症狀常難以察覺，加上民眾對疾病的自我認知低下，故常以致於錯失治療先機。因此，不限於年齡都應加強對民眾宣導“三高患者”透過定期篩檢，早期診斷早期治療才是目前能減緩腎臟病惡化的有效方法。

**關鍵字：**慢性腎臟病、成人預防保健、三高

## Association between PM2.5 Exposure with Gut Microbiota Abundance and Composition in Chronic Disease Patients

### 懸浮微粒(PM2.5)暴露與慢性病患者腸道微生物群豐度及組成的相關性

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**Background:** Air pollution, particularly fine particulate matter (PM2.5), has been recognized as a significant environmental risk factor for various health conditions. Growing evidence highlights a crucial interaction between gut microbiota and the lungs, known as the “lung–gut axis”. This study investigates the impact of PM2.5 exposure on gut microbiota abundance and composition in patients with chronic diseases.

**Methods:** A total of 184 patients in south Taiwan diagnosed with chronic diseases, specifically diabetes mellitus (81.5%), hypertension (75.5%), and chronic kidney disease (48.4%), were recruited. Fecal samples were collected from the participants to analyze the composition of the gut microbiota using Illumina sequencing of the 16S ribosomal ribonucleic acid gene. Monitoring data for PM2.5 were obtained from the Environmental Protection Administration of Taiwan, and Land-use Regression modeling was used to estimate participants' long-term exposure to PM2.5 over the past 10 years.

**Results:** The patients were divided into three groups based on the tertile values of the estimated PM2.5 exposure levels. The Shannon and Simpson index revealed significant differences in alpha diversity among the PM2.5 exposure groups. The high PM2.5 exposure group had significantly lower microbial species diversity and a marginally significant higher microbial dysbiosis index. Beta diversity analysis showed that the microbial community composition was significantly different among the three groups ( $p = 0.010$ , weighted normalized UniFrac distance matrix). A distinct microbial community structure was found in the high PM2.5 exposure group, characterized by increased abundances at the genus level of *Bacteroides*, *Veillonella*, *Ruminococcus* (*X. gnavus* group), *Flavonifractor*, *Family\_Lachnospiraceae* sp., *Lachnoclostridium*, and *Tyzzereella*, along with decreased abundances at the genus level of *Family\_Coriobacteriales* *Incertae Sedis* sp., *Marvinbryantia*, *Adlercreutzia*, *Collinsella*, *Ruminococcaceae* UCG.014, *Holdemanella*, and *Subdoligranulum*.

**Conclusion:** Exposure to PM2.5 leads to a reduction in gut microbiota abundance and induces gut microbial dysbiosis in microbial composition among patients with chronic diseases.

## Discordance between the creatinine- and cystatin C-based estimated glomerular filtration rate in predicting adverse outcome

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### Objectives :

Shrunken pore syndrome, defined by discordance between cystatin C- and creatinine-based estimation of kidney function, was rarely reported in Asia. This study examined the discordance between cystatin C-based and creatinine-based estimation of kidney function (CKD-EPI<sub>cys</sub> and CKD-EPI<sub>cre</sub>) as well as their association with clinical outcome in Taiwan.

### Methods :

CKD subjects with significant body weight loss in Taoyuan General Hospital from 2018 to 2020 were enrolled. Cystatin C, creatinine, demographic and laboratory data were assessed during the baseline period and followed till death, dialysis, or administrative censor. Severe GFR decline was defined as stable serum creatinine doubling or  $eGFR_{MDRD} \geq 50\%$  decline from baseline. We stratified subjects according to the quartile of CKD-EPI<sub>cys</sub>-to-CKD-EPI<sub>cre</sub> ratio. Sub-hazard ratios (sHR) and time ratios were measured by competing risk regression and cause-specific accelerated failure time (CS-AFT) model. Cumulative survival and incidence were also depicted.

### Results :

From a total of 449 pre-ESRD subjects with creatinine and cystatin C testing, the incidence of mortality, dialysis and severe GFR decline were 2.4, 8.3, and 14.7 per 1000 patient-month.

Compared to 4<sup>th</sup> quartile group, the 1<sup>th</sup> tertile group had higher incidence of mortality, dialysis and severe GFR decline (4.4 vs. 0.5 per 1000 patient-month, 13.9 vs. 6.2 per 1000 patient-month, and 17.9 vs. 8.4 per 1000 patient-month) ( $P_s < 0.05$ ). In competing risk regression, the 1<sup>th</sup> tertile group was a predictor of death (sHR = 3.04(1.00—81.60) ( $P < 0.05$ )). In CS-AFT, first quartile group lead to 81.4%, 48.9%, and 56.6% decrease in median survival time to mortality, dialysis and severe GFR decline ( $P_s < 0.05$ ).

### Conclusions :

Cystatin C-based kidney function estimation may predict higher risk of adverse outcome than creatinine-based estimation in CKD subjects with significant body weight loss.

### Key words :

Mortality, Dialysis, Cystatin C, Shrunken pore syndrome, CKD-EPI



## **Effectiveness of Abdominal Bracing Core Exercises as Rehabilitation Therapy for Reducing Abdominal Symptoms in Patients with Autosomal Dominant Polycystic Kidney Disease and Significant Polycystic Liver Disease**

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### **Background :**

In patients with autosomal dominant polycystic kidney disease (ADPKD) who also have polycystic liver disease (PLD), organomegaly often leads to abdominal symptoms. Abdominal bracing core (ABC) exercises have been validated as effective for alleviating chronic back pain. The purpose of this study was to assess the effectiveness of ABC rehabilitation exercises in reducing pain in ADPKD patients with significant PLD.

### **Methods :**

Significant PLD was defined as a height-adjusted total liver volume (htTLV) exceeding 1,600 mL/m<sup>2</sup>. The intervention group (n=12) participated in ABC exercises, while the control group (n=11) received only a consultation about nutrition and exercise, along with a recommendation for regular exercise. After a 3-month biweekly intervention, changes in pain, abdominal symptoms, quality of life (QoL), and bioelectrical impedance analysis (BIA) were analyzed.

### **Results :**

The participants comprised 23 individuals (male: 4 [17.4%], female: 19 [82.6%]). Their mean age was 54, and the mean  $\pm$  SD of htTLV was 2,706  $\pm$  1,335. The mean  $\pm$  SD of eGFR was 53.9 $\pm$ 29.0 mL/min/1.73m<sup>2</sup>. After the intervention, pain and pressure-related symptoms significantly decreased in some cases; however, gastrointestinal symptoms did not improve. Pain and QoL, as assessed by the Korean Oswestry Disability Index and the second version of the short-form 36-item Health Survey, showed significant improvements. The results of BIA indicated a noticeable change in the soft lean mass of the proximal body following the intervention.

### **Conclusions :**

Our study demonstrates that ABC exercise is effective in alleviating pain and increasing soft lean mass in ADPKD patients who have significant PLD.

### **Key words :**

Autosomal dominant polycystic kidney disease; Polycystic liver disease; hepatomegaly; Exercise therapy; Chronic pain; bioimpedance

## Alternative Medicine in Patients with Chronic Kidney Disease

### 慢性腎臟病病人使用另類療法之分析

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**背景：**慢性腎臟病病人者除了接受醫學治療外，也常發現許多腎病病人，企圖挽救腎功能流失而自行購買另類療法包含中草藥偏方或其他健康食品服用，結果卻反而加速腎功能惡化而提早透析治療。

**方法：**採結構式問卷收集南部某醫學中心腎臟科門診加入 Pre ESRD 照護計畫之慢性腎病病人為對象，收錄自 2023 年 1 月 1 日至 2024 年 8 月 31 日共 694 位完整收案病患進行資料分析。

**結果：**(1) 收案對象平均年齡為 66.9 歲 (SD=14.3)；平均罹患慢性腎臟病時間為 3.4 年 (SD=5.0)；疾病分期中 CKD stage 3b 有 245 位(35.3%)；stage 4 有 213 位(30.7%)；stage 5 有 118 位(17.1%)。(2) 有 275 位(39.6%)的病人收案時曾經使用或正在使用另類療法。(3) 使用輔助與另類療法的種類方面，以使用健康食品 244 人 (78.9%) 占多數、中草藥者 31 人 (11.3%)，健康食品及中草藥同時使用者 27 人(9.8%)。(5) 服用健康食品種類 1-2 種者有 205 人(84.0%)，≥3 種者有 39 人(16.0%)。

**結論：**病人在罹患腎臟病後，常聽從他人建議或依據自己的醫療信念，嘗試其他治療方式反而加速病情惡化。醫療團隊在照護上能協助病人建立良好的保健觀念及認知，應可減少慢性腎病病人濫用藥物導致腎功能持續惡化的風險，可能可以延緩CKD病患腎臟惡化的程度，達到健康促進生活方式之目的。

**關鍵字：**慢性腎臟病、另類療法

## Application of Power BI interactive data visualization software in CKD case management

### 應用 Power BI 動態可視化工具在慢性腎臟病數據管理成效探討

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#### Background :

台灣透析盛行率居世界之冠，健保署積極推動慢性腎臟病防治照護計畫，以期延緩進入透析日程。慢性腎臟病照護過程中，進行數據蒐集分析管理，有助於了解疾病進程，制定個別照護計劃，疾病不同階段採取適當措施延緩病情惡化。目前指標多以靜態圖或表格數字呈現，數據統計以 Excel 及部分人工方式計算，呈現當月及前月數據，無法宏觀與即時檢視歷年指標差異。Power BI 以動態視覺化優勢，創建互動式視覺圖表，快速掌握數據的脈絡及趨勢，全面擴展應用，能夠深度解析數據，直觀判斷優化決策。

#### Methods :

運用 Power BI 轉換多方資料源，利用 Power Query 對數據進行量值運算，創建多元化儀表板，運用各項圖表、矩陣資料表、篩選器等功能，分析收案、照護、結案概況等；KPI 指標含括：高危險群轉介完成 CKD 篩檢百分比、接受個案管理照護模式執行率、接受腎臟病自我管理衛教百分比、CKD 分期改善百分比、CKD 合併糖尿病 HbA1C>9% 百分比等、健保申報分析申報數量及點額，進行同期差異比較，快速掌握趨勢。

#### Results :

運用 Power BI 於 Pre ESRD 照護成效分析，新收案分析介面，2024 年 6 月總收案 5995 人，其中 1324 人由新陳代謝科轉入、688 人由心臟科轉入、810 人由院外轉入；未結案分析介面，接受醫病共享決策比例中，完成末期腎臟替代治療衛教模式共 86 人、未完成 14 人，提供醫師轉介腎臟照護衛教師個案清單，以利追蹤醫病共享執行效益；結案分析介面，顯示結案病人中，1341 人進入血液透析、171 人腹膜透析，介面中呈現失聯大於 180 天人數有 1023 人，針對失聯病人進行原因分析，以提升照護完整性。

#### Conclusions :

應用 Power BI 進行資料數據管理，即時深入解析歷年收案成效、照護品質指標、健保申報費用效益，展現腎臟照護衛教師臨床照護之成效。動態視覺化效果，豐富且多元介面，可聚焦分析主題，取代人工計算方式與傳統簡報。未來期望應用 Power BI，演算 Pre ESRD 收案病人腎臟病衰退日程變化、影響因素進行分析，能夠有效延緩進入透析治療。

#### Key words :

慢性腎臟病、Power BI、腎臟照護衛教師

## Analysis of elderly functional assessment performed by patients with chronic kidney disease

### 慢性腎臟病人執行長者功能評估之分析

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**Background:** 依據內政部統計臺灣 65 歲以上人口，於 111 年 1 月底占總人口比率逾 16.9%，已正式邁入「高齡社會」，因此我們的目標不只是長壽，是健康老化，即維持身心功能在最理想的狀態。為了能夠早期發現長者功能衰退的徵兆，國民健康署參考世界衛生組織(WHO)長者整合性照護指引(Integrated care for older people, ICOPE)，推動長者功能評估工作，幫助長者及早發現可能導致失能的風險因子，及早介入運動與營養等處置，以預防及延緩失能的發生。國民健康署吳昭軍署長表示，老化雖然無法避免身心功能衰退，但透過長者及早進行評估，藉由各種健康促進策略，以維持甚或提升長者身心功能，協助掌握老年生活。

**Methods:** 長者功能評估內容包括延緩失能的關鍵六大指標：「認知功能、行動能力、營養、視力、聽力及憂鬱」，透過簡易的問題檢測，了解六大能力的狀況，及早介入處理，以預防及延緩失能，提升老年生活品質；慢性腎臟病衛教室配合國民健康署推動長者功能評估工作，自 112 年 3 月至 112 年 12 月止，針對本院 pre-ESRD 收案病人執行長者功能評估，共 188 名，分析慢性腎臟病病人在六大能力的狀況，期望以此評估，早期發現長者功能是否衰弱與失能，藉此維持機改善老人身體功能及心理健康。

### Results

經衛教室收案分析如下：男性 83 人(44.1%)，女性 105 人(55.9%)。

一、認知功能方面：1、詢問長者，今天的日期回答年月日：有 22 人再重複一次之後，可以說出正確的日期；2、詢問長者，您現在在哪裡？有 188 人回答正確。

二、行動功能：椅子起身測試：在 12 秒內連續起立坐下五次；有 151 位長者能在 12 秒內完成五次起立坐下，有 20 位長輩長者，因膝關節的問題無法達成，有 17 位的長者可以完成五字的起立坐下，但是大於 15 秒。

三、營養不良：1、過去三個月，您的體重是否在無意間減輕了 3 公斤以上？2、過去三個月，您是否曾經食欲不振？有 161 位長者沒有營養不良的問題，有八位長輩因確診 COVID-19，導致食欲不振減輕 3 公斤以上，但是確診痊癒後體重有再回復，有 13 位長輩因其他共病的問題，像是腸胃不適體重恢復比較慢。

四、視力障礙：您的眼睛看遠看近或閱讀是否有困難？有 156 位長輩有白內障或已經開刀的情形，有 17 位自覺日常生活及看電視沒有問題，有時 15 位固定在眼科者診所回診追蹤。

五、聽力障礙：請執行氣陰測試，長者是否兩耳都聽得到？這個項目有高達 164 位長輩會需要提高音量或靠近耳朵才能聽到，其中有高達 150 位的長輩沒有因為聽力障礙就醫，有 24 位的長輩有就醫並佩戴助聽器使用。

六、憂鬱：1、過去兩週，您是否常感到厭煩心煩或台語(阿雜)，或沒有希望？有 146 位長者不會覺得厭煩或沒有希望，有 42 位長者因為經濟或照顧孫子或另外一半有身心障礙的家人，而感到厭煩。2、過去兩週，您是否減少很多的活動和感興趣的事？有 154 位長輩執行完日常工作之後，有比較長的時間待在家裡，例如買菜外出散步運動及協助載小孩之後，就會待在家裡有 30 四位長輩不需要負擔家中的家務，會到長照據點上課與人互動。

**Conclusions:** 經由長者功能評估發現，有很多的長輩在視力聽力及憂鬱的項目上有比較多功能衰退的情形；老化造成的功能衰退常常被忽視，民眾多將聽不清楚、走路變慢、健忘、無力等視為理所當然的現象，不知道要尋求協助。俗話說：「人老心不老」，首先瞭解長者自我身心狀況，透過功能評估量表、健康促進的介入措施，延緩功能的衰退速度，維持或提升身心功能，讓長者們接受並享受健康老化的過程。

**Key words:** 慢性腎臟病，長者功能評估

## The association of monocyte count with renal outcomes and mortality in patients with chronic kidney disease

### 慢性腎臟病患者的單核球細胞數與腎臟功能變化和死亡率的相關性

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#### Background :

Monocytes bridge innate and adaptive immunity, enabling the body to form a targeted immune response against specific pathogens. Elevated monocyte count has been associated with increased risk of all-cause mortality in general population. Emerging evidence suggests that monocyte count is an important predictor of atherosclerotic vascular disease, and increasing evidence implicates monocytes in playing a pivotal role in renal disease. However, there is limited evidence whether monocyte count in patients with non-dialysis chronic kidney disease (CKD) is related to the decline in renal function, progression to end-stage kidney disease (ESKD), or all-cause mortality.

#### Methods :

We conducted a prospective observational cohort study, enrolling 347 adult patients with chronic kidney disease from February 1, 2014, until December 31, 2019. All baseline data, comorbidities, and relevant medications were recorded. Patients were followed up until January 31, 2023, with an average follow-up duration of 4 years. The primary outcome was an annual decline in eGFR of more than 3 ml/min/1.73 m<sup>2</sup>. The secondary outcome was ESKD and all-cause mortality.

#### Results :

We found that a higher monocyte count was significantly associated with an eGFR decline more than 3 ml/min/1.73 m<sup>2</sup> (odds ratio (OR) 1.003, confidence interval (CI) 1.001,1.006, p-value 0.017). We used receiver operating characteristic (ROC) analysis to define the optimal cut-point for monocyte count that predict faster kidney function decline. The cut-point value was 483 per microliter (μL), indicating that monocyte count higher than 483/μL are associated with a significantly greater risk of experiencing a faster decline in kidney function. Monocyte count, however, was not predictive of mortality (OR, 0.999; 95% CI, 0.996 to 1.003; P = 0.763).

#### Conclusions :

Monocyte count has the potential to predict faster renal function decline in patients with chronic kidney disease. The monocyte count cut-point value of 483/μL provides a clinical threshold to identify patients at higher risk for rapid kidney function decline. However, monocyte count could not significantly predict mortality in our cohort study.

**Key words:** Monocyte count, rapid renal function decline

## Association of triglyceride-glucose index with aortic stiffness in non-dialysis chronic kidney disease

三酸甘油酯-葡萄糖指數與非透析慢性腎臟病患者主動脈硬度的關聯性

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### Background:

The triglyceride-glucose (TyG) index, a marker of insulin resistance, has been linked to cardiovascular disease (CVD) events and arterial stiffness in the general population. However, the role of the TyG index in patients with chronic kidney disease (CKD) remains unclear, especially given the influence of both traditional and non-traditional risk factors on arterial stiffness. This study aims to evaluate the association between the TyG index and arterial stiffness in CKD patients.

### Methods:

A total of 301 CKD patients were evaluated. Baseline characteristics, anthropometric data, and fasting blood samples were collected. Aortic stiffness was assessed by measuring carotid-femoral pulse wave velocity (cfPWV) using an automatic pulse wave analyzer. The TyG index was calculated as  $\ln [\text{fasting triglyceride (mg/dl)} \times \text{fasting glucose (mg/dl)}] / 2$ . Serum levels of adipokines, including leptin, adiponectin, AFABP, and resistin, were measured using a commercial enzyme-linked immunosorbent assay (ELISA) kit.

### Results:

In this study, 301 CKD patients were stratified by tertiles of the TyG index. Patients in the highest TyG tertile had significantly higher rates of diabetes (73.3%), hyperlipidemia (76.2%), BMI (28.1 kg/m<sup>2</sup>), and aortic stiffness (53.5%) compared to those in the lowest tertile. cfPWV was significantly higher in the highest TyG tertile (9.91 m/s) compared to the lowest (8.95 m/s,  $p = 0.035$ ). Multivariate analysis confirmed that the TyG index was independently associated with increased aortic stiffness (OR: 2.91,  $p = 0.018$ ). Additionally, Pearson's correlation analysis revealed that the TyG index was positively associated with log leptin ( $r = 0.146$ ,  $p = 0.017$ ) and log FABP ( $r = 0.137$ ,  $p = 0.024$ ), while negatively associated with log adiponectin ( $r = -0.246$ ,  $p < 0.001$ ).

### Conclusions:

The triglyceride-glucose (TyG) index is significantly associated with aortic stiffness in patients with chronic kidney disease (CKD), suggesting its potential role as a cardiovascular risk marker in this population.

### Keywords:

Triglyceride-glucose index, aortic stiffness, carotid-femoral pulse wave velocity, chronic kidney disease

## Improving Smoking Cessation Referral Rates for Chronic Kidney Disease Patients through Interdisciplinary Collaboration

### 運用跨團隊合作提升慢性腎病病患戒菸轉介率

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#### Background :

吸菸對身體有害幾乎是眾所皆知的事，依研究證實吸菸的民眾相較未吸菸的民眾，有超過 5 成增加腎臟病惡化、心血管疾病發生以及總死亡率。更進一步證實，香菸中有毒物質會減少腎小球過濾率和腎血漿流量的比例、出現蛋白尿、增加蛋白質流失，進而加速腎臟功能退化。吸菸量愈大和菸齡愈長，不良生理反應也增加，易致病程快速進入末期腎臟疾病。因此戒菸為慢性腎臟疾病患者的一個重要須達成的目標，改善病程進展，有助於疾病防治。

#### Methods :

本院家庭醫學科提供戒菸門診與衛教服務，並與院內各科部建立轉介機制，因此腎臟科藉此機會配合推動。本科採心智共享模型，首先建置多職類團隊，結合醫師、衛教師、個管師建立跨領域團隊，並協助腎臟科醫師取得戒菸醫師資格以建立戒菸共識，邀請專家至科內舉辦醫護人員菸害防制宣導教育，加強菸害防治之重要性；制定慢性腎臟疾病戒菸個案轉介流程，針對慢性腎病戒菸病患採積極個案管理，並持續追蹤個案戒菸進度，幫助慢性腎臟病病患成功脫離菸害。

#### Results :

此戒菸轉介計畫自 110 年 06 月至 112 年 12 月止，透過醫病共享決策及個案管理整合至戒菸轉介流程中，慢性腎臟病總收案數其中有吸菸個案數為 516 人，轉介戒菸成功個案數為 232 人、轉介率為 45%。轉介後醫師給予戒菸藥物，戒菸衛教師給予專業戒菸諮詢、個別化支持、積極性追蹤及個案意志力戒菸之結果。

#### Conclusions :

吸菸會導致慢性腎臟病病程惡化，也是許多疾病的危險因子，因此戒菸能延緩腎功能退化，致力於臨床疾病的防治。腎臟科積極推廣慢性腎臟病吸菸個案轉介戒菸門診，榮獲全國區域醫院腎臟科 110 年戒菸轉介王金獎、111 年銀獎及 112 年銅獎之殊榮。本計畫的實施不但推動跨科部提升戒菸率外，更發揮個案管理師之獨特功能，達到戒菸勸導成效，降低腎臟功能損傷危險因子，減緩病患提早進入透析，冀望未來能持續性的推廣。

#### Key words :

慢性腎臟病、戒菸轉介、跨團隊合作

## Reason analysis for end stage renal disease (ESRD) patients with pre-establishing vascular access receive first dialysis at admission —A Survey from a Medical Center in Southern Taiwan

### 末期腎臟病患預先建立血管通路住院透析原因分析-以南部某醫學中心為例

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**前言：**末期腎臟病病患在適當時機下事先建立好透析血管通路，在心理與身體都做好準備下，順利且安全由門診進入血液透析治療，是腎臟照護團隊最關注的議題。而當病人已預先建立血管通路，在接受首次血液透析仍是住院透析，這不僅對醫療利用與資源會明顯增加之外，更會是讓病人透析品質有負面影響。目的是探討末期腎臟病患進入長期透析時使用血管通路的住院原因現況調查，做為臨床實務之參考。

**方法：**調查自 2021 年 1 月至 2024 年 8 月底，收集南部某醫學中心腎臟內科定期回診且有加入 Pre ESRD 照護計畫，且首次透析是血液透析之慢性腎病病人，共 463 位完整收案病患進行資料分析。

**結果：**總共有 463 位個案進入血液透析前已完成血管通路，其中血液透析時有 324 位(70%)是使用血管通路，有 97 位(29.9%)是住院透析。而 97 位完成血管通路仍住院透析者，平均年齡 67.0±12.42 歲；有 66 位(68%)是男性；平均住院天數 12.2±13.7 天；最短為 2 天，最長的為 82 天；住院原因分析:(1)病患檢驗數值異常且出現尿毒症狀如：呼吸喘、虛弱、噁心嘔吐等，經由腎臟科醫師評估後需住院透析有 73 位 (73.5%)，(2)其他疾病因素：因心血管疾病的有 8 位 (8.2%)；腸胃內科疾病有 4 位 (4.1%)；因骨折及腹腔問題須接受手術有 4 位 (4.1%)；胸腔科的問題及多重共病且輾轉住多科的各有 3 位 (3.1%)；感染科與神內各 1 位 (1%)。

**結論與建議：**此分析顯示已經建立好血管通路的末期腎臟病患，有近 30%入院來透析。故對這些已經建立好血管通路的病人，在每一次回診照護時不僅要注意血管通路的成熟度，並隨時要觀察病人的症狀及監測檢驗數值，若是在主治醫師評估可以進來透析了，給予透析正向心理建設外，需要更深入了解病人拒絕透析的原因。期望病患在心裡與身體都做好準備下，皆能安全順利的從門診進入透析。

**關鍵字：**末期腎臟病、血管通路、住院透析



## Using the Health Education in Telligent Platform to Stepwise Initiation of Peritoneal Dialysis on Pre-End-Stage Renal Disease Patients

### 衛教智能平台運用於末期腎臟病前期病人接受腹膜透析預先植管成效

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#### Background :

當末期腎臟病前期(Pre-ESRD)病人的肌酐酸(Creatinine) $>6$  mg/dL，且伴有食慾不振、噁心嘔吐、高血鉀症、肺水腫或意識不清等尿毒症狀，即開始接受末期腎臟病替代治療，然而「透析前的準備」，除了心理上能坦然地面對透析，選擇適合自己「腹膜透析」治療方式，可考慮進行預先埋腹膜透析管，等到需要透析時，再將管子拉出，研究指出，接受腹膜透析預先植管(SIPD)的病人可降低導管滲漏率、腹膜炎率、導管出口部位的感染率、導管耗損率與增加導管壽命等，都優於傳統腹膜透析導管。當預先做好「透析前的準備」，在照護團隊建議下的時間點接受透析，就能平順度過這個過渡期，避免緊急透析、住院天數長、插入臨時透析導管不適感及透析導管感染等併發症風險。

#### Methods :

本院腎臟團隊於於 111 年 1 月建立「衛教智能平台」線上系統，至 113 年 8 月針對末期腎臟病前期病人有 211 位加入線上平台，提供末期腎臟病治療選擇透介紹(血液透析、腹膜透析、腎臟移植)、透析生活小百科、洗腎旅程等主題，讓病人及家屬與衛教師，不受限空間、互動零距離，一對一溝通諮詢，透過即時提問，個管師即時解答相關問題，團隊依據反饋與病人討論達成決策，讓病人及家屬更深入了解，腹膜透析預先植管與傳統腹膜透析導管(CPD)優缺點比較，進而減少，等待導管傷口癒合且有尿毒症狀，仍同時需要血液透析的治療、居家導管傷口照護、住院天數過久影響工作及生活作息等狀況的發生。

#### Results :

- 1.腹膜透析選擇預先植管(SIPD)與傳統腹膜透析導管(CPD)比率(%), 25%:75%(110年) vs.36.4%:63.6%(111年)、34.8%:65.2%(112年)、45.5%:54.5%(113年8月止)。
- 2.針對預先植管(SIPD)病人開始進行腹膜透析時調查顯示，腹膜透析護理師反饋，導管出口處感染率、導管滲漏發生率皆比傳統腹膜透析導管下降，且當需進行透析時，盡速將導管拉出並可馬上執行腹膜透析，減短等待透析時間，病人反饋導管在埋放期間，不用花時間照顧傷口，埋管後心情較放鬆，且住院天數減少，覺得生活品質有上升。

#### Conclusions :

本團隊運用「衛教智能平台」線上系統，讓病人貼近了解腹膜透析原理及操作，針對末期腎臟前期病人決定選擇採取腹膜透析時，衛教師進行預先植管(SIPD)與傳統腹膜透析導管(CPD)優缺點比較，建議進行預先植管(SIPD)，以降低導管出口處感染率、導管滲漏發生率，進而提高病人生活品質。

#### Key words :

末期腎臟病前期、衛教智能平台、預先植管

## Association between high-sensitivity troponin I and mortality risk in individuals with albuminuria

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### Background

High-sensitivity troponin I (hs-TnI) is a key biomarker for diagnosing acute myocardial infarction but is also elevated in asymptomatic individuals. Elevated hs-TnI, reflecting subclinical myocardial injury, has been linked to increased all-cause and cardiovascular mortality in the general population. However, its relationship with mortality in individuals with albuminuria, a marker of kidney damage and cardiovascular risk, is not well established. This study investigates the association between hs-TnI levels and all-cause and cardiovascular mortality in albuminuric individuals.

### Methods

We analyzed data from 1,625 participants with albuminuria, defined as a urinary albumin-creatinine ratio (ACR)  $\geq 30$  mg/g, from the 1999-2000 to 2002-2004 cycles of the National Health and Nutrition Examination Survey (NHANES) in the United States (U.S.). Serum hs-TnI levels were measured using the Abbott ARCHITECT i2000SR system, and participants were divided into quartiles based on hs-TnI concentrations. Mortality outcomes were obtained by linking NHANES data to the National Death Index, with follow-up until December 31, 2019.

### Results

The mean age of the participants was  $54.5 \pm 0.7$  years, and 53.9% were female. Elevated hs-TnI levels were significantly associated with older age, male sex, Black race, hypertension, cardiovascular disease, higher body mass index (BMI), and lower estimated glomerular filtration rate (eGFR). After adjusting for potential confounders, participants in the higher hs-TnI quartiles had a progressively increased risk of all-cause mortality compared to those in the lowest quartile: 48% higher (HR: 1.48, 95% CI: 0.93-2.34) in the second quartile, twice as high (HR: 2.03, 95% CI: 1.32-3.11) in the third quartile, and 2.8 times higher (HR: 2.81, 95% CI: 1.77-4.46) in the fourth quartile (P-trend  $< 0.001$ ). Similarly, the risk of cardiovascular disease (CVD)-related mortality increased with higher hs-TnI levels, showing a 78% higher risk (HR: 1.78, 95% CI: 0.64-4.94) in the second quartile, a 2.2-fold higher risk (HR: 2.21, 95% CI: 0.95-5.12) in the third quartile, and a 3.9-fold higher risk (HR: 3.92, 95% CI: 1.54-9.99) in the fourth quartile (P-trend  $< 0.001$ ). These associations remained consistent across eGFR subgroups, with similar results in participants with eGFR  $\geq 60$  and those with eGFR  $< 60$  mL/min/1.73 m<sup>2</sup>.

### Conclusions

Elevated blood levels of hs-TnI are associated with increased mortality. Measuring hs-TnI in individuals with albuminuria may help identify those at higher risk for adverse health outcomes, enabling earlier and more intensive risk factor modification.

**Keywords:** subclinical myocardial injury, high-sensitivity troponin I, albuminuria, chronic kidney disease, mortality risk.

## A Comparative Analysis of Quality of Life in Chronic Kidney Disease Patients Undergoing Different Dialysis Modalities: A Systematic Review and Evidence-Based Nursing Approach

### 不同透析模式對慢性腎臟病患者生活品質的影響：橫斷面研究與實證護理之系統性探討

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#### Background :

CKD is a progressive condition that leads to ESRD, requiring long-term dialysis therapy for survival. The choice of dialysis modality has a profound impact on patients' quality of life (QoL). As healthcare decisions increasingly focus on individual patient outcomes, Patient-Reported Outcomes (PROs) have become critical in guiding clinical decisions for dialysis patients. This study aims to explore the differences in QoL between PD and HD patients and to provide evidence-based insights for improving clinical care and treatment decisions.

#### Methods :

A systematic search was conducted in PubMed, EBSCOhost, and The Cochrane Library, focusing on studies before September 2024. The final analysis included three high-quality studies that compared QoL between PD and HD using standardized tools like SF-36 and KDQOL scales.

#### Results :

Study 1: Using the SF-36 scale, PD patients showed significant improvement in emotional function, physical function, body pain, and body composition compared to HD patients ( $P < 0.05$ ). KDQOL results revealed that PD patients experienced better sleep quality, social support, health status, and social interactions, with significant differences ( $P < 0.05$ ). Study 2: A meta-analysis of SF-36 data comparing PD and HD patients showed that PD patients had higher unstandardized mean differences (USMD) for both psychological and physical component summary scores, indicating a favorable impact of PD on QoL. KDQOL results showed that PD patients had higher scores across multiple domains, including burden of kidney disease, work status, symptom management, and social interaction, with moderate to high heterogeneity ( $I^2$ : 52.8% to 93.3%). Study 3: The KDQOL-SF-36 physical composite score (PCS) was significantly higher in PD patients than HD patients (44.75 vs. 37.84,  $P < 0.001$ ), though no significant differences were found in other QoL domains.

#### Conclusions :

PD generally outperforms HD in multiple QoL dimensions, especially psychological well-being and social support. Study 1 highlights significant QoL differences, helping patients choose suitable modalities. Study 2 links lower HD QoL scores to higher mortality and hospitalization. Though PD provides better overall QoL, treatment decisions should also consider individual health and family support. Educational efforts should promote PD, given its multiple advantages in QoL outcomes.

#### Key words :

PD, HD, Quality of Life(QoL), CKD, HRQoL (Health-Related Quality of Life)

## Association of heart failure, albuminuria, and mortality in the U.S. general population

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### Background

Chronic kidney disease (CKD), commonly assessed by reduced glomerular filtration rate (GFR) or albuminuria, is an independent risk factor for heart failure (HF). Although eGFR is often used to predict cardiovascular risk, albuminuria is increasingly recognized for its strong prognostic value, even at lower levels. This study assesses the role of albuminuria in predicting HF and long-term mortality, independent of eGFR.

### Methods

We analyzed data from 10,484 adults in the 1999–2004 National Health and Nutrition Examination Survey with eGFR  $\geq 60$  mL/min/1.73 m<sup>2</sup>. NT-proBNP was measured, and HF was categorized using age-adjusted NT-proBNP cutoffs from the European Society of Cardiology. Urinary albumin-creatinine ratio (ACR) was classified as normal (<10 mg/g), high normal (10–<30 mg/g), moderately increased (30–300 mg/g), and severely increased (>300 mg/g). Mortality data were obtained from linkage to the National Death Index, with follow-up through December 31, 2019.

### Results

Among the participants (mean age 45.1 years, 49.2% male), 7.6% were classified as “Grey zone (heart failure not likely),” and 8.1% as “heart failure likely or very high risk.” Compared to those with normal ACR, participants with high normal (OR: 1.31, 95% CI: 1.06–1.63), moderately increased (OR: 2.40, 95% CI: 1.82–3.15), and severely increased ACR (OR: 7.06, 95% CI: 3.56–14.04) had significantly higher odds of being classified as “heart failure likely or very high risk.” During a median follow-up of 215 months, 2,646 participants died. Moderately to severely increased ACR was associated with higher risks of all-cause mortality (HR: 1.95, 95% CI: 1.69–2.25) and cardiovascular mortality (HR: 2.84, 95% CI: 2.22–3.65) after adjusting for potential confounders. High normal ACR was also associated with increased all-cause mortality (HR: 1.38, 95% CI: 1.23–1.55) and cardiovascular mortality (HR: 1.67, 95% CI: 1.34–2.09). These associations remained significant when stratified by heart failure status. Additionally, when participants were grouped based on heart failure status (heart failure very unlikely vs. heart failure not likely, likely, or very high risk) and albuminuria levels (ACR < 10 mg/g vs.  $\geq 10$  mg/g), those with heart failure not likely, likely, or very high risk and ACR  $\geq 10$  mg/g had the highest risk of both all-cause and cardiovascular mortality compared to the other groups.

### Conclusions

Albuminuria is a significant predictor of heart failure and long-term mortality, independent of eGFR. Participants with elevated ACR and higher NT-proBNP-defined heart failure risk had the highest mortality risk. Incorporating ACR into clinical risk assessments may improve identification of individuals at greater risk for adverse cardiovascular outcomes, even with normal eGFR.

**Keywords:** Heart failure, NT-proBNP, albuminuria, CKD, mortality risk

## Efficacy of Finerenone in Cardiovascular and Renal Protection for Patients with Diabetic Kidney Disease: A Clinical Analysis

糖尿病腎病變患者使用醛固酮受體拮抗劑 Finerenone 對心腎功能保護的成效分析

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### Background :

Diabetes is a leading cause of CKD and significantly increases cardiovascular mortality risk. Traditional steroidal mineralocorticoid receptor antagonists (MRAs) reduce renal and cardiovascular damage but have limitations, such as hyperkalemia. Finerenone, a novel non-steroidal MRA, has shown potential benefits with fewer side effects, as demonstrated in trials like ARTS-HF and ARTS-DM, which highlighted its efficacy in reducing heart failure biomarkers and albuminuria in Type 2 DM patients.

### Methods :

This study systematically reviewed trials, including the FIGARO trial, where 7,437 diabetic CKD patients were randomized to receive either Finerenone or placebo, alongside renin–angiotensin system blockers. The study lasted 3.4 years, focusing on cardiovascular outcomes such as death, myocardial infarction, stroke, or heart failure hospitalization.

### Results :

The FIGARO-CKD trial confirmed Finerenone's effectiveness in reducing HF events, particularly in patients without prior HF. The risk of a first HF episode was significantly reduced (HR 0.68, P = 0.02; absolute risk reduction 1.1%, NNT = 91). In the broader population, time to first HF hospitalization was also reduced (HR 0.71, P = 0.0043; absolute risk reduction 1.4%, NNT = 70). However, no significant improvement was observed in cardiovascular outcomes across CKD stages or urinary albumin levels. The study also noted a potential synergistic effect between Finerenone and SGLT2i, with 8.5% of patients on SGLT2i at baseline and an additional 15.7% starting during the trial. Post-hoc analysis revealed greater protection in obese patients (BMI >30 kg/m<sup>2</sup>), possibly due to higher aldosterone levels, suggesting further research on drug combinations is warranted.

### Conclusions :

Finerenone significantly reduces heart failure risk in diabetic kidney disease patients, particularly those without a history of heart failure. Although its effect on overall cardiovascular outcomes was limited, its synergy with SGLT2 inhibitors and enhanced efficacy in obese patients highlights its potential role in comprehensive patient care. Clinically, Finerenone is recommended for high-risk CKD patients to protect cardiovascular and renal function. Nurses should individualize patient care plans based on cardiovascular and renal health status, guiding medication use and ensuring proper education about treatment options. Regular monitoring of cardiovascular and renal function is crucial to optimize patient outcomes and treatment efficacy.

### Key words :

Diabetic kidney disease, Finerenone, Cardiovascular protection, Renal protection, SGLT2 inhibitors.

## Associations of peripheral blood mononuclear cell immunophenotypes with peripheral artery occlusive disease and diabetic foot syndrome in chronic kidney disease stage 4-5D patients

慢性腎臟病第 4 至 5D 期病人的周邊血液單核球細胞免疫分型與周邊動脈阻塞性疾病和糖尿病足症候群的相關性分析

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**Background:** Peripheral artery occlusive disease (PAOD) and diabetic foot syndrome (DFS) are highly prevalent among patients with chronic kidney disease (CKD), especially those with end-stage kidney disease (ESKD), and contribute significantly to mortality and morbidity. It is well known that CKD/ESKD patients have dysregulated immune system, which influences their survival outcomes. This study aimed to decipher the peripheral blood immunophenotypes in advanced CKD/ESKD patients with PAOD and DFS and their associations with patient outcomes.

**Methods:** We prospectively recruited CKD stage 4 to 5D (D = dialysis) patients from Shuang Ho Hospital, Taipei Medical University, following informed consent. A total of 90 patients were enrolled and categorized into three groups: Group 1 (n=30) with confirmed PAOD, Group 2 (n=30) with confirmed DFS, and Group 3 (n=30) without PAOD or DFS. Peripheral blood samples were collected from each patient for routine hemogram and biochemical tests, followed by the isolation of peripheral blood mononuclear cells (PBMC) using density gradient centrifugation. PBMC immunophenotyping was performed using a multi-color Attune NxT Flow Cytometer (Thermo Fisher Scientific) with fluorochrome-conjugated antibodies targeting CD3, CD4, CD14, CD16, CD19, CD25, CD45RA, CD56, CD62L, and CCR7. Statistical analysis was conducted to compare immune profiles across the three groups.

**Results:** Of the 90 patients, 84 were undergoing maintenance dialysis, and 6 were in CKD stages 4-5. Immunophenotyping revealed 30 distinct immune cell subsets, including various B cells, T cell subtypes (T helper cells, cytotoxic T cells, double-positive T cells, double-negative T cells), NK cells, NKT cells, and monocytes (classical, nonclassical, and intermediate). Patients with DFS exhibited a significant reduction in active regulatory T cells (CD3+CD4+CD25+CD56-) and an increase in effector memory T helper cells (CD45RA-CD62L-CCR7-CD4+CD3+CD56-). Additionally, DFS patients had a notable decrease in NK cells (CD56+CD16+). Over a one-year follow-up, half of the DFS patients experienced amputation, and both DFS and PAOD groups exhibited significantly increased mortality.

**Conclusions:** Our findings reveal distinct immune dysregulation patterns in advanced CKD/ESKD patients with PAOD and DFS, which may differentially impact clinical outcomes. Future research will focus on conducting multiple regression analyses to identify risk factors that predict poor outcomes.

## The Relationship Between Kidney Disease Chronicity and Severe Post-Biopsy Hemorrhage in Native Kidney Biopsies

### 腎病慢性程度與腎切片後嚴重出血之關係

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#### Background :

Hemorrhage remains the most common complication after kidney biopsy. This study aimed to investigate whether the chronicity of kidney disease increases the risk of severe post-biopsy hemorrhage.

#### Methods :

This single-center retrospective cohort study included adult patients who underwent native kidney biopsy at the Taipei Veterans General Hospital from January 2008 to April 2023. Patients who required transcatheter arterial embolization (TAE) due to severe hemorrhage were categorized as the case group. The control group is those with no hemorrhage or mild hemorrhage who did not require intervention. We collected data on kidney function, coagulation tests, hemoglobin levels, kidney size, and chronic kidney disease (CKD) stages. Pathological reports were reviewed for kidney disease chronicity indices.

#### Results :

Patients in the case group had significantly more advanced CKD stages and smaller kidney sizes compared to the control group. Histopathological findings, such as glomerulosclerosis and interstitial fibrosis, were more pronounced in the case group. These results highlight a strong correlation between advanced CKD and an increased risk of severe post-biopsy hemorrhage.

#### Conclusions :

The study indicated that kidney disease chronicity is an independent risk factor for severe post-biopsy hemorrhage. Patients with more significant kidney disease chronicity are at higher risk for hemorrhagic complications requiring TAE.

#### Key words :

Chronic kidney disease, kidney disease chronicity, native kidney biopsy, post-biopsy kidney hemorrhage, transcatheter arterial embolization,

## Clinical Outcomes and Nursing Recommendations for Renal Replacement Therapies

### 腎臟替代療法之間的臨床效益與照護建議探討

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#### Background :

Renal replacement therapies are essential for end-stage renal disease (ESRD) treatment, with hemodialysis (HD), peritoneal dialysis (PD), and kidney transplantation (KT) being the primary options. Each therapy differs significantly in terms of survival rates, quality of life (QoL), and treatment costs. Understanding these differences is crucial for developing the best care plans tailored to patient needs.

#### Methods :

A systematic search of databases, including PubMed, was conducted up to September 25, 2024. Studies included systematic reviews, prospective trials, and multiple regression analyses focusing on survival rates, QoL, and costs associated with HD, PD, and KT.

#### Results :

The evidence suggests that KT offers the best clinical outcomes for ESRD patients, with significant improvements in both QoL and survival rates. One study found that 67 kidney transplant patients reported mid-to-high QoL levels, particularly in intimate relationships, family functioning, and health, though psychosocial scores were lower. Another study involving 92 patients showed that health-related QoL was the highest, while psychosocial scores remained the lowest. KT demonstrated a five-year survival rate of 93.4%, compared to 44.2%-54.9% for PD and 55.1% for HD. The costs associated with each therapy were NT\$165,560 per KT, NT\$427,000 annually for PD, and NT\$570,000 annually for HD. QoL, as measured by the Quality of Life Index (QLI-D), was significantly higher in PD patients compared to HD patients, with a difference of 2.81 units ( $p < 0.001$ ).

#### Conclusions :

KT remains the most effective option for both survival and QoL, though its cost can be a barrier. For patients with sufficient resources and no contraindications, KT is the optimal choice. HD, while slightly improving survival rates over PD, is linked to lower QoL and higher costs, making it suitable for those unable to afford KT but capable of adhering to regular clinical appointments. PD strikes a balance between better QoL and moderate costs. Nurses should focus on personalized care, ensuring patients are well-informed about the pros and cons of each treatment. Regularly assessing QoL and health status enables ongoing adjustments to care, while also addressing financial considerations. Nurses should also help patients navigate treatment costs and insurance options to ensure financial stability while optimizing outcomes.

#### Key words :

PD, HD, Quality of Life, Survival Rate, KT, Healthcare Costs, Health Insurance



## Content Analysis and Viewing Behavior Study of YouTube Kidney Health Videos YouTube 腎臟保健影片之內容分析與觀看行為研究

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### Background :

在當今醫學領域，腎臟病的防治一直是一個極具挑戰的課題，政府為提升民眾腎臟健康促進，自 2013 年起推動全民健康保險腎臟病照護病人衛教計畫，根據國人 10 大死因統計，「腎炎、腎病症候群及腎病變」從蟬聯多年的第 9 名進步至 2023 年第 10 名，顯示早期篩檢與早期治療的成效及重要性。因此，為了更強化健康促進結果，本研究旨在探討台灣最常使用的 YouTube 影音平台，評估 YouTube 影片對腎臟病防治的影響和內容。

### Methods :

截至 2024 年 9 月 20 日，使用關鍵詞「腎臟」系統搜尋在 YouTube 影音平台上之影片，發現有 119 部超過 10 萬觀看次數的台灣影片。排除準則為非腎臟病防治的主題、人類非健康促進對象、商品廣告、非台灣語言或重複的影片，最後篩選出 82 部影片進行整理，統計其與影片時間長度、影片創作頻道訂閱數、不同的主講者的身分背景及各式腎臟病防治主題類型之影響。

### Results :

這些影片平均觀看次數為 609564.82 次，平均擁有 609,564 訂閱者，時間長度為 16.79 分鐘，主要以醫學專家為主角，包括腎臟病醫師(52 部，占 63.41%)、其他領域醫師(13 部，占 15.85%)及中醫師(10 部，占 12.20%)，通常涵蓋兩種以上的健康主題，主要是飲食(59 部，占 71.95%)、疾病症狀(29 部，占 35.37%)與生活方式調整(19 部，占 23.17%)之腎臟病防治主題。

分析觀看次數最多的影片與創作頻道訂閱數及時間長度之間的影響，皆呈現微弱正相關性，非主要決定因素。不同衛教者之間對觀看次數的影響產生顯著差異，特別是由某醫師作為主角的影片觀看次數顯著性較高。雖然不同的腎臟病防治主題對觀看次數的影響並不顯著，但某些主題（例如：飲食和疾病症狀，多元回歸係數分別為 0.35 和 0.25）在高觀看次數的影片中出現頻率較高，可能對觀看次數有一定的正向影響，顯示出影片內容的選擇仍然是吸引觀眾的重要因素。

### Conclusions :

YouTube 是台灣傳播腎臟健康資訊的重要平台，不同的影片類型皆可能是熱門影片，它有潛力成為增強民眾參與腎臟病防治和自我管理策略的工具。未來研究可進一步探討影響影片觀看量的其他因素。

### Key words :

腎臟病防治、YouTube、影片、自我管理

## One Skin luminance-Based End-stage Kidney Disease Prediction Model in Patients with Chronic Kidney Disease: an External Validation Study

### 慢性腎臟病人以膚色亮度為基礎的晚期慢性腎臟病預測模式：一個外部有效性研究

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#### Background :

Skin disorder is one of common symptoms that is complained by patients with chronic kidney disease (CKD). Model with skin illuminance can predict eGFR<15 precisely and accurately. However, the model validity for external subjects is unclear. This study aims to use the same protocol to external validate the performance of the developed prediction model.

#### Methods :

We collected patients with CKD who enrolled in the multidisciplinary care in another hospital. The traditional factors including demographic features, primary disease, life of habit, body mass index, blood pressure, biochemistry data, and comorbid conditions, were collected by the same protocol. Skin color was measured by a novel high-precision and accurate instrument. The area under ROC curve was used to evaluate the model performance when applied to the study subjects.

#### Results :

Totally, 113 patients with CKD, whose average age was 70.6 years and average eGFR was 33.6, completed all measurements before September 2024. Nearly twenty percentage of the study subjects' eGFR value <15. The accuracy percentage of the model predicted eGFR<15 was 86.3%. The area under ROC curve for the model applied to the external subjects was as high as 90.6% (95% CI: 85.1%, 96.0%), which implied a good performance of the developed model.

#### Conclusions :

The model to predict eGFR<15 is promising in patients with CKD for external validation. Further investigation of the model performance is needed to apply to different countries and ethnics. This study was supported by the Pingtung Hospital, the Ministry of Health and Welfare (PNTN-30).

#### Key words :

Skin luminance, chronic kidney disease, kidney function, end-stage kidney disease

## Urinary tract infection requiring hospital admission could induce subsequently accelerated deterioration of renal function in adult CKD patients

成年慢性腎病患者發生需住院之泌尿道感染可引起後續之腎功能加速惡化

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**Background.** Urinary tract infection (UTI) or acute pyelonephritis can lead to renal scarring and impact the subsequent renal function progression. The aims of this study were to investigate the changes of renal function related to UTI requiring hospital admission (UTI/HA) in patients with chronic kidney disease (CKD).

**Methods.** This was a multicenter, retrospective observational study. Adult CKD patients enrolled in the pay-for-performance (P4P) care program in the nephrology clinics between January 1, 2010 and December 31, 2021. The estimated glomerular filtration rate (eGFR) was calculated using the formula derived from the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) creatinine equation. Renal events and renal function before and after UTI/HA in CKD patients were analyzed for short-term and mid-term renal outcomes.

**Results.** Among 174 CKD patients with UTI/HA, 59 (33.9%) had bacteremia, 90 (51.7%) acute kidney injury (AKI), and one in-hospital mortality. There was a faster decline of estimated glomerular filtration rate (eGFR) after UTI/HA compared to the pre-UTI/HA period [median (IQR) 0.35 (0.16-0.69) versus 0.16 (0.04-0.33) ml/min/1.73 m<sup>2</sup> per month, P < 0.0001].

**Conclusions.** This study highlights the impact of UTI/HA on renal outcomes in adult CKD patients. It demonstrates a high incidence of in-hospital AKI but with low mortality, and accelerated deterioration of renal function following UTI/HA.

**Keywords:** acute kidney injury, chronic kidney disease, estimated glomerular filtration rate, urinary tract infection

## The Comparison of the Effect of Intradialytic Exercises on Lower Limb Muscle Strength in Dialysis Patients

### 比較透析中運動與不運動對透析病人下肢肌力的影響

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#### Background :

血液透析病人因尿毒症所引起相關的神經和肌肉病變，導致肌肉張力與強度下降，使病人出現活動耐力偏低(傅、吳，2020)。在血液透析過程中，因患者大多採平躺，導致身體活動上有所限制。以一週3次血液透析每次4小時為例，透析病人一年平均臥床624小時。文獻指出，病人臥床3~4週，肌肉質量每天會以1.5%~2%比率流失，再加上因慢性病與透析造成身體衰弱，更容易引起心血管疾病，導致周邊動脈硬化的風險(吳等，2010；林、徐，2020)。因此想藉此探討透析中介入運動，是否能改善透析病人下肢循環及增加肌力。

#### Methods :

根據臨床問題，以PICO進行文獻搜尋，此為治療型問題，研究設計以隨機對照試驗(Randomized Controlled Trial；RCT)為佳，資料庫以華藝線上圖書館、Pubmed、Cochrane Library、Clinicalkey、Embase等五個資料庫，使用布林邏輯「AND」「OR」，關鍵字以Mesh term方式進行搜尋，依納入/排除條件檢索文獻共171篇，排除不符合主題136篇，逐篇閱讀標題及全文後排除13篇、排除重複文獻20篇，最終納入2篇文獻並以JBI-RCT Checklist和類實驗研究查檢表進行評讀。

#### Results :

證據等級評析研究方法與結果，發現納入的二篇文獻證據等級為1b及2，亦發現透析中運動的期望效果明確地超過不良效果，因此依照JBI建議強度之評等為A級，具明確指出策略超過預期效果，有充足證據支持，且對資源使用有好處，同時考慮病人價值觀及喜好，故給予“強”建議。

#### Conclusions :

透析中依病人身體狀況進行透析中阻力運動 Intradialytic resistance training (IRT)，不僅可以相對較短的時間，抑制透析期間的不良反應肌肉力量和功能，還可有效且安全地增加下肢肌肉功能，是安全有效的做法。建議透析病人欲想改善下肢肌力時，可使用透析中阻力運動 Intradialytic resistance training(IRT)，納入年齡30歲以上，透析年資3個月以上，進行每週三次，每次40分鐘，由3分鐘熱身，30分鐘阻力運動，及7分鐘的冷卻和拉伸。

#### Key words :

Intradialysis exercise 、physical activity 、hemodialysis 、muscle strength

## Explore the relation between mental health and clinical outcomes in advanced chronic kidney disease patients

### 探討晚期慢性腎臟病人的精神健康與臨床指標之相關性

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**背景：**隨著慢性腎臟病（Chronic Kidney Disease, CKD）疾病程度加重，其生理及心理相關指標也都會變差，監測病人臨床症狀和身心健康狀態可以提供重要訊息，幫助優化 CKD 管理，因此瞭解並辨識病人對於疾病的生理、心理、情緒狀態，可以幫助病人積極面對，找到應對策略以減緩腎功能進展與惡化；本研究目的為探討晚期 CKD 病人的精神健康與臨床指標之相關性。

**研究方法：**本研究採橫斷性立意取樣，收案地點為高雄某醫學中心腎臟內科門診，收案對象為經腎臟科醫師診斷 CKD 第五期、未診斷精神障礙的病人。以結構式問卷調查及病歷回顧方式收集資料，包含基本資料表、華人健康量表(Chinese Health Questionnaire, CHQ-12)、心情溫度計簡易版(BSRS-5R)、臨床檢驗指標等。CHQ-12 量表共 12 題，主要檢測憂鬱與焦慮程度，用以評估慢性病人及中老年人身心健康狀況，得分愈高表示精神狀況愈差，總分 $\geq 3$  分表示有情緒困擾的傾向；BSRS-5R 量表共 6 題，主要作為精神症狀的篩檢表，能夠迅速了解病人的心理照護需求，進而提供所需之心理支持服務。BSRS-5R $\geq 4$  分代表精神疾病(如憂鬱症、焦慮症)的高風險組；臨床指標包括尿素氮(BUN)、血清肌酸酐(Cr)、腎絲球過濾率(eGFR)、血色素(Hb)、血磷(Pi)、血鉀(K)..等，所有統計均使用 R software version 4.2.進行資料分析。

**研究結果：**2024 年 4 月 1 日至 2024 年 8 月 30 日共收案 132 位，平均年齡為  $64.5 \pm 12.7$  歲，女性(53.0%)、高中(含)以下(80.3%)、已婚(67.4%)、無工作(65.9%)、主要照顧者為自己(78.8%)、主要醫療決策為自己(54.5%)者佔多數，平均 Cr  $7.0 \pm 6.1$  mg/dl、eGFR  $8.7 \pm 3.2$  mL/min/1.73m<sup>2</sup>、Hb  $10.3 \pm 1.5$  g/dL、Pi  $4.5 \pm 0.8$  mg/dL、K  $4.5 \pm 0.6$  mg/dL。結果發現，CHQ $< 3$  的平均年齡為  $66.6 \pm 11.6$  歲，而 CHQ $\geq 3$  的平均年齡為  $58.3 \pm 13.9$  歲，顯示 CHQ $\geq 3$  有情緒困擾的病人明顯較年輕 (P=0.003)。在 BSRS 精神疾病高風險組中，女性佔 78.6%，顯示女性更可能屬於高風險群 (P=0.043)。CHQ $< 3$  的平均 eGFR 為  $8.1 \pm 3.4$  mL/min/1.73m<sup>2</sup>，而 CHQ $\geq 3$  的平均 eGFR 為  $7.8 \pm 2.7$  mL/min/1.73m<sup>2</sup>，兩組 eGFR 有顯著差異 (P=0.025)。BSRS 精神疾病高風險組的平均 eGFR 為  $6.9 \pm 2.7$  mL/min/1.73m<sup>2</sup>，明顯低於 BSRS 低風險組 (P=0.021)。此外，CHQ $\geq 3$  組的血鉀值顯著較高 (P=0.026) 及 Hb 顯著較低 (P=0.024)。

**結論：**本研究結果呈現年輕、女性、較低的腎絲球過濾率、血色素和較高的血鉀值與病人情緒困擾相關。臨床照護團隊和晚期腎臟病人進行衛教諮詢時，可透過簡易身心評估量表了解病人特質、相關的身心健康狀態，進而提供適時適當的照護需求或評估轉介專業人員，以達到更好的照護品質與成效。

**Keywords:** chronic kidney disease (CKD), mental health, clinical outcomes

## Association between the serum irisin and peripheral arterial stiffness according to the cardio-ankle vascular index in CKD stage 3-5 patients

血清鳶尾素濃度跟非透析第三期到第五期慢性腎臟病患者以心踝血管指數測量週邊動脈硬度有關

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**Background:** Irisin is related to energy balance and metabolism and has a positive effect on the prevention and treatment of atherosclerosis. The cardio-ankle vascular index (CAVI) is a useful biomarker of arteriosclerotic disorders and is closely related to various cardiovascular (CV) events. This study investigated the correlation between serum irisin levels and arterial stiffness in non-dialysis patients with stage 3–5 chronic kidney disease (CKD).

**Methods:** We enrolled 170 CKD patients. A commercial enzyme-linked immunosorbent assay was used to measure irisin levels. The CAVI values were determined using the waveform device (VaSera VS-1000). A CAVI value of  $\geq 9.0$  on either side was defined as peripheral arterial stiffness (PAS).

**Results:** In this study, 73 (42.9%) patients were found to have PAS. Compared to those without PAS (control group), patients with PAS were older ( $P < 0.001$ ) and had a higher incidence of diabetes mellitus (DM,  $P = 0.006$ ), higher levels of fasting glucose ( $P = 0.011$ ), and lower levels of irisin ( $P = 0.003$ ). Multivariate logistic regression analysis found irisin levels (odds ratio [OR]: 0.982, 95% confidence interval [CI] 0.969–0.994,  $P = 0.004$ ), old age (OR: 1.059, 95%CI 1.025–1.094,  $P = 0.001$ ), and DM (OR: 2.824, 95%CI 1.251–6.376,  $P = 0.012$ ) to be independently associated with PAS in patients with stage 3–5 CKD. Further, using Spearman's correlation analysis, the left and right CAVIs revealed a significantly negative correlation with log-transformed irisin levels ( $r = -0.177$ ,  $P = 0.021$ ;  $r = -0.169$ ,  $P = 0.028$ , respectively). The area under the curve for the receiver operating characteristic curve to predict PAS by serum irisin level was 0.631 (95% CI = 0.548–0.714,  $P = 0.002$ ).

**Conclusions:** In patients with long-term PD, a negative association was observed between serum log-CRP and leptin levels and endothelial dysfunction determined by VRI values.

**Key Words:** Irisin, Chronic kidney disease, Peripheral arterial stiffness, Cardio-ankle vascular index.

## Novel renal biomarkers in detecting phthalate-associated nephrotoxicity in patients with chronic kidney disease

新型腎臟生物標記於慢性腎臟病患者鄰苯二甲酸鹽相關腎毒性檢測之角色

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### Background :

Phthalates are plasticizers widely used in daily consumer products. Exposure to phthalates has been associated with adverse health effects, including renal injury. However, traditional renal function tests might underestimate the early renal damage associated with phthalate exposure. In this study, we investigated novel urinary renal biomarkers kidney injury molecule-1 (KIM-1) and 8-hydroxy-2'-deoxyguanosine (8-OHdG) for their potential roles in detecting phthalate-associated renal damage.

### Methods :

Adult patients ( $\geq 20$  years of age) who have chronic kidney disease (CKD) stage 3–5 were recruited in this study. Urinary concentrations of eight phthalate metabolites were measured to calculate the estimated daily intakes (EDIs) of corresponding phthalate parent compounds. We utilized urinary KIM-1 and 8-OHdG concentrations to detect early renal damage related to phthalate exposure. To evaluate the impact of phthalate exposure on renal disease, we utilized weighted quantile sum (WQS) regression models to assess the mixture effects of phthalate EDIs on KIM-1 and 8-OHdG levels.

### Results :

In this study, 169 patients with CKD were enrolled for analysis. The overall detection rate of urinary phthalate metabolites was 100% in the study population. After adjusting for baseline covariates, the WQS indexes of phthalate EDIs were positively associated with urinary KIM-1 and 8-OHdG concentrations ( $\beta$  (95% confidence interval), 0.060 (0.029–0.090) log ng/g creatinine and 0.057 (0.037–0.076) log  $\mu\text{g/g}$  creatinine, respectively).

### Conclusions :

Phthalate exposure is associated with renal injury in patients with CKD. Novel renal biomarkers such as KIM-1 and 8-OHdG are considered promising to detect early phthalate-associated nephrotoxicity.

### Key words :

8-hydroxy-2-deoxyguanosine, chronic kidney disease, kidney injury molecule-1, phthalates

## Analysis of the Status of Preemptive Dialysis Access Establishment and the Effectiveness of Medical Resource Utilization in First-Time Dialysis Patients

### 首次透析病人預先建立透析通路現況與醫療資源利用成效之分析

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#### 研究目的：

在台灣，末期腎臟病的透析治療發生率與盛行率高於全球其他國家。這些病人常因面臨需接受透析治療而產生焦慮與恐懼，導致他們拖延或拒絕預先建立透析通路，進而影響透析照護品質及醫療資源的利用。因此，對於慢性腎臟病病人介入個案管理照護模式，以及進行醫病共享決策(Shared Decision Making; SDM)，提供病人了解並選擇適合的治療方式，並做好透析決策和預先建立透析通路，成為慢性腎臟病照護的首要任務。本文的研究目的在於分析於透析治療前接受慢性腎臟病個案管理照護的病人，預先建立透析通路的現況及醫療資源利用成效。

#### 研究方法：

本研究採資料庫回溯性研究設計，針對東部某醫學透析中心，收集 2023 年至 2024 年 7 月透析病人的資料。以首次透析日為基準，分析接受血液與腹膜透析的個案共 190 位。研究重點分析透析前病人醫療資源利用包含：(1)個案管理照護：分析病人透析前是否接受個案管理照護的情況。(2)醫病共享決策(SDM)：探討病人在末期腎臟病治療選擇過程中，是否參與醫病共享決策。(3)預先建立透析通路的現況：評估病人在首次透析前是否已經建立透析通路。(4)首次透析時有無住院比較之差異。

#### 研究結果：

資料顯示：首次透析病人共有 190 位，有接受個案管理照護的共 84 位 (43.6%)；有執行醫病共享決策(SDM)的有 78 位 (41.1%)；在透析前，有預先建立透析通路的有 44 位 (23.2%)；在這 44 位病人中，有接受個案管理照護的 26 位 (59.1%)；有執行醫病共享決策的 24 位 (54.5%)；有接受個案管理照護且有執行醫病共享決策(SDM)的有 16 位 (36.4%)；首次透析時未住院的有 19 位 (43.1%)。

#### 結論與討論：

研究顯示，接受個案管理照護和參與醫病共享決策的病人在透析通路預先建立上有顯著正面影響。雖然僅少數病人在首次透析前建立通路，但因介入措施而提高通路建立率，顯示其對改善透析照護品質和醫療資源利用的重要性。此外，首次透析時住院病人會面臨更高的併發症風險及醫療費用。未來應加強以下措施：增強病人教育，幫助病人理解透析治療的必要性和通路建立的好處；促進醫病共享決策，使病人參與治療選擇；強化個案管理系統；定期評估與改善，調整照護品質和資源利用。透過這些措施，提高通路建立率和整體醫療效果，最終改善病人的生活品質。

**關鍵字：**首次透析病人、個案管理、醫病共享決策、血管通路、醫療資源利用



## In response to the "2025 Taiwan Kidney Strength Project" Cross-department cooperation, Increase the enrollment rate of "Early Chronic Kidney disease."

響應「2025 腎力計畫」跨處室合作，提升「初期慢性腎臟病」新收案率

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### Background :

台灣腎臟醫學會與國健署發起「2025 腎力計畫」，訂定腎病識能、多元合作、廣擴照護量能目標。本院承辦衛生福利部中央健保署之全民健康保險初期慢性腎臟病醫療給付改善方案，加強慢性腎臟病前端的預防。然而 2021-2022 年起因疫情及收案醫師調動，造成初期慢性腎臟病新收案人數由 2020 年 1110 人(平均 93 人/月)至 2022 年已下降 827 人(69 人/月)。是故；希望藉由跨處室合作，提升「初期慢性腎臟病」新收案率及照護涵蓋率，將初期慢性腎臟病新收案人數設定為 102 人/月，改善幅度 48%。

### Methods :

全員腦力激盪，SWOT 分析-優勢、弱點、機會及威脅後，擬訂計畫及執行，1.向上推廣，提升收案醫師資格人數。2.提升資訊功能-看診系統腎病風險及新收案個案提示。3.提升衛教師人力及專業能力(因應糖尿病及初期慢性腎臟病照護整合方案，鼓勵衛教師取得相關資格證書及能力，提升收案及照護品質)。4.跨處室多元提升民眾及病患腎病健康識能。

### Results :

初期慢性腎臟病收案資格醫師由 26 人上升至 37 人；專職腎臟照護衛教師新增至 2 位。2023 年初期慢性腎臟病新收案由 872 人上升至 1363 人；每月平均新收案數由 69 上升至 114 人/月，改善幅度達達 65%。2023 年院內外相關衛教講座共 92 場，推廣活動共 20 場。附加效益：提升院方營收及糖尿病及初期慢性腎臟病照護整合方案收案率由 6 人上升至 268 人。

### Conclusions :

本院持續努力提升早期腎臟病照護的涵蓋率，但尚有多位醫師未具收案資格、收案醫師變動與病患未按時追蹤及抽血，造成收案個案流失仍是值努力與加強空間。未來建議院方提升醫師參予計畫之動力，給予適當獎勵。且更全方位推廣腎病健康識能，全力響應「2025 腎力計畫」目標，期待能更多病患得到完善早期照護方案，定期追蹤腎功能變化，讓病人得到全方位照顧，降低或延緩腎功能惡化，減輕健保醫療負擔。

### Key words :

2025 台灣腎力計畫 全民健康保險初期慢性腎臟病醫療給付改善方案 腎病健康識能

## Revisiting Frequent Premature Atrial Contractions and All-Cause Mortality in Non-Dialysis CKD population

### 重新探討非透析慢性腎病族群中頻繁早期心房收縮與死亡率的關係

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#### Background :

Cardiac arrhythmias are common in chronic kidney disease (CKD) patients. The European Society of Cardiology (ESC) now considers frequent premature atrial contractions (PACs) as associated with an increased risk of all-cause mortality, rather than being benign. Therefore, our study aims to evaluate the mortality risk of frequent PACs in non-dialysis-dependent CKD patients.

#### Methods :

The CKD patients who joined the pre-end-stage renal disease program and examined 24-hour Holter monitor were recruited in the Kaohsiung Medical University Hospital healthcare system from April 2009 to December 2021. The total PAC counts were calculated, and the frequent PACs were defined with a cutoff value of 218 beats per day. The relationship between frequent PACs and all-cause mortality was analyzed using survival analysis and the Cox regression model.

#### Results :

After excluding 195 participants with a history of atrial fibrillation (AF) and 239 individuals with newly detected AF, 1,743 patients were included in the final analysis. The Kaplan-Meier curve indicated that individuals with PACs greater than 218 beats per day were linked to an increased risk of all-cause mortality compared to those with lower PACs frequency. In a multivariable-adjusted Cox regression model, frequent PACs were associated with an increased risk of all-cause mortality (adjusted hazard ratio, 1.36; 95% Confidence interval, 1.13-1.63; p-value = 0.001).

#### Conclusions :

Our study demonstrated that non-AF CKD patients with frequent PACs were associated with a higher risk of all-cause mortality. Further studies are required to establish the threshold for frequent PACs and the prevention strategy for frequent PACs subjects.

#### Key words :

Premature atrial contractions, chronic kidney disease, mortality.

## Progression of Chronic Kidney Disease in Diabetic Patients: Insights from a Multi-State Markov Model

### 利用多狀態馬可夫模型分析糖尿病患者的慢性腎臟病進展

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#### Background:

Chronic kidney disease is a significant global health concern, particularly among patients with type 2 diabetes, who experience a faster progression of the disease. Although multiple studies have examined chronic kidney disease, its natural progression in diabetic patients remains less understood. This study aims to fill that gap by applying a multi-state Markov model to evaluate chronic kidney disease progression and identify the factors influencing the transition between disease stages.

#### Methods:

This retrospective cohort study included eight hundred twenty-two diabetic patients diagnosed with stage three chronic kidney disease. A multi-state Markov model was employed to assess transitions between chronic kidney disease stages (three, four, and five), as well as endpoints such as renal replacement therapy or death. The analysis included covariates like heart failure, coronary artery disease, proteinuria, hyperuricemia, and baseline estimated glomerular filtration rate.

#### Results:

The model identified several key risk factors associated with chronic kidney disease progression in diabetic patients, including male gender, heart failure, coronary artery disease, high urinary protein levels, hyperuricemia, and lower baseline estimated glomerular filtration rate. Additionally, certain medications, including antidiabetic agents, diuretics, lipid-lowering drugs, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and hematopoietic agents, were found to influence disease progression. Patients with these risk factors showed a higher probability of progressing from stage three to stage four.

#### Conclusions:

The multi-state Markov model offers valuable insights into the progression of chronic kidney disease in diabetic patients, identifying crucial risk factors that accelerate disease advancement.

#### Keywords:

Chronic kidney disease, Diabetes mellitus, Multi-state Markov model

## The Efficacy of Kremezin in Delaying Renal Replacement Therapy in Chronic Kidney Disease Patients

### 克裏美淨在延緩慢性腎臟病患者進入腎臟替代治療的療效

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#### Background :

The study assessed the causal effect of Kremezin on delaying renal replacement therapy (RRT) in patients with stage 3, 4 and 5 chronic kidney disease (CKD). It enrolled 344 patients from a Taipei medical center between 2011 and 2021, all without prior history of RRT.

#### Methods :

The efficacy on renal outcomes, the need of renal replacement therapy between Kremezin and non-Kremezin groups. The analysis included survival curves and Cox proportional hazards models, with statistical significance set at a p-value of <0.05.

#### Results :

In stage 3 + 4 CKD patients, Kremezin had reduced the risk of RRT initiation by approximately 43% ; remarkably, in stage 4 CKD patients, Kremezin significantly extended median survival time free from RRT to 9.58 years, an increase of 6.84 years compared to non-users, and reduced the risk of RRT initiation by approximately 80%;

#### Conclusions :

Kremezin remained an effective therapeutic option for stage 3 and 4 CKD patients, which significantly delayed dialysis initiation.

#### Key words :

Kremezin, chronic kidney disease (CKD), renal replacement therapy (RRT)

## Nursing experience of caring for a patient with diabetic nephropathy with below-knee amputation

### 照顧一位糖尿病腎病變病人膝下截肢之護理經驗

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**【背景】** 透析病人罹患周邊動脈阻塞疾病(PAOD)為 32%，研究顯示患者截肢後死亡率極高，截肢後傷口感染導致疼痛，無法接受截肢導致肢體缺失。團隊給予心理支持、改善個案截肢後傷口疼痛情形，協助提升自我照顧能力，儘早適應截肢後生活型態改變。

**【方法】** 以 Gordon 十一項健康功能型態為評估架構，藉由實際照顧評估、觀察、直接會談、查閱病歷等方式收集資料，予統整分析整理後確認個案有:急性疼痛/與術後傷口有關、身體活動功能障礙/與截肢後喪失肢體功能有關、身體心像紊亂/與截肢造成身體外觀改變有關；照會復健科，運用跨領域合作擬定個別性職能復健計畫，增加個案自我照護能力，給予口頭加油打氣及適時稱讚以提升自信心，強化個案藉由輔具使用下床活動意願；照護過程主動關懷，說明幻肢痛之原理並提供改善措施以減輕病人疼痛指數；運用同理心建立良好護病關係，介紹其他截肢病友分享心路歷程，強化家屬共同參與照護活動意願並採漸進式方式運用鏡像治療協助個案正視截肢肢體。

**【結果】** 個案可了解疼痛原因並執行緩解疼痛措施，疼痛指數降至 3 分以下，於出院前已可使用輔具協助行走，並主動討論出院後日常生活應注意事項。

**【結論】** 個案因糖尿病足傷口癒合不良行左腳膝下截肢手術，術後面臨心理及生理雙重負擔，照護過程引導妻子及女兒共同參與照護活動，強化個案信心及自我照護意願，並藉由跨領域的團隊合作使個案逐步重建正向的生活態度；臨床照護應兼顧生、心、靈各層面問題，依個案需求提供個別性協助，以利個案能盡早恢復原有生活型態，並予凸顯護理價值-Our Nurses. Our Future。

關鍵字：糖尿病腎病變、截肢、身體心像紊亂

## Advanced Stage Lung Cancer Independently Predicts Adverse Renal Outcomes: A Prospective Observational Study in Taiwan

### 台灣前瞻性觀察研究：晚期肺癌患者的腎臟不良預後獨立關聯性

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#### Background :

Chronic Kidney Disease (CKD) is a growing global health concern, with Taiwan reporting the highest incidence and prevalence of end-stage renal disease worldwide. Concurrently, lung cancer remains a leading cause of cancer-related deaths. This study investigates the relationship between CKD and lung cancer, focusing on renal events in lung cancer patients.

#### Methods :

This prospective observational study was conducted at Kaohsiung Medical University Hospital from January 2012 to December 2023. It included 4,081 patients with stage I-IV lung cancer. Renal events were defined as either a doubling of creatinine levels or initiation of hemodialysis. Cox proportional hazards regression and competitive risk regression analyses were performed to investigate associations between various factors and renal events.

#### Results :

Of the 4,081 patients, 906 (22.2%) experienced renal events. Patients with renal events were more likely to have advanced-stage cancer (78.9% vs. 61.4%,  $p < 0.0001$ ) and exhibited higher rates of diabetes, hypertension, and targeted therapy use. In logistic regression, advanced-stage disease was a significant predictor of renal events (OR: 2.35,  $p < 0.0001$ ). Even after adjusting for age, sex, diabetes, hypertension, chemotherapy, and targeted therapy, advanced-stage disease remained significant (OR: 1.45,  $p = 0.0265$ , Table 2-2). Similarly, Cox regression showed advanced-stage disease was strongly associated with poor renal outcomes (HR: 3.75,  $p < 0.0001$ ), which persisted after adjustments (HR: 2.82,  $p < 0.0001$ , Table 3-2). Additionally, competitive survival model confirmed the independent effect of advanced-stage disease on adverse renal outcomes, even when accounting for competing risks (HR: 1.91,  $p = 0.0003$ ).

#### Conclusions :

Advanced stage lung cancer independently predicts adverse renal outcomes, even after adjusting for multiple confounders. This finding underscores the need for early detection and targeted renal protective strategies in lung cancer management, particularly for patients with advanced disease.

**Key words :** Chronic kidney disease, Renal event, Lung cancer, Onconeurology

## An Analysis of the Effectiveness of Pharmacy Services Provided to Patients with Pre-End-Stage Renal Disease in Pharmacist Outpatient Clinics

### 藥師門診提供末期腎臟病前期病人藥事服務之成效分析

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#### 目的：

據國內末期腎臟病前期(Pre-ESRD)照顧研究證實，醫療團隊的適當介入加上提供必要醫療照護與衛教可降低洗腎比例、住院率或死亡率。因應健康保險署為減緩慢性腎臟病(chronic kidney disease, CKD)惡化推動之全民健康保險 Pre-ESRD 病人照護與衛教計畫，本研究針對藥師參與末期腎臟病前期(CKD stage 3b、4 及 5)病人之腎臟病跨團隊照護，並以病人用藥配合度提升率及指標藥品-口服非類固醇消炎止痛劑(NSAIDs)使用降低比例為指標，評估以藥師門診提供門診末期腎臟病前期病人藥事照護之成效。

#### 方法：

本研究為回溯性研究，收集某區域教學醫院自 2023 年 1 月 1 日至 2023 年 12 月 31 日新納入 Pre-ESRD 照護計畫且照顧期間符合全民健康保險 Pre-ESRD 定期追蹤給付條件(與首次收案藥事服務間隔至少 77 日)者，比較前後兩次用藥配合度評估分數差異、使用 NSAID 比例及藥師衛教及指導介入分析。本研究以 ARMS score (總分最低 12 分，最高 48 分)作為病人用藥配合度評估依據，總分 12 分為醫囑遵循程度最佳，分數超過 12 分視為疑似配合度不佳。

#### 結果：

本研究共納入分析新收案為 137 人，以男性比例較高(59.9%)男，平均年齡 71.4 歲，年齡範圍 44-95 歲。藥師門診藥事服務共 225 人次，來診 2 次以上共 67 人，回診率為 48.9%。分析新收案病人慢性腎臟病分期以 stage 4 最多(39.4%)，stage 3b 次之(22.9%)，使用藥品 $\geq 10$ 項者佔 31.4%，多數病人皆有除 CKD 以外 2 項以上共病(97.8%)。比較有回診病人前後用藥配合度 ARMS 分數大於 12 者由 17.9%(12 人)降至 12.6%(8 人)，前後用藥配合度平均分數為由 12.3 降至 12.1；NSAIDs 異常使用比率由 13.4%(9 人)降至 11.9%(8 人)。藥師衛教及指導介入包含疾病自我照顧、用藥知識及藥物使用、避免藥物腎傷害及腎毒性藥品衛教指導完成率為 100%，須再行指導用藥技巧者為 97.8%。

#### 結論：

經由藥師門診可提供 CKD 病人充份藥事服務，藉由用藥知識及使用技巧的衛教介入可提升病人用藥配合度外，也可以降低 NSAID 異常使用人數，並讓每位病人清楚所有其正在使用的藥品目的及正確使用，避免藥物腎傷害，期望能減緩 CKD 惡化與併發症的發生。

## Effect of early health education in single center nephrology ward

### 單一醫療中心在腎臟內科病房早期對腎臟相關健康教育的效果

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#### Background

According to the longevity of people life, chronic diseases were increased. Chronic kidney disease (CKD) is one of health burden. CKD health education could be prevented the CKD progression. For about CKD education, pre-ESRD program would be done at outpatient department. On the nephrology ward, our nursing staff noticed the health education about CKD patients and family members were unknown especially on the dietary education. The nursing staff were done a pilot survey about the quality of care revealed poor nursing staff knowledge, the CKD health education knowledge of family members and patients. There should be encouraged about the health care implementation started at the time of diagnosis. We made a pilot study for the implementation about the CKD awareness.

#### Methods

At our nephrology ward, an integrated team including nephrologist, nurse, and nutritionist has been collected. We discussed about the pilot survey done at our nephrology ward. So, we planned to do the pilot study in our ward. In the pilot survey, the patients were enrolled due to newly diagnosed CKD admitted to the ward. We consulted nutritionist to educate patients, group health education at the ward, one-by-one CKD educations to the patients or family by the nursing staff. Thereafter we will record the cognitive accuracy about the diet control, fluid control, satisfaction about the education by nutritionist.

#### Results

A total of 15 cases were collected in the pilot study from April 2024 to June 2024. The awareness of the CKD education is 94 % at the time of the discharge from the ward. The satisfaction about the dietary education by nutritionist is 96 % before discharge. The satisfaction of the CKD education by our nursing staff is 92 % before discharge. We also collected about the rehospitalization 14 days after discharge. There was no rehospitalization and visited to emergency department. Our nursing staff have the phone contact 7 days after the discharge from the ward. The persistent self-care about CKD diet, fluid control was 91 %. Above results encouraged our team to continue early CKD education to the patients and their family for the awareness of CKD. Due to the limited case in the pilot study, we planned to further prospective cohort study for implementation about the early CKD awareness to our patients and family members.

#### Conclusions

The pilot study revealed the persistent CKD awareness for CKD diet education, fluid control 7 days after phone contact. The satisfaction about the education by nutritionist and nursing staff were high during our pilot study. Finally, the early CKD awareness education should be started in the first time of diagnosis of CKD was suggested.

#### Key words

Chronic kidney disease, nutrition education, medical ward, team approach, software interface.



## Association Between Sodium Bicarbonate usage and Major Kidney Events among Patients with Adult Polycystic Kidney Disease: A Cohort Study using TMUCRD 遺傳性多囊腎病患者使用重碳酸氫鈉與重大腎臟疾病預後關係:TMUCRD 世代研究

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**Background :** Post-hoc analysis from a prospective trial revealed that lower serum bicarbonate levels are associated with a more rapid decline in estimated glomerular filtration rate (eGFR) in adults with polycystic kidney disease (PCKD). However, it remains uncertain whether alkalization therapy using sodium bicarbonate can prevent the progressive deterioration of renal function in PCKD patients.

**Methods:** This retrospective cohort study was conducted using data from the Taipei Medical University Clinical Research Database (TMUCRD). Adult PCKD patients were identified based on ICD-9 coding and corresponding imaging studies. Patients who received sodium bicarbonate treatment for more than 28 days were categorized as the sodium bicarbonate user group. A matched control group of PCKD patients who did not receive sodium bicarbonate therapy was created using a modified Charlson Comorbidity Index (CCI). The primary adverse renal outcomes included a decline in eGFR of more than 25%, initiation of maintenance dialysis, and hospitalization. Event-free survival analysis and Cox proportional hazards models were employed to compare outcomes between the two groups.

**Results:** Out of 3,769 PCKD patients, 71 individuals who had received sodium bicarbonate for over 28 days were matched with 568 patients who had not received sodium bicarbonate (1:8 ratio). The sodium bicarbonate group had a lower mean age and a higher prevalence of anemia and renal disease. Additionally, this group exhibited higher baseline serum creatinine levels, lower baseline eGFR, lower hemoglobin levels, reduced serum calcium, and elevated serum potassium and phosphate levels (Table 1). Survival analysis demonstrated that non-users had superior event-free survival with regard to eGFR decline >25%, initiation of dialysis, and hospitalization compared to sodium bicarbonate users. Cox proportional hazards analysis indicated that sodium bicarbonate use was not associated with an increased risk of maintenance dialysis (adjusted hazard ratio [aHR], 0.93; 95% CI, 0.57–1.50; P = 0.754) or hospitalization (aHR, 1.17; 95% CI, 0.86–1.60; P = 0.318) after adjustment for covariates.

**Conclusions:** This retrospective cohort study found no significant association between sodium bicarbonate treatment and an increased risk of maintenance dialysis or hospitalization in PCKD patients. However, given the inherent limitations of the retrospective design, these findings should be confirmed through a well-designed prospective randomized controlled trial.

**Key words :**

Chronic kidney disease; Polycystic kidney disease; Sodium bicarbonate; TMUCRD

**Case report: Hyponatramia and inappropriate secretion of antidiuretic hormone associated with the use of imipramine**

**使用 imipramine 相關的低鈉血症和抗利尿激素分泌異常症候群**

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**Background :**

Among the various medications that have been associated with the development of syndrome of inappropriate antidiuretic hormone secretion (SIADH) are the tricyclic antidepressants. A 84-year-old man admitted due to dizziness after taking medication for benign prostatic hyperplasia (Imipramine, Tamsulosin) about one week later. The patient developed hyponatremia, depressed serum osmolality, and elevated urine sodium concentrations consistent with SIADH. The treatment of fluid restriction and taking more salt were prescribed, but in vain, until the discontinuation of imipramine. The patient's consciousness became better, and hyponatremia was improved.

**Methods :**

The treatment of fluid restriction and taking more salt were prescribed, and finally we discontinued imipramine.

**Results :**

The patient's consciousness became better, and hyponatremia was improved.

**Conclusions :**

It is possible that there is an interplay between ADH, imipramine and its major metabolite desipramine, increasing age, and the production of persistent urinary sodium secretion, and hyponatraemia. Further clarification of any such interactions depends on further similar case reports.

**Key words :**

SIADH, Hyponatremia, Imipramine, Tricyclic antidepressant, TCA

## Relationships between Indices of Arm Anthropometry, Bioimpedance, and Laboratory in Maintenance Hemodialysis Patients

### 長期血液透析患者中臂人體測量學、生物阻抗及實驗室指標之間的關係

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**Background:** Maintenance hemodialysis patients often experience protein-calorie malnutrition. Our aim is to evaluate the independent prediction accuracy of bioelectrical impedance analysis derived variables by the measurements of upper arm anthropometry and clinical laboratory indexes for evaluation of nutritional status of hemodialysis patients. Furthermore, the relationship between measurements of upper arm anthropometry and clinical laboratory indexes and cross-sectional evaluation of the prevalence of malnutrition with the use of the norms and thresholds were done.

**Methods:** In a retrospectively cross-sectional survey of 32 stable hemodialysis patients (aged 28 to 82 years) in hemodialysis unit of Taipei Municipal Zhongxiao Hospital, we evaluated measurements of upper arm anthropometry with measurements of single frequency bioelectrical impedance analysis and clinical laboratory indexes. Concordance was evaluated with intraclass correlation coefficients and Bland-Altman analysis.

**Results:** The comparisons between measurements of upper arm anthropometry with measurements of single frequency bioelectrical impedance analysis and some of clinical laboratory indexes were statistically significant. This study further found that both mid-arm fat area and triceps skin-fold thickness were independent contributors to percent fat mass after adjustment for body mass index and gender in the hierarchical multiple regression models. This study also demonstrated that mid-arm muscle circumference, or mid-arm muscle area, or corrected mid-arm muscle area independently predicted height normalized indices of fat-free mass, respectively, after adjustment for body mass index and gender in the hierarchical multiple regression models. Prediction equations for height normalized indices of lean body mass and percent fat mass were shown. The prevalence of protein wasting measured by mid-arm muscle circumference (50%) appears to be equivalent to that measured by serum albumin concentration (50%). Agreement between bioimpedance derived lean body mass and mid-arm muscle circumference (MAMC) derived lean body mass by equation was demonstrated.

**Conclusions:** Mid-arm muscle and fat variables by upper arm anthropometry correlated with nutritional variables of single frequency bioelectrical impedance analysis and clinical laboratory indexes. Mid-arm muscle and fat variables by upper arm anthropometry were independent predictors of body composition regarding height-normalized indices of fat-free mass and percent fat mass of hemodialysis patients even after adjustment of gender and body mass index. External validation was evidenced by agreement of Bland-Altman analysis between BIA-derived lean body mass (LBM) and LBM predicted by MAMC-based equation.

**Key Words:** Arm Anthropometry, Bioimpedance, Hemodialysis, Bland-Altman analysis, hierarchical multiple regression models

## To Explore the Efficacy of Erythropoietin (EPO) in Treating Anemia in Hemodialysis Patients with Cancer

### 探討紅血球生成素(EPO)於血液透析合併癌症病人貧血之療效

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#### 目的(Background)

貧血是慢性腎臟病及透析病人的主要併發症，臨床上普遍使用紅血球生成素 erythropoietin (EPO) 治療腎性貧血。然血液透析病人癌症發生率高，且貧血容易發生；若干研究指出乳癌、非小細胞肺癌、頭頸癌、淋巴瘤及子宮頸癌與血液性癌等使用 EPO 反而會縮短存活或增加腫瘤惡化及復發的危險性。故經醫師評估未使用 EPO 治療可能增加貧血嚴重度。為使病人獲得適切之醫療照護並兼顧生活品質，我們依據現有文獻及指引制定本科處置共識，以提升透析照護品質。

#### 方法(Methods)

常規透析合併癌症的病人經腎臟科醫師評估後，若為急性嚴重貧血可透過輸血治療，而在使用 EPO 前須評估貧血的其他可改善原因如低儲鐵量、骨髓纖維化、感染、發炎、透析不足或腸胃道出血等。給與 EPO 至血紅素(hemoglobin, Hgb)值大於 11g/dL 時，病人死亡、嚴重心血管事件及中風的危險性增高。本單位將治療目標設定當 Hgb 10 g/dL 以上即停止注射。蒐集 2023 年 02 月至 2024 年 02 月一年期間合併癌症之血液透析病人，包含年齡、性別、透析年資、癌症類別、Hgb 及 ferritin 值、輸血次數、EPO 藥物注射率、劑量等相關資料進行統計分析以瞭解罹癌透析病人貧血治療狀況。

#### 結果(Results)

共收案 82 人，男性佔 52.4%，平均年齡 66.1±7.4 歲；透析年資平均 11.2±8.2 年，癌症類別如下：頭頸癌 5 人(6.1%)、甲狀腺癌 2 人(2.4%)、肺癌 3 人(3.7%)、乳癌 7 人(8.5%)、肝癌 17 人(20.8%)、膽胰系統及腸胃道癌 2 人(2.4%)、泌尿道癌 31 人(37.9%)、大腸直腸癌 7 人(8.5%)、子宮頸癌 3 人(3.7%)、慢性白血病 2 人(2.4%)、淋巴瘤 1 人(1.2%)、多發性骨髓瘤 2 人(2.4%)。接受 EPO 治療者 70 人(85.4%)、未注射者 12 人(14.6%)；接受 EPO 治療組 Hgb 為 9.7±1.1 g/dL，未接受治療組 Hgb 為 9.1±1.0 g/dL。分析接受 EPO 治療組注射前、後結果顯示：Hgb< 8g/dL：9 人(12.9%)，EPO 用量 23111.1±10765.4U/月/人、ferritin 1643.9±1464.0 ng/mL、輸血 4.4±4.5 次；Hgb 8-10g/dL：27 人(38.5%)、EPO 用量 23185.2±12784.6U/月/人、ferritin 825.1±552.1 ng/mL、輸血 2.4±2.6 次；Hgb 10-12g/dL：34 人(48.6%)，EPO 用量 23617.6±7648.8 U/月/人、ferritin 438.8±194.6ng/mL、輸血 0.5±0.9 次；未注射 EPO 組：Hgb< 10g/dL：10 人(83.3%)，ferritin 1695±995 ng/mL、輸血 9.5±6.6 次；Hgb>10g/dL：2 人(16.7%)，ferritin 323.5±84.5 ng/mL、輸血 0.3±0.4 次數。

#### 結論(Conclusions)

罹癌透析病人大多數接受 EPO 治療且 Hgb 值較未接受者高，貧血程度因癌別及疾病嚴重度有所差異；兩組病人仍需配合輸血以改善貧血，未接受 EPO 治療者輸血需求明顯較多，應持續追蹤病人臨床症候與相關檢驗數據以改善貧血提升透析生活品質。

#### 關鍵字(Key words)

紅血球生成素、血液透析、貧血

## The Effect of Nutritional Counseling on the Changes of Biochemical Indicators in Diabetes Patients with Kidney Disease

### 營養衛教對糖尿病合併腎臟病病人生化指標之影響

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#### Background :

糖尿病是造成末期腎臟病的主要原因之一，當糖尿病合併慢性腎臟病時，不但會增加罹患心血管疾病風險，同時也會增加全因性死亡率。而營養狀況與慢性腎臟病人的死亡率相關，所以維持病人適當的營養狀況尤為重要。因此本研究欲探討營養衛教對糖尿病合併腎臟病病人的飲食狀況及生化指標的影響。

#### Methods :

本研究為回溯型研究，探討南部某糖尿病專科診所之糖尿病合併腎臟病病人於營養衛教後對病人生化指標的影響。本研究對象為經醫師診斷為慢性腎臟病且為「全民健康保險末期腎臟病前期(Pre-ESRD)之病人照護與衛教計畫」收案之病人。分析 2022-2023 年間有進階年度收案者，與前一次年度收案時生化數值之差值；若一年內有兩次營養衛教紀錄者則被歸為營養衛教組，小於兩次營養衛教者則被歸為控制組。收集基本資料、體位、生化數值及飲食紀錄，以獨立 t 檢定分析病人在兩次年度評估時的生化數值、以配對 t 檢定分析營養衛教組病人在兩次年度評估時的熱量及三大營養素。

#### Results :

本研究結果共收集 140 人，平均年齡為  $73.3 \pm 11.1$  歲、男性為 76 人(54.3%)。其中營養衛教組共 102 人，此組營養評估結果發現，兩次年度評估之攝取熱量、攝取醣類、攝取蛋白質及攝取脂質皆與建議量相差小於 20%(熱量： $93.6 \pm 15.8\%$  vs.  $93.2 \pm 15.3\%$ ,  $p=0.802$ ；醣類： $85.3 \pm 16.1\%$  vs.  $84.7 \pm 17.4\%$ ,  $p=0.729$ ；蛋白質： $103.6 \pm 29.7\%$  vs.  $109.9 \pm 85.0\%$ ,  $p=0.457$ ；脂質： $104.6 \pm 24.3\%$  vs.  $105.1 \pm 27.7\%$ ,  $p=0.858$ )，未達統計上差異。若進一步分析有無營養衛教對生化數值的影響，結果發現，營養衛教組較控制組之血色素( $-0.17 \pm 1.28$  vs.  $-0.52 \pm 0.75$ ,  $p=0.050$ )、鉀離子( $0.01 \pm 0.47$  vs.  $-0.16 \pm 0.41$ ,  $p=0.042$ )、鈣離子( $-0.11 \pm 0.47$  vs.  $-0.38 \pm 0.97$ ,  $p=0.030$ )下降差值均較控制組小。

#### Conclusions :

本研究結果顯示，經營養衛教的糖尿病合併腎臟病病人其飲食攝取量與建議量相近，且對其血色素、鉀離子及鈣離子的控制結果均較無營養衛教之病人好。綜合以上，營養衛教對糖尿病合併腎臟病病人的飲食控制及貧血改善有益。

#### Key words :

慢性腎臟病、糖尿病、營養衛教、血色素

## The association between wet bulb globe temperature with obesity indices in a large Taiwanese population study

### 在一大型台灣族群中，綜合溫度熱指數與肥胖指數的關聯性

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**Background:** As global temperatures continue to rise due to climate change, the prevalence of obesity has also shown a parallel upward trend. This suggests a possible link between environmental heat exposure and obesity. The wet bulb globe temperature (WBGT), an index that accounts for temperature, humidity, and radiant heat, provides a more comprehensive measure of heat stress on the human health. However, limited research has examined the potential correlation between WBGT and obesity. Thus, the aim of this study was to explore the relationship between WBGT and various obesity indices.

**Method:** A total of 121,364 participants from the Taiwan Biobank (TWB), recruited between 2008 and 2020, were linked to WBGT data obtained from the Central Weather Bureau and processed using a machine learning model. Participants without WBGT data due to living offshore (n = 940) were excluded, leaving a final cohort of 120,424 participants. The WBGT data for each participant were calculated based on the 5-year average prior to the TWB survey year.

**Results:** The mean age of the 120,424 enrolled participants was  $48.76 \pm 10.96$  years old in participants without central obesity, and  $51.22 \pm 10.80$  years old in participants with central obesity. Multivariable analysis showed that WBGT was significantly and positively associated with waist circumference (WC) (coefficient  $\beta = 0.00083$ ;  $p = 0.0001$ ), a body shape index (ABSI) (coefficient  $\beta = 0.00011$ ;  $p < 0.0001$ ), abdominal volume index (AVI) (coefficient  $\beta = 0.02783$ ;  $p = 0.0002$ ), conicity index (CI) (coefficient  $\beta = 0.00142$ ;  $p < 0.0001$ ), visceral adiposity index (VAI) (coefficient  $\beta = 0.02082$ ;  $p < 0.0001$ ), and central obesity (odds ratio [OR] = 1.01800;  $p = 0.002$ ), which was defined as WC > 90 cm in males and WC > 80 cm in females, after adjusting for potential confounders.

**Conclusion:** In conclusion, WBGT was associated with WC, ABSI, AVI, CI, VAI, and central obesity in a large Taiwanese population study.

**Key words:** wet bulb globe temperature; obesity indices; Taiwan Biobank

## Reduce the incidence of malnutrition in peritoneal dialysis patients

### 降低腹膜透析病人營養不良發生率

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#### 背景：

腹膜透析是末期腎臟病患者提供的腎臟替代療法之一，透過腹膜進行溶質和液體的交換，有效清除體內廢物。然而，這一過程患者會流失蛋白質，導致有高達 30-50%的營養不良發生率。重要的是，根據諸多研究資料顯示，腹膜透析患者的整體死亡率與營養不良密切相關。2020 年 KDOQI 營養照護指引建議每日蛋白質攝取量為 1.2-1.3 克/公斤，但實際上 41-42%的透析患者未能達到此標準。以血清白蛋白 < 3.5 g/dL 來定義，本院腹膜透析中心統計發現 2024 年第一季度有 34%腹膜透析病人出現營養不良，因此引發品質改善的動機。

#### 方法：

為評估患者營養狀態及瞭解成因，我們進行迷你營養評估量表(MNA)及病人營養不良影響因素問卷調查。

#### 結果：

分析結果發現，護理指導與衛教工具不完整，衛教時數及跨團隊合作也不足。因此，我們鼓勵患者積極參與營養改善對策、提升衛教工具實用性，以及電訪家訪關懷。此外，我們結合現有醫療資訊系統與 Microsoft Power BI 進行視覺化處理，將檢驗報告圖像化，並使用平板向患者說明其營養狀態的變化，共同討論制定營養方案，及早介入提升整體照護，經介入措施處置後，第三季腹膜透析營養不良已降低為 30%，營養蛋白質其實很難在短時間內進行改善，醫護團隊與病人需長期共同努力，以達到病人更完善的改善效果。

#### 結論：

最終目標是改善低白蛋白血症對患者的不良影響，進而全面提升透析品質。

**關鍵詞：**腹膜透析、營養不良、品質改善

## Mild Cognitive Disorder Correlated to Uremia Toxins From Gut in Patients with Chronic Kidney Disease

### 慢性腎臟病患者與腸道尿毒症毒素相關的輕度認知障礙

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### Background and Aims:

Mild cognitive disorder (MCI) is common but under-diagnosed in patients with moderate to severe chronic

kidney disease. MCI is strongly correlated with morbidity and mortality. Uremia related MCI is characterized by vascular calcifications in frontal lobe of brain. However, how uremic toxins from Gut such as Indoxyl sulfate (IS) or P-cresol affect brain are still debated.

### Method:

Patients with chronic kidney disease (age<85 years old, no past history of dementia or stroke) with mild cognitive disorder were enrolled. Basic biochemistries including eGFR, IS and P-cresol were collected.

Functional resting Magnetic Resonance Image (MRI), cognitive test (CANTAB®; Oxford) including the short term memories (DMS), executive function (SWM), and attention psychomotor speed (RVP), were analyzed by neurologists. In addition, physical activities such as the Berg-Balance scale (BBS) and The 36-item Short Form Survey (SF-36). Further rehabilitation exercises or nutritional intervention by ketosteril® were randomly assigned to observe the change of cognitive test and brain image.

### Results:

A total of 10 patients finished currently in this study. Median age was 77 years old, average eGFR was 29 ml/min/1.73m<sup>2</sup>. IS levels showed a significant association with cognitive function test RVP ( $r = 0.986$ ,  $p < 0.01$ ), physical activities such as BBS ( $r = -0.837$ ,  $p < 0.01$ ) or SF-36 ( $r = -0.763$ ,  $p < 0.05$ ). However, eGFR levels showed no significant association with any cognitive test but only SF-36 ( $r = 0.772$ ,  $p < 0.05$ ).

### Conclusion:

Compared to eGFR, uremic toxins are significantly associated with cognitive tests and physical activities in CKD patients. Further investigation on how gut originated uremic toxins affect brain are warranted.

**Keywords:** Chronic kidney disease; Functional MRI; Glomerular filtration rate; Indoxyl sulfate; Mild cognitive disorder; P cresol; Uremic toxins Funding acknowledgement:

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## To Explore the Effectiveness of Regular Health Education for Diabetic Nephropathy Patients Using the Uremic Oral Sorbent Ast-120

### 探討使用尿毒素吸附劑的糖尿病腎病變病人定期衛教後之成效

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#### 背景：

針對初始使用尿毒素吸附劑的末期糖尿病腎病變病人，定期接受護理及營養衛教後，期望病人在飲食、藥物、生活習慣改變等控制下，減緩腎臟病惡化，延緩進入透析治療。

#### 方法：

此研究於腎臟科門診收案，經醫生診療後初次開立 KREMEZIN 藥物並使用至少一年，從 2020 年 1 月至 2023 年 6 月共收集 16 位糖尿病腎病變病人，每三個月定期接受護理和營養衛教，採一對一個別化衛教諮詢，提供個別飲食計畫，利用彩色衛教單張、彩色圖片及食物模型等進行衛教，並當下請病人或家屬回覆示教，以 paired-t test 來分析前後之腎功能、血中白蛋白、鈉、鉀、鈣、磷、糖化血色素等變化。

#### 結果：

分析 16 位 stage 4-5 的糖尿病腎臟病病人，平均年齡為 73 歲，排除追蹤使用藥物期間進入透析的 3 位病人後，最終分析 13 位病人的生化數值，營養指標白蛋白數值有微幅增加(0.8%)，糖化血色素下降(1.89%)，但都未達統計差異，其他生化數值和熱量攝取亦無統計差異。

#### 結論：

腎臟實質造成破壞，產生不可逆的變化，等到出現明顯尿毒症狀時，常常已是無法恢復的腎衰竭，糖尿病腎病變病人定期接受衛教諮詢，經濟狀況許可下可搭配使用尿毒素吸附劑，以期延緩開始透析的時間，幫助糖尿病腎病變腎病變病人改善生活品質。

## Disproportionate Anemia in Chronic Kidney Disease Necessitates Screening for Multiple Myeloma

### 慢性腎臟病人的血色素異常低下宜鑑別多發性骨髓瘤

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#### Background:

Multiple myeloma is a haematological malignancy that hard to diagnosed due to its nonspecific symptoms and diagnosed may be delayed. The classic symptoms of MM—hypercalcemia, renal failure, anemia, and bone pain (CRAB)—may not be fully expressed in most patient. According to the literature, anemia presented in around 70% patient and renal failure presented in around 20-50% patient with newly diagnosed multiple myeloma. Chronic kidney disease (CKD) patients often present with varying degrees of anemia, complicating the diagnostic process for multiple myeloma (MM). This study investigates the relationship between hemoglobin levels in CKD patients and the incidence of MM, positing that disproportionately low hemoglobin may serve as a critical indicator for further investigation.

#### Methods:

This study employed a single-center retrospective cohort design. Data were collected from CKD patients and multiple myeloma patient, including the Kidney Disease: Improving Global Outcomes CKD stage, serum creatinine levels and hemoglobin level. The hemoglobin levels of participants were analyzed in relation to the incidence of MM diagnosed within the cohort.

#### Results:

Our analysis revealed that CKD patients exhibiting significant anemia, defined as hemoglobin levels below a specific threshold, had a markedly higher incidence of MM compared to those with less severe anemia. Statistical correlation indicated that hemoglobin levels served as a potential predictive marker for MM diagnosis in this population. Notably, the findings suggested that a threshold hemoglobin level could reliably prompt further diagnostic evaluation for MM in CKD patients.

#### Conclusions:

This study underscores the importance of considering multiple myeloma in CKD patients with disproportionately low hemoglobin levels. Clinicians should be vigilant in evaluating anemia severity in this demographic, as early detection of MM can improve patient outcomes.

**Key words:** anemia, hemoglobin, multiple myeloma, chronic kidney disease

## **Investigating the Role of Vitamin D in Arterial Stiffness Among Elderly Patients with Non-Dialysis-Dependent Chronic Kidney Disease.**

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### **Background**

Vitamin D deficiency is particularly prevalent among elderly individuals with chronic kidney disease (CKD), posing additional health challenges. In non-dialysis-dependent CKD (CKD ND) patients, this deficiency may contribute to increased arterial stiffness, a key marker of cardiovascular disease risk.

This study aimed to explore the association between vitamin D levels and arterial stiffness in elderly patients with non-dialysis-dependent CKD.

### **Methods:**

In the present study, 140 patients aged 68 years and older with (CKD ND) were recruited and divided into two groups based on vitamin D status: those classified as vitamin D deficient ( $25(\text{OH})\text{D} < 20 \text{ ng/ml}$ ) and those deemed vitamin D non-deficient ( $25(\text{OH})\text{D} \geq 20 \text{ ng/ml}$ ). To assess arterial stiffness, brachial-ankle pulse wave velocity (baPWV), a reliable marker for this condition, was calculated for all participants.

### **Results:**

The study revealed a high prevalence of vitamin D deficiency among participants, with 78.1% of patients exhibiting levels below the recommended threshold. The mean concentration of 25-hydroxyvitamin D ( $25(\text{OH})\text{D}$ ) was measured at  $18 \pm 8 \text{ ng/ml}$ . Notably, there was an inverse correlation between  $25(\text{OH})\text{D}$  levels and brachial-ankle pulse wave velocity (baPWV), indicating that lower vitamin D levels were associated with increased arterial stiffness. Furthermore, multiple linear regression analysis confirmed that vitamin D levels were independently associated with baPWV in patients with non-dialysis-dependent CKD ( $P < 0.001$ ). This model accounted for 48% of the total variance in baPWV, highlighting the significant impact of vitamin D status on vascular health in this population.

### **Conclusions:**

This study found that low levels of 25-hydroxyvitamin D ( $25(\text{OH})\text{D}$ ) are significantly associated with increased arterial stiffness, as indicated by elevated brachial-ankle pulse wave velocity (baPWV). These findings underscore the importance of monitoring and addressing vitamin D status in older adults with CKD ND to potentially mitigate cardiovascular risks linked to arterial stiffness.

**Key words:** Vitamin-D, Chronic kidney disease (CKD), 25-hydroxyvitamin D, arterial stiffness

## High ambient air ozone exposure is associated with metabolic syndrome in a large Taiwanese population study

在一項大型台灣人群研究，探討高環境空氣臭氧暴露與代謝症候群相關

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### Background :

Metabolic syndrome (MetS) is a huge health issue worldwide that increases the risk of cardiovascular disease, diabetes mellitus, stroke, cancer, and mortality. Meanwhile, the air pollution exposure precipitates stress responses which along with the alterations in glucose and lipid metabolism. However, the long-term effect of ozone (O<sub>3</sub>) exposure on metabolism still remains unclear. The purpose of this study is to explore the relationship between the long-term exposure of O<sub>3</sub>, with MetS and its components, in a large cohort of around 120,000 Taiwanese participants in the Taiwan biobank (TWB) correlated to O<sub>3</sub> concentration in Taiwan using a fine spatial-temporal resolution ensemble mixed spatial model with Geospaital Artificial Intelligence technology.

### Methods :

A total of 121,364 participants were enrolled from the TWB, with the mean age  $49.9 \pm 11.0$  years. The definition of MetS was according to the National Cholesterol Education Program Adult Treatment Panel III guidelines and modified criteria for Asians. Individual exposure of daily average O<sub>3</sub> concentrations for 1, 3, and 5 years before enrollment were collected.

### Results :

After multivariable analysis, the 1-year (per 1 ppb; odds ratio [OR] = 1.012;  $p < 0.001$ ), 3-year (per 1 ppb; OR = 1.012;  $p < 0.001$ ), and 5-year average of O<sub>3</sub> (per 1 ppb; OR = 1.015;  $p < 0.001$ ) were significantly associated with MetS. Furthermore, the 1-year (per 1 ppb; OR = 1.014;  $p < 0.001$ ), 3-year (per 1 ppb; OR = 1.019;  $p < 0.001$ ), and 5-year average of O<sub>3</sub> (per 1 ppb; OR = 1.023;  $p < 0.001$ ) were significantly associated with abdominal obesity. The 1-year (per 1 ppb; OR = 1.021;  $p < 0.001$ ), 3-year (per 1 ppb; OR = 1.016;  $p < 0.001$ ), and 5-year average of O<sub>3</sub> (per 1 ppb; OR = 1.015;  $p < 0.001$ ) were significantly associated with hypertriglyceridemia. The 5-year average of O<sub>3</sub> (per 1 ppb; OR = 1.009;  $p = 0.001$ ) was significantly associated with low high-density lipoprotein (HDL) cholesterol. The 1-year average of O<sub>3</sub> (per 1 ppb; OR = 1.009;  $p = 0.0012$ ) was significantly associated with hyperglycemia. However, the O<sub>3</sub> level were not associated with high blood pressure.

### Conclusions :

In conclusion, our study showed that high ambient air O<sub>3</sub> exposure was significant associated with MetS and its components, including abdominal obesity, low HDL-cholesterol, hyperglycemia and hypertriglyceridemia. The findings of this study have important implications for public health and environmental policy. Specifically, the results of this study may be useful in individuals and organizations to take action to reduce air pollution and promote public health.

**Key words :** air pollution, ozone, metabolic syndrome and its components, Taiwan Biobank

## Improve the completeness rate of barcode correspondence for hemodialysis treatment equipment

### 提升血液透析治療設備條碼對應之完整率

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#### Background :

正確辨識血液透析治療設備為守護病人透析安全首要目標，血液透析治療設備包括血液透析機、RO 機與人工腎臟的 UDI 條碼，為避免人工辨識錯誤，故透析治療前護理師需完整執行對應設備條碼完整方可開始進行治療。

**問題陳述：**本單位為進行病人血液透析相關治療，對象及治療地點包括門診、住院與加護單位或病房隔離室(例如空氣傳染病人)，病人治療前均要完成透析設備辨識，系統回傳至 HIS 系統與電腦醫囑稽核，辨識正確後才可進行透析治療，但 2023 年 7 月至 9 月完整率僅有 96.3%，經查未完整處為人工腎臟 UDI 條碼或透析肝炎專機辨識問題，造成資訊對應遺漏，故進行改善。分析事件可能原因：1.人員因素：護理師因未依標準程序完成。2.設備因素:病房隔離室無法攜入或缺無線之條碼掃描機，僅用人工辨識，無法完成資訊條碼對應而遺漏。3.儀器因素：住院病人變動大，專機來不及綁定 4.資訊系統因素:護理師於透析管理系統進行條碼對應時，因電腦 HIS 系統久未使用被自動登出權限或因輸入任一文字造成資訊系統稽核失效無法對應。目標訂為：『病人血液透析治療設備條碼對應之完整率應為 100%』

#### Methods :

針對以上要因，擬定改善方案如下：1.單位內宣導並成立宣導稽核小組，負責將過程中易遺漏之處整理公告並一對一宣導。2.負壓隔離室無法攜入設備對應時可於隔離室外面先進行對應後再將透析設備移入。3.血液性隔離專機無法及時對應問題與單位技術員討論可先以雙人確認後以手動方式輸入透析設備與原因編號。4.宣導同仁因 HIS 系統久未使用則會自動登出，造成於透析管理系統對應時資訊無法介接至 HIS 系統查核造成對應失效。5.品管組新增血液透析病人透析治療設備條碼對應之品管指標，另請資訊室建置報表，協助後端抓取所有透析治療中無對應或對應失效的報表，提升稽核完整性。

#### Results :

112 年 7-9 月(改善前)完整率為 96.3%，經由改善措施，112 年 10-12 月(改善中)上升到 98.5%，113 年 1-3 月(改善後)持續上升為 99.1%，4 月份持續追蹤已達目標值 100%。

#### Conclusions :

運用資訊完整的血液透析治療設備條碼對應可有效守護病人透析安全，避免因人為核對產生錯誤。

#### Key words :

血液透析、透析治療設備、設備條碼

## Factors related to the prevalence of peripheral arterial disease in routine hemodialysis patients in a hospital in southern Taiwan

### 南部某醫院常規血液透析病患周邊動脈疾病盛行率之相關因素探討

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#### Background:

本研究主要之目的在於評估常規血液透析病患周邊動脈疾病盛行率之相關因素探討。有周邊動脈疾病患者容易被一般人與血液透析病人所忽略，若不妥善治療，常演變為心臟病、腦中風或截肢。長期透析患者是周邊動脈疾病的高危險群，本研究希望透過南部某醫院常規血液透析病患為研究樣本，希望能在推論盛行率與危險因子的建立上更能夠被確認。因此，研究目的在於評估長期血液透析病患之周邊動脈疾病盛行率，並從血液透析病患人口學特性、生活習慣、臨床生化檢驗值與過去病史分析與周邊動脈疾病之相關因素以便作為在防治擬訂策略與計畫方針之參考。

#### Methods:

本研究採以結構式問卷收集資料，常規血液透析病患為對象，共收案275名病患，男生126人，女生149人，平均年齡61.5歲採自行填答及面對面訪談方式收集資料。內容包含人口學特質、過去病史與生活習慣，並參閱病歷收集受訪者之臨床生化檢驗值資料，周邊動脈疾病之診斷標準為其中有一側足踝及手臂收縮壓比值 $<0.9$ 。平均數為1.06，標準差為0.17；以量右測ABI，平均數為1.07，標準差為0.16。左右兩側ABI值之皮爾森相關係數R為0.82 ( $p<0.001$ )，顯示兩者間有高度相關，不會因為量測不同側而有太大差異。並以SPSS22軟體統計分析方法包括描述性統計、皮爾森積差相關檢定、T檢定及單因子變異性分析、多元複迴歸分析等方法。

#### Results:

研究結果發現：常規透析患者周邊動脈疾病之盛行率為16.9%，有周邊動脈疾病平均年齡(69.2歲)顯著大於非周邊動脈疾病者(59.8歲)，罹患任何一種慢性病、糖尿病與冠狀動脈硬化(分別為95.6%、66.7%、37.8%)亦均顯著高於非周邊動脈疾病者(73.4%、26.6%、8.6%)，但透析前尿素氮與透析前肌酸酐顯著低於非周邊動脈疾病者，複邏輯斯迴歸分析顯示，年齡越大、糖尿病、冠狀動脈硬化罹患周邊動脈疾病勝算比顯著較高，而透析前尿素氮濃度的增加與較低的周邊動脈疾病勝算比有顯著相關。相較於國外研究，本研究顯示長期透析患者的周邊動脈疾病盛行率較低；本研究也發現周邊動脈疾病比率與年齡、糖尿病、冠狀動脈硬化病史與透析前尿素氮濃度有顯著相關。

#### Conclusion:

本研究經由同一位受過訓練的技術師量測透析患者之ABI，若 $<0.9$ 則判定為周邊動脈疾病的長期血液透析病患顯著較高，且建議在臨床上懷疑的高危險群病患，以早期發現病患周邊動脈循環的問題與進一步給予治療，並建議醫護人員對於高危險群患者提供更多相關照顧資訊及提供護理衛教，並讓病患認識疾病知識顯著增加，動脈疾病惡化及早施以個案健康管理，可建議未來能以追蹤研究設計求取發生率並使周邊動脈疾病之相關因素更加確立，以減少之併發症之發生。

**關鍵字：**血液透析、盛行率、生活效能、周邊動脈疾

## Efficacy of Daptomycin Lock Therapy in the Treatment of Catheter-Related Bloodstream Infections in Hemodialysis Patients

### 達托黴素封存療法在治療血液透析患者導管相關血流感染中的效果

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#### Background :

Catheter-related bloodstream infections (CRBSI) pose significant risks to hemodialysis (HD) patients with long-term catheters. Daptomycin, an antibiotic with potent activity against Gram-positive bacteria, has been explored as a potential lock therapy to treat these infections and salvage the catheters. This study aims to evaluate the efficacy of daptomycin lock therapy combined with systemic antibiotics in the treatment of CRBSI in HD patients.

#### Methods :

A retrospective analysis was conducted on HD patients with long-term catheters who developed Gram-positive CRBSI. Patients were treated with systemic antibiotics and daptomycin lock therapy. The primary outcome was the resolution of infection, defined by the disappearance of fever, negative blood cultures, and retention of the catheter without recurrence of infection.

#### Results :

The study included 13 patients with a mean age of 62.1 years (range 26-86), the majority of whom were male (69.2%). The patients had underlying conditions such as diabetes mellitus (76.9%), coronary artery disease (23.1%), and solid organ neoplasia (7.7%). The infections were caused by various pathogens, including methicillin-sensitive coagulase-negative Staphylococci (MS-CoNS) in 7.7%, methicillin-resistant coagulase-negative Staphylococci (MR-CoNS) in 30.8%, methicillin-sensitive Staphylococcus aureus (MSSA) in 7.7%, methicillin-resistant Staphylococcus aureus (MRSA) in 46.2%, and vancomycin-sensitive Enterococcus (VSE) in 7.7%. The overall success rate of the treatment was 30.8%, with a failure rate of 69.2% and infection-attributable mortality at 23.1%. In subgroup analysis, success rates varied: 100% for MS-CoNS and MSSA, 25% for MR-CoNS, 16.7% for MRSA, and 0% for VSE.

#### Conclusions :

Daptomycin lock therapy combined with systemic antibiotic administration shows promise for treating CRBSI in HD patients, particularly for infections caused by coagulase-negative staphylococci and MSSA. However, its efficacy against MRSA remains limited. Further studies with larger sample sizes and prospective designs are necessary to confirm these findings and refine treatment protocols.

#### Key words :

Antibiotic lock therapy, Daptomycin, Catheter-related bloodstream infections, Hemodialysis

**Uric acid associates with arteriovenous fistula stenosis in hemodialysis patients****尿酸濃度對血液透析病人動靜脈瘻管狹窄的影響**Kai-Ni Lee<sup>1</sup>, Chien-An Chen<sup>1</sup>, Jia-Rong Lin<sup>1</sup>, Chiao-En Ko<sup>2</sup>李凱妮<sup>1</sup>, 陳建安<sup>1</sup>, 林佳蓉<sup>1</sup>, 葛蕎恩<sup>2</sup><sup>1</sup>Department of Nephrology, Tainan Sinlau Hospital, Tainan; <sup>2</sup> Department of Nursing, Chang Gung University of Science and Technology, Taoyuan<sup>1</sup> 台南新樓醫院腎臟科，台南；<sup>2</sup> 長庚科技大學護理系，桃園

**Background:** Uric acid (UA) is a pro-oxidant inside the cell and induces endothelial dysfunction. UA is associated with hypertension, metabolic syndrome, fatty liver, cardiovascular disease and progression of kidney disease. Endothelia dysfunction and reactive oxygen species play a vital role in arteriovenous fistula (AVF) stenosis. In this study, we evaluate the association between serum UA level and AVF stenosis in patients with maintained hemodialysis.

**Methods:** Chart reviews and laboratory records were used to collect data. The diagnosis and intervention for AVF stenosis used fistulography and percutaneous transluminal angioplasty.

**Results:** All 65 patients were enrolled. During the 7-year period, thirty patients experienced AVF stenosis. The univariate logistic regression analysis showed that AVF stenosis was only associated with 7-year averaged serum UA level (OR: 3.457, 95% CI: 1.517-7.877, p=0.003). The multivariate logistic regression analysis showed that AVF stenosis was associated with 7-year averaged serum UA level (OR: 3.551, 95% CI: 1.507-8.3671, p=0.004) after adjustment of age, diabetes mellitus, gender, history of previous AVF stenosis and 7-year averaged serum cholesterol level. The optimum critical point of 7-year averaged serum UA level with optimal sensitivity and specificity for AVF stenosis was 7.0813 mg/dl. An analysis of time to events with adjustment for other variables using multivariate Cox regression analysis showed that there was a 2.692 times greater risk of AVF stenosis for patients with 7-year averaged serum UA > 7.08 mg/dl than for patients with 7-year averaged serum UA ≤ 7.08 mg/dl (HR: 2.692, 95% CI: 1.278-5.668, p=0.009).

**Conclusions:** In hemodialysis patients, serum UA was a significant risk factor for AVF stenosis.

**Key words:** uric acid; arteriovenous fistula stenosis



## The new flowchart of hepatitis B testing in hemodialysis patients

### 血液透析病患 B 型肝炎檢測之新版流程

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#### Background :

B 型肝炎病毒是造成肝硬化和肝癌的主因之一，即使已有 B 型肝炎病毒疫苗，仍有病患無法產生抗體，每年仍有 0.15% 透析病患因肝病死亡，且發生肝癌比例也較正常人高，所以 B 型肝炎病毒檢查對透析病人是相當重要的課題。罹患 B 型肝炎之血液透析病患需使用專用機，會增加醫療成本，故早期預防及發現實為重要，遂引發本單位進行舊制改善動機。

#### Methods :

經與肝膽腸胃科醫師討論後，修訂本血液透析室 B 型肝炎病患處置流程。除細分 B 肝表面抗體(Anti-HBs)、B 肝表面抗原(HBsAg)，並追蹤檢驗 Anti-HBc，以釐清病人是否為具免疫力之非帶原者，或隱藏型的 B 肝帶原者(resolved HBV carrier)。(1)HBsAg(-)、Anti-HBs(-)，加驗 Anti-HBc。針對 Anti-HBc(-)者，建議其接種四劑 B 型肝炎疫苗；而 Anti-HBc(+)，則檢驗 HBV DNA，若 HBV DNA(+)，視為感染 B 型肝炎，依規定於 B 肝隔離床透析並轉介治療。(2)HBsAg(-)、Anti-HBs(+)，驗 Anti-HBc Ab。(3)HBsAg(+)、Anti-HBs(-)，視為感染 B 型肝炎，依規定 B 肝隔離床照護，並轉介肝膽腸胃科，持續每 6 個月追蹤腹部超音波及 AFP 檢測，以作為疾病早期發現與治療的關鍵。

#### Results :

2024 年 4 月全面篩檢共 164 位門診血液透析病患，採檢率為 100%。HBsAg(-)、Anti-HBs(-) 為 35 人，而 Anti-HBc(-) 為 17 人，依流程建議病人施打 B 肝疫苗，結果共 14 人施打，4 位個案拒絕；Anti-HBc(+) 為 18 位，未檢測出 HBV DNA。HBsAg(-)、Anti-HBs(+)，加驗 Anti-HBc Ab 共 115 人，其中一人未篩檢，採檢率為 99.1%，結果顯示，其中 78 位 Anti-HBc Ab(+), 37 位 Anti-HBc Ab(-)。HBsAg(+)、Anti-HBs(-) 為 13 人，採取 B 肝隔離床措施。

#### Conclusions :

B 型肝炎的傳染途徑主要是感染含 B 型肝炎病毒的血液、體液經由皮膚或黏膜進入人體，尤其是進入血液內，它在人體內的潛伏期平均約二個月或更久。修訂後的本院新版血液透析 B 型肝炎病患處置流程更清楚，可幫助釐清病人是否為具免疫力的帶原者及隱藏型 B 型肝炎的依據，後續與肝膽腸胃科共同照護，亦可幫助病人獲得更好的醫療品質。

#### Key words :

血液透析，B 型肝炎

## **Improving Vascular Access Care Models during Dialysis to Reduce Catheter Dislodgment Events**

### **改善透析中血管通路照護模式以降低管路滑脫事件**

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#### **Background :**

Dialysis vascular access is the lifeline of patients, and pipeline safety is of vital importance. When an intradialysis vascular access incident occurs in a unit, it will not only cause harm to the patient and affect the nurse-patient relationship, but may also create a sense of distrust in treatment and affect subsequent treatment. Because a total of 3 incidents of dialysis tubing slippage during dialysis occurred in 2022, resulting in patients losing massive blood and being hospitalized.

#### **Methods :**

The reason was further analyzed to be paper glue slippage and failure to receive nursing guidance related to vascular access care. From December 1 to December 15, 2022 Daily observation of the dialysis treatment model in the unit found that the accuracy rate of nurses performing vascular access care during hemodialysis was only 71.7%. In order to prevent subsequent related injuries, a task force was established to improve the accuracy of vascular access care during hemodialysis and reduce slippage.

#### **Results :**

After the implementation of the project, the accuracy rate of vascular access care in the unit increased from 71.7% to 91%. So far, no intradialytic vascular access incidents have occurred.

#### **Conclusions :**

It can be seen that the safety of dialysis patients can be effectively maintained by improving the vascular access care model.

#### **Key words :**

Catheter Dislodgment, Dialysis, Vascular Access

## Using a Home Hemodialysis App to Care for a Middle-Aged Male with End-Stage Renal Disease Undergoing Initial Hemodialysis: A Nursing Experience

### 運用居家透析 APP 照護一位中年男性末期腎病變初次行血液透析之護理經驗

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#### 【背景】

病人 20 多年前罹患糖尿病導致末期腎病變，出現呼吸喘、水腫及食慾變差之合併症而開始接受血液透析治療，筆者照護過程中藉由觀察及會談發現病人缺乏血液透析相關知識，除了面對透析生理不適進而影響日常活動外，尚需面對後續生活型態改變，以及害怕長期透析增加家人負擔，而造成心理調適障礙，故引發筆者想深入探討之動機，希望結合居家透析 APP 之運用，提升個案血液透析治療相關知識，並建立符合病人個別需求之治療策略。

#### 【方法】

筆者運用 Gordon 十一項健康功能型態評估，確立病人有體液容積過量、自我照顧知識缺失、調適障礙之護理問題。護理期間運用個別性護理措施，鼓勵病人表達內心感受，利用傾聽、情感支持及討論等溝通技巧，護理過程中以病人為中心，護理指導內容力求簡單化、具體化，教導病人居家透析 APP 使用，將每日體重、血壓及飲食拍照記錄至居家透析 APP 中，並於血液透析治療時給予回饋，同時藉由居家透析 APP 護理指導影片，教導限制水分之重要性及減少高血磷食物攝取；並安排腎友分享經驗，給予支持與鼓勵達到身心靈之照護。

#### 【結果】

病人於初次接受血液透析三週後，到院透析時可主動與護理人員及病友打招呼，每日皆測量體重、血壓及記錄飲食，上傳至居家透析 APP 中，並主動針對不了解的飲食使用拍照回傳與醫護人員討論調整。

#### 【結論】

病人因血液透析治療自我照顧知識不足，導致水份限制及飲食控制不佳，更因透析造成生活模式改變，進而產生調適障礙。護理過程中，筆者運用某醫學中心居家透析 APP 之影片進行血液透析相關知識、水份及飲食控制之護理指導，並於 APP 中紀錄生命徵象、體重及個人飲食型態，並依病人臨床狀況進行調整即時給予回饋；在心理調適方面，筆者透過主動關懷、聆聽及給予病人正向鼓勵。期望藉此護理經驗提供護理人員日後照護此類病人之參考。

## Determinants of Intra-graft Stenting in Hemodialysis Patients with Arteriovenous Grafts Under Routine Surveillance

### 血液透析病患接受人工瘻管內支架置放之探討

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#### Background :

Hemodialysis (HD) patients with arteriovenous grafts (AVGs) are more prone to thrombosis than those with arteriovenous fistulas. Routine surveillance, though aimed at reducing thrombosis, has limited evidence supporting its effectiveness in improving graft patency. It often results in more interventions like percutaneous angioplasty (PTA) and intra-graft stenting, typically following repeated PTA failures. Our study aims to identify factors associated with intra-graft stenting in patients with AVGs under routine surveillance.

#### Methods :

Patients with AVGs receiving HD and routine surveillance at our outpatient clinic were tracked from the clinic's initiation until death, transplantation, transfer, or December 31, 2022. The correlation between demographic characteristics and intra-graft stenting was analyzed.

#### Results :

In our cohort of 22 patients under routine surveillance, heart failure was significantly associated with an increased likelihood of intra-graft stenting (Odds ratio = 17,  $p = 0.05$ ) (Table 1). Age ( $\rho = 0.5$ ,  $p = 0.02$ ), serum iron ( $\rho = 0.44$ ,  $p = 0.04$ ), and transferrin saturation ( $\rho = 0.49$ ,  $p = 0.02$ ) were also significantly correlated with the intra-graft stenting rate (Table 2). Multivariate regression analysis confirmed heart failure as a significant predictor of intra-graft stenting ( $\beta = 1.83$ ,  $p = 0.02$ ) (Table 3).

#### Conclusions :

Our study found heart failure to be associated with intra-graft stenting in patients with AVGs under routine surveillance.

#### Key words :

Arteriovenous graft; Heart failure; Intra-graft stenting

## Blood Purification in Acute Liver Failure: A Case of Bongkreki Acid Poisoning 急性肝衰竭中的血液淨化療法：米酵菌酸中毒案例報告

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### Background :

Bongkreki acid (BA), produced by *Pseudomonas cocovenenans* in fermented foods, causes severe poisoning, inhibiting mitochondrial function. Common in Africa and China, BA poisoning is fatal at 1-1.5 mg. Prevention focuses on banning risky foods and raising awareness for better management.

### Methods :

Therapeutic Plasma Exchange (TPE) and the Molecular Adsorbent Recirculating System (MARS) are vital extracorporeal treatments for acute liver failure (ALF). TPE removes toxins and replenishes coagulation factors, managing hepatic encephalopathy and multiorgan dysfunction, while MARS uses albumin dialysis to eliminate toxins like bilirubin and bile acids. Both treatments support patients as a bridge to liver transplantation or recovery, offering temporary liver function support in severe hepatic dysfunction.

### Results :

A 53-year-old woman with chronic HBV developed acute liver failure after eating contaminated rice noodles, likely due to HBV reactivation and bongkreki acid poisoning. She presented with shock, jaundice, and multiple complications. Treatment included CVVH, plasma exchange, antivirals, and antibiotics. Despite severe complications requiring intubation, her liver function improved with MARS therapy, and bongkreki acid levels decreased.

### Conclusions :

Bongkreki acid poisoning and HBV reactivation led to acute liver failure in a 53-year-old female. Treatment with TPE, MARS, and supportive care, including CVVH and antiviral therapy, resulted in gradual improvement and recovery of liver function despite severe complications.

### Key words :

Bongkreki acid, Bongkreki acid, Therapeutic Plasma Exchange, Plasmapheresis, Molecular Adsorbent Recirculating System, Albumin-based liver support system

## Applying Empirical-Based methods to explore the effectiveness of vascular exercise and home care for dialysis patients

### 運用實證手法探討透析患者血管運動及居家照護之成效

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#### 背景:

本單位 2024 年 1 月至 8 月間，每月透析總人數約 193 人，九成以上的患者選擇永久性血管通路進行透析治療，其中以自體動靜脈瘻管最多佔 70.5%，其次為人工血管佔 25.9%，在此期間共 153 位患者發生因血流量過小或是最常見的主因為血栓所導致的阻塞，進而必須接受經皮血管成型術每月平均約高達 10.3%(翁、黎，2019)。患者除需忍受侵入性治療及術後的疼痛所產生的焦慮感，更有可能因血管功能不佳導致透析清除率不足，不僅增加醫療成本，更使住院率及死亡率顯著增加(呂等，2017)。

#### 方法:

(一)文獻搜尋策略及資料庫:搜尋時間 2022 年 1 月 1 日至 2024 年 8 月 31 日文獻，採用 PubMed、Medline、Cochrane Library、CINAHL 資料庫進行搜尋，結構化搜尋策略以 PICO 為檢索引引，輸入控制詞彙 MESH、關鍵字，提高廣泛系統性檢索之敏感度與精確性。本文使用的關鍵字為 hemodialysis(MeSH)And Vascular exercise (MeSH)And home care(MeSH) And (randomized controlled trial or controlled clinical trial)來進行文獻的搜尋。(二)文獻搜尋結果及排除標準:進行電子資料庫檢索，共獲取 46 篇文獻，排除重覆文獻共 24 篇，檢視標題及摘要後排除 10 篇不符合研究主題，最後剩餘 12 篇進行檢視全文，其中 3 篇對象不符合、1 篇非隨機控制試驗，排除標準為(1)研究使用多種介入措施；(2)非以英文發表之原創研究論著；(3)無法取得全文，最後篩選共 8 篇研究進行整合文獻。(三)文獻納入條件及評讀工具:依據 PICO 設定篩選納入標準，P:接受血液透析的成年病患、I:實驗組接受血管運動(手臂運動、抓握及握球等)、C:控制組無接受血管運動、O:測量變相為瘻管功能及居家照護品質

，以 2019 年 Cochrane Collaboration tool 發表的第二版偏差風險為評估工具評讀文獻品質。

#### 結果:

依據整合實證文獻的結果指出介入持續至少 8 週以上，每天居家照護執行血管運動包括手臂運動、抓握及握球等，至少 5 至 6 次，方式為握緊網球每次 3 秒至 5 秒鐘後放鬆，再握緊交替執行，維持至少 5 至 15 分，此方式能增加最大握力、增加直徑、增加血流速，進而改善動靜脈瘻管的功能。

#### 結論:

血管通路功能與居家照護方式有密切關係，提供居家血管通路照護資訊及透過掃描 QR code，藉由影片教學發揮行動衛教模式，鼓勵病患及家屬參與自我健康照護，進而提升照護品質。

關鍵字:血液透析、血管運動、居家照護、隨機對照試驗

## The abdominal imaging screening of hemodialysis

### 血液透析患者的腹部影像學篩檢

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#### Background :

根據衛福部 111 年國人死因統計結果，臺灣癌症已連續 42 年為十大死因之首，十大癌症順位中，肺癌與肝癌已經連續 44 年名列前 2 名。2011 年 Liang 等人使用臺灣健保資料庫數據，末期腎病患者罹患癌症風險較一般族群高 1.64 倍，其中罹患泌尿道癌、肝癌及乳癌的風險顯著較高(Liang et al., 2011)。癌症篩檢的主要原則是早期發現早期治療，目的是在症狀出現前檢測癌前病變(李等, 2023)。腹部超音波為臨床上最常用來判讀脂肪肝變性的簡單工具，肝硬化及肝腫瘤之診斷更是腹部超音波檢查之最主要對象(柯、許, 2023)。目前國民健康署僅有成人預防保健的 B、C 型肝炎篩檢提供腹部超音波檢查，本單位提供血液透析患者規則每年追蹤一次腹部超音波檢查，屬於次段預防的範疇。

#### Methods :

本研究為前瞻性研究隊列研究(prospective cohort study)，透析患者利用腹部影像學篩檢結果初步來判斷良、惡性肝腫瘤，出現影像學異常則提供個別化癌症篩檢，密切追蹤肝功能及影像學，或轉介至肝膽腸胃科，持續追蹤一年紀錄診斷肝癌發發生率。

使用 Excel 2016 及 SPSS 25.0 統計軟體進行描述性統計分析。

#### Results :

末期腎臟病暨規則血液透析三個月以上為常規門診透析患者，本單位共 157 人，2023 年執行腹部超音波或腹部電腦斷層等腹部影像學檢查共 172 人次，多數人為每年追蹤一次，若合併 B 型肝炎、C 型肝炎、影像學檢查有異常者則增加為半年追蹤一次。

#### Conclusions :

本研究顯示血液透析患者若出現腹部影像學異常，約有三分之一會在一年內被診斷出肝癌，提供患者個別化的癌症篩檢，其潛在益處可能超過其潛在危害，非侵入性的檢查可以提高患者進行篩檢意願，同時應用於臨床評估病人脂肪變性的程度及脂肪肝炎或晚期纖維化的風險。除了早期發現早期治療外，提供透析患者良好生活型態的衛教及運動飲食處方，可以降低患者罹患惡性腫瘤風險，透析醫療人員每週與患者見面 2-3 次，這為提供患者積極的衛教創造了良好的機會，若能充分利用這些時機，針對健康生活方式、飲食和運動進行定期教育，將對患者的健康管理和疾病預防產生顯著的幫助。

#### Key words :

end-stage renal disease, dialysis, Community screening

## Clinical Emergency Confirmation Methods for Suspected Artificial kidney Blood Leakage-- Experience Sharing from Regional Hospital

### 疑似人工腎臟漏血之臨床緊急確認方式--地區醫院經驗分享

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#### Background :

血液透析治療中需確保病人透析安全與品質，是故透析機器會裝置紅外線漏血偵測器，用於透析過程中監測人工腎臟有無漏血造成感染及血液流失；而若在漏血偵測器警報響，但肉眼看不出來人工腎臟外管有漏血情形時，常導致判斷是否有人工腎臟漏血之困難，增加護理人員負擔。

#### Methods :

本院透析機器裝置紅外線漏血偵測器設定:人工腎臟疑似微量漏血(<300PPM)時，顯示為 Blood leak detector Dirt；若漏血量高至 300 PPM 則顯示為 Blood leak。

透析過程中透析機漏血偵測器警報響顯示: Blood leak detector Dirt Blood leak 訊息時，透析機主動將透析模式跳至 Bypass 狀態並 Blood Pump 停止轉動，護理師即時檢視人工腎臟外管有無紅色或粉色透析液，確定或排除假性漏血情形。

從顯示有漏血之人工腎臟外管取少量液體，以 AUTION Sticks10EA 尿液檢測試紙作定性檢查判定潛血反應，若潛血反應呈陽性，即顯示人工腎臟有漏血情形。

尿液潛血試紙沾上外管透析液體後，經 60 秒後比照試紙改變顏色判定潛血反應，顏色越深潛血量越多。此個案潛血反應檢查呈現藍色陽性反應 3+(01.0)約 30PPM，判定人工腎臟有高度懷疑漏血風險，應立即更換新的人工腎臟透析，維持病人應有的透析品質。

#### Results :

醫療團隊秉著病人安全透析照護品質下，即時利用尿液潛血試紙佐證人工腎臟有無漏血之判別、即時執行相關處置，維持病人應有的透析品質、確保病人無遭受感染之風險及失血之疑慮。

#### Conclusions :

文獻顯示，尿液潛血檢測試紙經過 60 秒後，依含血量顏色由淺漸漸變深，潛血反應呈現 1+(0.06)約 10PPM，2+(0.2)約 20PPM，3+(01.0)約 30PPM；所以尿液潛血試紙確實可以協助佐證人工腎臟有無漏血初步之緊急判別。

#### Key words :

血液透析, 人工腎臟漏血, 尿液潛血試紙



## Improves Dialysis Clearance Rate (Kt/V) of Hemodialysis Patients in a Medical Center-Based Hemodialysis Unit

### 某醫學中心血液透析中心提升透析病人透析清除率(Kt/V)

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#### Background :

依醫學中心評鑑標準， Kt/V 需有 95% 以上的病人  $\geq 1.2$  為優良指標。研究顯示，將 Kt/V 增加到 1.2 之過程，每增加 0.1，病人死亡率每年減少 7%。透析不足會導致身體毒素累積，再次出現尿毒症狀如疲倦、噁心嘔吐、貧血，所以足量透析可說是透析病人最重要的透析指標。本血液透析中心 2023 年第一季平均為 93.3%，未達閾值，故引發改善動機。

#### Methods :

1) 主護護理師衛教病人足量透析對長期存活率的重要，指導水分控制、評估調整適當乾體重。(2) 避免二次透析間體重增加太多，導致因抽筋或掉血壓等問題，被迫調降血液流速或透析液藥水速度，造成抽血數值受影響。(3) 新病人仍在整合適當的透析器，單獨調整抽血日至月底，或進行複驗，以呈現最真實狀態。(4) 再由副護理長調查抽血當日遲到或提早結束透析病人的抽血結果，必要時進行複驗。(5) 血管通路監測方式包括血管通路流量、靜脈壓力、再循環測量等，本中心引進國內首創透析中動脈壓監測系統：可知道透析當下實際血流速是否和機器設定相符合，視狀況立即調整透析針角度、深度或更換大小適切的透析針；根據動脈壓力及早發現屢管阻塞問題，趁早處理提升透析效能。

#### Results :

本透析中心共有 167 位透析病人，每月固定於第三週進行全門診病人抽血檢驗，2023 年第一季(改善前)93.9%經由改善措施，第二季上升到 94.8%，第三季達到目標值 96.3%。

#### Conclusions :

為提升透析品質，增加病人的存活率及生活滿意度，減少不必要的住院及醫療支出，讓每位病人知道足量透析的重要，並盡可能都能獲得足量透析是相當必要的。本透析中心會持續進行品質改善並逐案分析，根據抽血結果進行宣導；改善過程中發現藉由密切觀察透析中動脈壓力變化，能更及早發現屢管阻塞狀況並及時處理。

#### Key words :

血液透析中心、透析清除率、足量透析

## Establishing an Interprofessional Collaborative Practice Model to Improve Serum Albumin Levels in Maintenance Hemodialysis Patients

### 建立跨領域團隊合作照護模式提升長期血液透析病患血清白蛋白數值

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#### Background :

蛋白質熱量消耗 (protein-energy wasting, PEW)，這是血液透析病患(Hemodialysis, HD)常見的問題之一，盛行率約 30-70%，PEW 容易引發肌少症及免疫力不足等，導致生活品質降低和住院率的增加，甚至造成死亡率上升。本血液透析中心血清白蛋白數值根據 KDOQI(Kidney Disease Outcomes Quality Initiative)須維持在 3.5g/dL 以上，本中心於 2022 年統計白蛋白數值高於 3.5g/dL 之病患佔整體病患之 84.3%，但血清白蛋白的提升是可改善病患的整體健康，故本中心將建立標準化的營養評估工具，及系統性的營養教育介入方式，再利用跨領域團隊合作照護模式，達到提升 HD 病患血清白蛋白之目標。

#### Methods :

本中心成立營養小組，於 2023 年 1 月至 2024 年 6 月進行以下介入措施：(1)營養評估工具系統化：KDOQI 建議需定期對 HD 病患進行全面性的營養評估，營養不良發炎分數(Malnutrition Inflammation Score, MIS)是作為評估營養指標的重要依據，故本中心於透析資訊系統導入 MIS 表單，篩選出營養不良高風險個案；(2)營養衛教內容標準化、及(3)強化及鞏固病人對於提高自身營養動機主動化：1.建立官方 Line 營養衛教內容、2.使用多媒體重複播放營養衛教內容、3.舉辦大型腎友交流聯誼會，並加入營養師之床邊看診模式量身定制飲食方案。

#### Results :

介入以上措施後，病患對於營養衛教滿意度(非常滿意及滿意)由未介入前的 77.52%提升至 99.24%。常規門診病患透過營養師床邊看診，看診率從 0%提升至 25% (40 人) (2024 年 6 月)。根據本中心血清白蛋白大於 75%指標來看，未介入措施前平均 84.3% (2022 年)；介入一年後平均 87.4% (2023 年)；介入 18 個月後平均 91.62% (2024 年 6 月)。血清白蛋白數值由未介入措施前的 3.93 g/dL (2023 年 12 月)，到介入 18 個月後提升至 4.05g/dL (2024 年 6 月)。

#### Conclusions :

本血液透析中心建立跨領域團隊合作模式，以站在病患立場之便利性做考量，結合營養師於床邊進行一對一的諮詢及衛教，並對病患進行全面且個別性的營養管理，結果顯示血清白蛋白有顯著提升，且病患對於營養知識資訊滿意度也大幅提升。

#### 關鍵詞 :

跨領域團隊合作照護模式、血液透析、白蛋白、蛋白質熱量消耗

#### Keywords :

Interprofessional Collaborative Practice Model; Hemodialysis; Albumin; Protein-energy wasting

## Effects of Levocarnitine on Renal Anemia and Intradialytic Hypotension in Hemodialysis Patients

### 肉鹼對血液透析病人腎性貧血及透析中低血壓的影響

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#### Background :

Levocarnitine 又稱左旋肉酸、肉鹼或肉質素等。人體的肉鹼 3/4 從食物中攝取，1/4 在肝臟與腎臟合成。其生理功能為攜帶長鏈脂肪酸通過粒線體內膜進行氧化，為肌肉主要能量來源，而體內肉鹼有 98% 存在於人體骨骼肌與心肌，僅 1% 存在於血漿中。肉鹼缺乏是血液透析患者常見的疾病，經透析流失為主要原因，加上血液透析患者因飲食攝取限制和腎臟內源性合成的剝奪，使血清肉鹼水平逐漸下降進而導致肉鹼缺乏。當肉鹼缺乏時，中、長鏈脂肪酸無法進入粒線體進行  $\beta$ -氧化作用，心肌及骨骼肌也無法獲得足夠能量，進而導致病人亦有骨骼肌虛弱、心肌病變、透析中低血壓及貧血對紅血球生成素反應不佳等臨床症狀。

#### Methods :

統計 2024 年 1-8 月本單位施打肉鹼共 6 例（每次透析後靜脈注射 1 g），針對是否可改善貧血、降低施打紅血球生成素(ESA)使用量及透析中反覆出現症狀性低血壓之發生做探討。依據當月底血色素數值大於 11g/dL 則減少下個月 ESA 1 次劑量，透析中低血壓定義為透析中收縮壓下降 >20mmHg 進行統計，並同步給予飲食衛教。採追蹤性研究分析，收集開始施打前一個月及第 6 個月評估病人對治療的反應，並利用 SPSS 25 統計軟體進行統整及資料分析，評估每周施打肉鹼後對於血液透析病人貧血、ESA 支數和發生透析中低血壓之影響。

#### Results :

統計採用 SPSS 25 統計軟體進行資料統計分析，以  $p < 0.05$  定義為具統計上之差異。依相依樣本 t 檢定分析發現，討論每周給予肉鹼合併護理衛教後對於透析病人血色素、ESA 支數及發生透析中低血壓頻率有無改善。三者皆無顯著差異。

#### Conclusions :

針對 Levocarnitine 治療肉鹼缺乏的透析病人主要有四個適應症：(1) ESA 抗性貧血；(2) 血液透析期間反覆出現症狀性低血壓；(3) 有症狀的心肌病變或心肌病變伴隨 LVEF 降低；(4) 疲勞和肌肉無力影響生活品質。但關於透析族群肉鹼治療的文獻研究仍存在一些限制，包括樣本量、研究設計的充分性和目標疾病的定義。此外，目前無法確定肉鹼治療的劑量反應關係和最佳給藥途徑，故在考慮補充肉鹼前，應充分評估是否有潛在病症之可能性。

#### Key words :

血液透析、肉鹼、貧血、透析中低血壓

## The Actual Clinical Benefit of Pre-pump Arterial Pressure : An Example of a Medical Center in Northern Taiwan

### 幫浦前動脈壓實際使用於臨床之效益---以北部某醫學中心為例

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#### Background :

透析清除率與病人的存活率有正相關，臨床評估是否達到足量透析的方式採每月檢測血液透析清除率(Kt/V)，清除率不足時血液流速的調整是常見的方式之一，臨床上觀察到部分病患即使調升血液流速設定仍無法改善清除率，可能原因與實際血液流速是否提升有關，現行檢測血液流速工具為血液透析流量監測儀，此方法除了機器操作不易，且無法多位病患同時持續使用，單位內自 2023 年導入幫浦前動脈壓(Pre-pump Arterial Pressure, PreAP)於血液透析過程中全程監測，除用於改善 Kt/V，並發掘是否於臨床有其他效益。

#### Methods :

本透析中心每月均會追蹤門診病患血液透析清除率(Kt/V)數值，自 2023 年 5 月起於每月抽血日將當日透析異常狀況登記並分析原因，包括透析時間縮短、調降血液流速原因及透析液使用的調整，並分析血液透析清除率(Kt/V)不足病人需改善的方向，另外當病人透析不足時卻無以上因素，則可利用上針後監測幫浦前動脈壓力(PreAP)數值及實際血流速是否下降，來做為調整穿刺針位置是否適當的參考，及推測是否有導管阻塞的可能性，必要時早期轉介心血管外科處置。推行過程執行措施(1)舉辦在職教育課程加強臨床人員對此參數重要性的認知，(2)臨床實際示範如何正確利用幫浦前動脈壓(PreAP)進行穿刺針位置的調整，避免因穿刺針吸壁或位置不佳造成透析過程中實際血流速不足，(3)不定期抽查臨床使用動脈壓的落實性，(4)進行幫浦前動脈壓(PreAP)使用問卷調查，發掘並改善使用端意見回饋。

#### Results :

經過臨床為期一年血液透析中全程使用幫浦前動脈壓力(PreAP)觀察到以下成效:1.提升血液透析清除率:自 2023 年 5 月起至 2024 年 5 月統計，Kt/V < 1.2 比例由 8% 降至 4%；2.藉由動脈壓力的監測推算實際血液流速，配合穿刺針位置的調整，可維持血流實際值與設定值誤差小於 10%，當壓力持續異常可作為血管通路阻塞的早期警示；3.推行初期因操作的不熟練及發生透析導管壓力保護套醫材品管不穩，臨床人員使用動脈壓監測意願降低，經由醫材改善、加強教育訓練，臨床使用落實率可達 100%；4.幫浦前動脈壓監測在使用經驗中觀察到，壓力的正負值可以做為導管位置是否正確的輔助工具；另外當病患在治療中發生血壓下降時，動脈壓力也同時發生改變，且因持續監測較血壓測量更及時呈現病患血液動力學變化。

#### Conclusions :

目前使用幫浦前動脈壓監測的相關資料稀少，經由使用經驗的累積，期許未來能訂定針對國人的監測值標準，並將血液透析動脈壓監測擴大應用於提升透析清除率、早期預警血管通路阻塞及預測透析中低血壓的發生。

#### Key words :

血液透析、幫浦前動脈壓監測、血液透析清除率(Kt/V)

## Improvement of the Proportion of Adequate Dialysis in Hemodialysis Patients through the Implementation of Continuous Quality Improvement Projects 導入連續品質改善計畫提升血液透析病人達適量透析比例

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### Background :

血液透析充分性對於維持腎衰竭病人的生命品質、降低併發症風險，以及提高長期存活率至關重要。然而，部分病人未能達到建議的透析充分性標準。單位透過導入連續品質改善 (Continuous Quality Improvement, CQI) 計畫，提升血液透析病人的尿素氮清除率 (URR) 達標率。

### Methods :

本計畫為前瞻性品質改善計畫，對象為本院門診接受血液透析治療的病人。計畫內容包括：  
1. 資料收集與分析：定期收集並分析每位病人的透析相關數據，統計分析目前達標與未達標病人的比例，並找出影響透析充分性的可能因素。  
2. 找出問題根源：查核透析 URR 未達 65% 之病人，透過照護團隊討論，找出影響原因，包括血管通路問題、透析處方不適當、病人因素及其他因素。  
3. 擬定改善措施：針對找出之問題根源，擬定具體可行的改善措施，包括血管通路評估與介入治療、調整透析處方、加強病人衛教、及提升醫護人員專業知能。  
4. 執行與監測：將擬定的改善措施付諸實行，二周後須監測其成效，檢視執行改善治療病人的透析數據，並追蹤未達標病人的改善狀況。  
5. 持續改善：根據監測結果，檢討並調整改善措施，以確保計畫持續發揮效用。

### Results :

自在 112 年第三季門診血液透析病人 URR 大於 65% 比例為 90.8%，未達閾值 95%，執行改善計畫進行照護品質改善，112 年第四季成功將單位尿素氮清除率 (URR) 達 65% 之達成率從 90.8% 提升至 95.4%。

### Conclusions :

本計畫透過導入連續品質改善計畫，成功提升血液透析病人達適量透析的比例，這個計畫具體可行。

### Key words :

血液透析、尿素氮清除率、連續品質改善、透析充分性、品質改善計畫

## Using cross-team intervention to improve the effectiveness of fistula care 運用跨團隊介入提升瘻管照護成效

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### Background :

在全台透析人口中，有八成以上病人選擇血液透析做為治療模式，血管通路是血液透析病人第二生命線，瘻管重建不僅會延誤病人透析治療，還需忍受侵入性治療及手術引發的疼痛，增加健保醫療支出費用及成本，甚至造成病人焦慮不安而影響透析品質，故維持良好動靜脈瘻管品質，是血液透析照護品質成效重要指標之一

### Methods :

動靜脈瘻管阻塞:指觸診瘻管脈衝無顫動感(thrill)，聽診無嘈雜音(bruit)之完全靜止狀態，導致無法進行透析稱之。本單位以自體動靜脈瘻管 138 位(81.2%)，人工動靜脈瘻管 16 位(9.4%)，根據文獻指出，手部握球運動可增加瘻管流速，但多數長者因握球過程中易感手痠無力，故往往在預執行透析治療時，經護理師評估後，才發現瘻管阻塞情形，在心臟血管外科醫師會診後，平均需等待超過 13 小時，方能進行外科處治。

### Results :

1. 透過跨團隊合作，制定瘻管失能處理流，當病人發生瘻管阻塞時，由血管照護小組窗口協助轉介，轉介包含心臟血管內外科或轉介策略聯盟醫療院所，即時處理瘻管阻塞病人免於瘻管重建。
2. 透過設置血管超音波門診，建立常規檢查，以早期發現瘻管失能前兆，即時執行經皮血管成型術(PTA)，降低動靜脈瘻管重建率，以延長動靜脈瘻管使用壽命及降低臨時導管放置引發感染的風險。
3. 建置瘻管照護資訊整合系統，包含血管超音波追蹤情形(協助困難穿刺病人進行最適施針處定位以及標記血管走向)、建立階梯式施針標記，並透過資訊化系統，讓醫療團隊可即時了解病人瘻管照護進展，增進醫療團隊間良好的溝通互動。
4. 提升病人瘻管照護能力：拍攝瘻管居家照護影片，放置於腎友通訊軟體內，讓病人及家屬隨手可獲得照護相關資訊。

### Conclusions :

透過建立常規血管超音波追蹤機制及瘻管阻塞跨科處理流程建立，由 PTA 處理等待時間>13 小時，降為<5 小時，並且透過跨團隊共同照護，達到優良瘻管重建率之成果。

### Key words :

瘻管照護

## Experience of caring for an elderly person receiving dialysis treatment due to excessive body fluid volume

### 一位老年人因體液容積過量接受透析治療照護經驗

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#### 【目的】

隨著醫療科技發達與社會經濟改善, 台灣目前屬超高齡化社會, 老年人口比例增加, 2020年腎臟病年報指出, 透析病人中 65 歲以上老年人佔了 52.4%, 顯示老年人透析的發生率及盛行率增加。老年人因生理功能衰退、體能差、自信心低、及過往社會化經驗等因素的影響限制, 學習意願及行動力比一般成年人低。在改變老年人自我照護行為的過程中, 若忽略老化對生理、心理、社會各方面的影響, 而無深入了解老人真實需求, 較難達到良好衛教成效。希望藉由照護經驗分享, 讓護理人員面對老年血液透析病人時, 應以柔軟的心及愛來守護病人, 進而發揮護理獨特功能的角色。

#### 【方法】

護理期間為 2023 年 1 月 20 日至 2023 年 3 月 25 日, 筆者運用 Gordon 十一項健康功能整體性評估, 經由臨床照護、會談、傾聽、觀察、身體評估及電子病歷查閱等方式收集資料, 歸納出主要健康問題為: 體液容積過量及不遵從、無望感。

#### 【結果】

健康問題有三項: 1.體液容積過量/與水份控制不當及無法有效移除有關。末期腎病病人因腎臟無法維持體內血漿滲透壓, 使體液滯留在細胞外液間隙嚴重, 造成肺水腫、心臟肥大, 出現呼吸困難的狀況。病人當水份及飲食不當造成兩次透析間體重增加過多, 易出現呼吸喘、肢體水腫、心肺積水等情況, 且容易在透析過程中發生抽筋、頭痛、血壓降低等現象, 先了解飲食喜好, 年長者可使用彩色海報或圖卡, 增強記憶及理解度。2.不遵從/因不了解一週三次適量透析的重要性。提供病人一週三次適量及規律透析的重要性, 進而接受透析。3.無望感/與老年期開始長期透析治療之壓力有關。老年開始接受透析治療需面對罹病角色改變、身體症狀的不適, 被迫改變生活習慣等壓力, 因應能力下降及無法適應, 對未來產生不確定感及無望感等負面情緒照護上應建立信任護病關係, 引導表達正負向情緒, 適時給予正向鼓勵, 並提供疾病相關訊息, 降低對未來的不確定性, 提升自我照護能力, 增進人際互動關係, 藉由信仰建立心理支持提升自我控制感。

#### 【結論】

老年進入血液透析面臨身體的不適, 無法改善而開始對於醫囑的不配合, 對於透析醫囑無法遵從的問題, 在照護過程中, 須傾聽關懷老年病人真正感受, 找出不遵從行為原因。初次透析患者皆須經過一段時間的學習、調整才能在日常生活中與自我生活型態取得平衡。自我照顧的能力越好, 可提昇生理方面舒適, 降低無助、無力感, 增加社會資源支持, 可有效提昇生活品質, 故血液透析病患的社會支持、自我照顧能力及生活品質的提升是需要被重視的, 也是護理人員的照護重點。

關鍵字: 老年人、血液透析、體液容積過量、不遵從透析醫囑

## Improve patient weight accuracy before and after dialysis

### 提升病人透析前後體重正確性

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**背景：**血液透析是目前末期腎臟疾病最常見的一種治療方式，長期血液透析病人每次透析時水分移除的目標誤差普遍存在，脫水量過多時則造成低血壓、動靜瘻管阻塞、抽筋、頭暈等症狀，及加重併發症甚至提高住院率與死亡率；相反的如水分移除量不足，導致體內水分過多易發生肺水腫、高血壓及心血管疾病等合併症。於 2022 年共發生三件透析治療水分移除異常事件，其中一件為水分移除量比目標值多，於透析中發生抽筋及低血壓情形；有兩件因水分移除量不足導致肺水腫，入加護病房放置氣管內管接呼吸器使用及接受緊急血液透析治療。查閱 2022 年 10-12 月病人的透析治療紀錄共 741 人次，病人脫水目標誤差正負 0.5 公斤以上，統計共有 10 人次，發生率為 0.51%。藉由擬定具體可行的改善措施與相關作業流程，期能降低病人透析前後體重誤差率，進而提升病人安全，及血液透析護理品質。

**方法：**彙整護理人員當時所紀錄之原因統計分析結果：(1)懷疑透析前後體重測量有誤 3 件 (30%)；(2)體重數字未上傳至電腦系統，病人憑記憶告知體重 3 件(30%)；(3) 透析前後衣物扣除重量未一致 2 件(20%)；(4)病人透析中備用食物未吃完，忘記告知護理人員 1 件 (10%)；(5)護理人員上線前計算病人當次透析水分移除量，為求快多以心算方式核算，上線後因工作忙碌未再重新檢視水分移除設定量 1 件(10%)。改善措施有：(1)護理人員方面：單位同仁每年進行一次體重機操作正確性之審核。舉辦安全透析相關議題課程，將體重機操作作業指導書及上課資料做成單位讀書本供同仁翻閱。照護交班時兩人至床邊除檢查管路安全外，再次核對水分移除設定量是否正確。宣導同仁上線前對體重有疑問者請在重新測量；上完線後與病人再次核對體重否正確。(2)接送人員方面：請接送人員將病人體重及扣衣物重寫在紙張。如為外籍看護因語言，故將所測量體重用手機拍照起來。(3)政策方面：修訂體重機操作作業指導書；新增測量體重護理衛教單張；設計測量體重注意事項海報。

**結果：**透過專案對策實施後，再次查檢在對策改善前後透析前後體重誤差率之變化，病人脫水目標誤差正負 0.5 公斤以上，發生率為 1.3%下降率至 0.51%。

**結論：**在本專案改善措施與相關作業流程介入前，病人脫水目標誤差正負 0.5 公斤以上，發生率為 1.3%，經本專案進行後下降率至 0.51%，重新修訂體重機操作作業指導書，將測量體重注意事項做成圖片海報，讓同仁有共同規範遵循以提升護理品質。本單位病患年齡層 65-75 歲人數占最多，請外籍看護，家屬或居服員無固定接送的人，而導致測量體重有誤，病患的需求並非醫療人員可控制，如不可控之因素希望藉由完善的護理標準及因應措施，來預防透析前後體重誤差率的發生。

**關鍵字：**透析前後體重、降低體重誤差率、血液透析



## The prevalence of malnutrition and frailty in patients on maintenance hemodialysis: a single dialysis unit study

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**Background:** Protein energy wasting and frailty are highly prevalent in kidney failure patients on maintenance hemodialysis (HD) therapy and are associated with adverse clinical outcomes. We evaluated the prevalence of malnutrition and frailty among patients in a single HD unit.

**Methods:** We conducted a cross-sectional study in the hemodialysis unit of a district hospital in Yunlin County. Patients aged 18 or older and receiving HD treatment thrice weekly for at least 3 months were recruited. The exclusion criteria included refusal to provide the informed consent, severe cognitive dysfunction, recent infection, active malignancy, severe malnutrition, recent cardiovascular events, and severe pulmonary and liver diseases. Regarding the assessment of malnutrition, we used the Mini Nutritional Assessment-Taiwan version 2 (MNA-T2) scale and also calculated the Geriatric Nutritional Risk Index (GNRI). The definition of frailty was based on the frailty phenotype defined by Fried et al. The Pearson correlation analysis was used for the assessment of correlation among MNA-T2, GNRI, and frailty state.

**Results:** A total of seventy-one patients were included in the investigation. The MNA-T2 results showed that 51 (71.8%) were in normal nutritional status, 19 (26.8%) were at risk of malnutrition, and 1 (1.4%) was classified as malnourished. The mean GNRI was  $102.98 \pm 8.86$ . For the frailty aspect, 1 (1.4%) had unintentional weight loss, 41 (57.7%) had slow walking speeds, 10 (14.1%) had low handgrip strength, 51 (71.8%) had low physical activity, and 12 (16.9%) had exhaustion. Forty-six patients (64.8%) were in pre-frail state and fourteen (19.7%) were categorized as frail. There was significant, positive correlation between GNRI and MNA-T2. The frailty score was significantly negatively correlated with both MNA-T2 score and GNRI.

**Conclusions:** Based on the results of these screening tools, a significant proportion of HD patients was susceptible to malnutrition and frailty. Subsequently, we will focus on the identification of potential risk factors for malnutrition and frailty in patients undergoing chronic HD.

**Keywords:** malnutrition; frailty; hemodialysis.

## The effectiveness of a nursing intervention project on improving the manual applying pressure rate to own fistula in hemodialysis patients 護理改善專案介入後對提升血液透析病人徒手加壓瘻管率之成效

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### 目的：

血液透析是末期腎臟衰竭病人維持生命最主要的治療方式之一，血管通路可以稱為血液透析病人的另一條生命線，長期透析的血管通路以動靜脈瘻管與人工瘻管為主，然而瘻管阻塞卻是血液透析病人最常見的併發症，當加壓止血不當引起血管通路功能不良時，會降低血液中尿素氮及肌酸酐的清除率，不僅會造成血液透析效率不佳，病人罹病率及住院率增加。期望藉由護理改善專案探討血液透析病人無法徒手加壓瘻管的原因，並採取相關措施以增加病人徒手加壓瘻管比例減少透析瘻管的阻塞，進而提升病人透析品質。

### 方法：

護理改善專案小組依據單位月報表中的透析瘻管統計量，並參考文獻及臨床專業經驗設計血液透析病人動靜脈瘻管未徒手加壓問題分析表，於4月間進行未徒手加壓原因統計，並計算出徒手加壓瘻管率，經醫護團隊應用臨床照護經驗進行評估與討論後，並進行相關改善措施。再與9月現況數據做徒手加壓瘻管率比較。

### 結果：

經護理改善專案小組介入後，單位內血液透析病人動靜脈瘻管徒手加壓率由53.47%提升至68.18%，透析瘻管阻塞率由1.41%降低至0.93%，透析瘻管阻塞後額外增加之護理時數由46小時下降至30小時，透析瘻管阻塞後額外增加之耗費醫療成本由395,795元降低至325,523元。

### 結論：

動靜脈瘻管加壓照護攸關病人、護理師及主要照顧者之間的連繫配合，要改善病人長久以來的瘻管加壓習慣，有其相對困難之處，應再更聚焦以提高改變的意願，雖然本研究在護理改善專案小組介入後，動靜脈瘻管徒手加壓率之改善幅度有限，未來仍需多方及跨團隊的持續介入以改善透析患者之生活及透析品質。

Key words: 血液透析(Hemodialysis)、動靜脈瘻管(Arteriovenous Fistula)

## Single center experience of plasmapheresis in a rural regional hospital

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### Background:

Therapeutic plasmapheresis has become an integral part of intensive medical practice. In this study, we retrospectively evaluated demographic features, indications, and safety of plasmapheresis in diseases that were treated with plasmapheresis in patients admitted to our blood purification unit between January 2014 and Dec 2023.

### Study design and methods:

This study was a retrospective analysis of therapeutic plasmapheresis procedures performed in Tungs' Taichung Metroharbour Hospital. All consecutive treatment sessions were included. We used 2 techniques namely therapeutic plasma exchange (TPE) and double filtration plasmapheresis (DFPP), using the HF440 machine (Infomed SA, Geneva, Switzerland) and the utilized replacement therapies involved frozen fresh plasma and 25% albumin with dilution as indicated. All treatment indications were performed according to the American Society for Apheresis (ASFA) recommendations.

### Results:

A total of 508 procedures were performed during the study duration of 10 years. These procedures were performed for 142 different patients. Mean age and gender ratio were  $57.0 \pm 17.6$  (range (19-95 years) and male 47.7%; female 52.3 %). The indications/categories of plasmapheresis was shown in Fig 1-2. Median procedures per patient was 5 (range 1-16). Most of the procedures were referred from neurology (216 cases, 42.5%), followed by nephrology, gastroenterology, and liver transplant teams, rheumatology, critical care, and hematology. Only 11 sessions reported adverse effects.

### Conclusion:

Plasmapheresis has place as a therapeutic modality in clinical practice with minimal adverse reactions. The increasing indications of plasmapheresis in the updated guidelines has broadened its scope in numerous diseases or syndromes associated with critical illness.

## The Performance of Taiwan National Health Insurance Reimbursement Criteria to Select Eligible Liver Failure Patients Treated with Molecular Adsorbent Recirculation System (MARS): A Retrospective Study

台灣國民健康保險給付標準在篩選符合分子吸附再循環系統 (MARS) 治療的肝衰竭病人之表現：一項回顧性研究

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### Background:

Liver failure is a life-threatening condition characterized by its inability to function, leading to toxin accumulation, coagulopathy, and multi-organ failure. While liver transplantation is the definitive treatment, extracorporeal liver support systems, such as the Molecular Adsorbent Recirculating System (MARS), are explored as bridging therapies. This study investigates the outcomes of MARS therapy, focusing on the impact of National Health Insurance (NHI) reimbursement.

### Methods:

This retrospective case-control study included patients treated with MARS at National Taiwan University Hospital from 2020 to 2024. Inclusion criteria were adults ( $\geq 18$  years) receiving MARS therapy for liver failure. The primary endpoint was 28-day mortality. We compared NHI-reimbursed versus non-reimbursed treatments, matching patients by gender, age, and MELD score. Statistical analyses included descriptive statistics and logistic regression.

### Results:

We analyzed 16 patients, including 11 without NHI coverage (Group 1) and 5 with NHI coverage (Group 2). Group 1 had more severe conditions and higher 28-day mortality. After adjustment, Group 1's mortality remained significantly higher, highlighting the potential role of NHI reimbursement criteria for selecting suitable patients for liver transplantation.

### Conclusions:

Patients with NHI-reimbursed MARS therapy had significantly better outcomes than those without NHI reimbursement. This emphasizes the importance of selecting candidates for MARS therapy. Expanding insurance coverage for MARS therapy might benefit more patients with liver failure.

### Key words:

Liver Failure, MARS Therapy, National Health Insurance Reimbursement

## Investigating the Prevalence and the Risk Factors of Clonal Hematopoiesis of Indeterminate Potential in Patients with Chronic Hemodialysis

### 探討意義未明之克隆性造血在慢性血液透析病人之盛行率與危險因子

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#### Background :

Clonal hematopoiesis of indeterminate potential (CHIP) and clonal cytopenia with undetermined significance (CCUS) are the presence of genetic mutations in hematopoietic stem cells without or with abnormal hemogram and associated with evolution to myeloid neoplasm. However, the prevalence, risk factors and the distribution of CHIP mutations among end-stage renal disease (ESRD) patients undergoing hemodialysis is yet to be reported.

#### Methods :

A total of 42 ESRD patients undergoing hemodialysis with either normal or abnormal hemogram were enrolled. Peripheral blood was collected for next generation sequencing for mutations in 47 genes.

#### Results :

CHIP mutations were found in 83.3% of patients. The most prevalent CHIP mutations are BCORL1 (42.9%), GNAS (25.7%), and BCOR (20%). The prevalence of autoimmune disease is higher in non-CHIP/CCUS than CHIP/CCUS group (42.9% vs 11.4%,  $p=0.042$ ). Clonal hematopoiesis risk score (CHRS) was calculated to define low-risk (11.4%), intermediate risk (65.7%), and high risk (22.9%) for risk of progression to myeloid neoplasms. Low risk CHRS group have higher platelet count ( $202.5 \pm 81.3$  vs  $127.0 \pm 39.5$   $k/\mu L$ ,  $p=0.006$ ) than intermediate risk CHRS group and higher serum phosphate level ( $5.65 \pm 0.90$  vs  $4.13 \pm 0.50$   $mg/dL$ ,  $p=0.003$ ) than high risk CHRS group.

#### Conclusions :

This is the first domestic cohort study of CHIP mutations in ESRD patients undergoing hemodialysis. Future applications aim to identify high-risk progression to myeloid neoplasms and predict overall survival for these patients.

**Key words:** Clonal hematopoiesis, hemodialysis, end-stage renal disease

## Care experience of hemodialysis women who are pregnant during COVID-19: a case report

### 血液透析婦女於新冠肺炎期間懷孕之照護經驗:個案報告

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#### ABSTRACT

Taiwan has the highest number of dialysis patients in the world. It is not common for women on dialysis to become pregnant, and the pregnancy process of women on dialysis carries very high risks for the mother and fetus. The fetus is also prone to malnutrition, premature birth, or low fetal weight. During the COVID-19 epidemic, cross-team care is needed to ensure Only by ensuring the safety of pregnant women and their fetuses during dialysis can the patient give birth smoothly. I would like to share this dialysis pregnancy care experience as a reference.

#### Background:

The 35-year-old case has a family history of hypertension and hyperlipidemia. She gave birth to a child by caesarean section in 2014. She started undergoing hemodialysis three times a week due to nephropathy syndrome in 2019, and received a total of 4 doses of the COVID-19 vaccine from 2021 to 2022. Pregnant in September 2022, infected with COVID-19 at 28 weeks pregnant.

#### Methods:

Starting from the 20th week of pregnancy, the patient's dialysis frequency was changed from three times a week to four times a week, with each dialysis taking 4 hours. Antihypertensive drugs were also adjusted to maintain blood pressure below 140/90mmHg. Pay attention to drugs that may cause teratogenesis, use low-dose aspirin to prevent pre-epilepsy, keep urea nitrogen below 50mg/dl before dialysis, and frequently assess dry body weight to avoid intradialytic hypotension. To maintain hemoglobin at 10-11g/dl, protein intake should be sufficient, adequate nutrition and dietary phosphorus content should be relaxed.

#### Results:

A baby boy weighing 2600gm was delivered by caesarean section at 37 weeks. This case was successfully delivered to a healthy fetus during the COVID-19 epidemic. It was the result of the joint efforts of teams from various departments in the hospital.

#### Conclusions:

Increase the dialysis frequency and dialysis time of pregnant women on dialysis, adjust high blood pressure medications, and avoid pre-epileptic syndrome. Nutritionists provide nutritional consultation, and nurses accompany and resolve case concerns, enhance the case's immunity, avoid infection, and alleviate their inner worries. The baby's safe arrival also added more warmth and hope to her dialysis life.

Keywords: Hemodialysis · Pregnancy

## Improvement of Human Factors Engineering for Treatment Personnel in Hemodialysis Room - Process Reengineering

### 血液透析室治療人員作業人因工程改善-流程再造

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#### 目的(Background)

衛生福利部統計新冠肺炎疫情過後近二年的護理執業人力因高齡化、慢性及多重疾病照護需求增加，導致護病比例超過負荷、人員身體機能受損。肌肉與骨骼疾病是醫療照護者較高比例的傷害，護理人員位居第一線執行醫療護理，較其他醫療人員更易面臨與職業有關傷害的風險，包括肌肉骨骼不適傷害，如何減低護理人員的職業災害所造成的直接與間接醫療成本損失，已成為醫院管理重要的課題。血液透析的管路安全為工作重點，人員執行透析作業時須使用腕關節及手指..等精細動作，長期下來造成人員經常有肌肉痠痛併發扳機指及腕隧道症候群的發生，其他的重複動作也造成肌肉傷害，因此我們將進行流程再造方式，減緩人員的疼痛及減少執業中危險因子的發生。

#### 方法(Methods)

本單位病人有 281 位，治療人員 30 位。經現場作業及環境調查，1.人員執行作業方面：照顧一位病人需施力的動作達 20 次以上，如：使用腕關節及手指執行 9 栓 5 夾以確保透析管路安全、拆除管路遇到難以轉開管路連接處時，需徒手用力拆除；常因點滴支架高度不同需反覆調整；2.病人方面：在透析前後因不同班別的病人須調整電動床(低於膝蓋)以預防跌倒。透過流程再造方案：1.人員執行作業方面：教導人員正確執行 9 栓時的雙手旋轉、執行 5 夾使用雙手施壓；運用紅色項圈將點滴支架限制在 150~170 公分之間供人員使用、提供鐵製 kelly 工具分離難以轉開的管路；跨科團隊加入本院復健師教導人員復健課程；2.病人方面：透過衛教單張教導各班別病人在透析前後正確使用電動床的方法及時機。

#### 結果(Results)

治療人員 30 位、平均年齡 41.4±7.8 歲、平均年資 13.9±8.8 年；執行現場作業過度施力動作，導致肌肉與骨骼疼痛者 17 位(56.6%)，其中因劇烈疼痛就醫者 2 位(11.8%)，流程再造結果顯示：1.人員方面：肌肉與骨骼疼痛者由 17 位(56.6%)下降至 2 位(6.7%)、使用鐵製 kelly 工具分離難以轉開管路者由 0 位(0%)提升至 30 位(100%)、復健課程上課率由 0 位(0%)提升至 27 位(90%)；2.病人方面：經由衛教單張的指導，透析前後主動調整電動床高度病人由 138 位(49.3%)提升至 228 位(81.4%)，其他無法配合者 52 位(18.6%)是行動不便，但可由陪同者調整。且經由此次流程再造，治療人員滿意度達 100%。

#### 結論(Conclusions)

工作中重複性高的不當施力及不當姿勢所造成的肌肉骨骼傷害是國內外常見的職業安全問題，進行人因潛在危害的檢核對於改善或預防人因傷害實有其必要性，並可改善工作人員肌肉骨骼不適危害。我們需要保護單位生產人力，提供良好的工具及方法，營造一個友善美好的工作環境，將整個工作環境與體驗提升到更高的層次。

關鍵字:血液透析、人因工程、流程再造

## The Improvement Plan for Electronic Nursing Records of Hemodialysis 血液透析電子化護理紀錄完整率之改善方案

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### 背景

根據護理法規明示護理人員執行業務時，應製作紀錄，且清楚詳實的護理紀錄利於醫療團隊溝通，對病人病情進展有所助益之外，亦為呈現照護過程中的佐證，因此列入本單位的品管指標，也是評鑑訪視作業重要的項目之一。單位自 2022 年 6 月開始啟用台大醫院總院 HDS 之血液透析電子化系統，其中涵蓋透析護理紀錄作業，初期執行過程中電子化護理紀錄之完整平均 71.9%，次年完整率降至 66.0%，引發改善之動機，期望藉由單位品管組介入後，可有效提升電子護理記錄之完整率，以維持病人安全及增進照護品質。

### 方法

於 2024 年 1 月至 2024 年 6 月期間，由單位品管組稽核成員分組、討論開會並收集相關護理紀錄缺失，護理紀錄構面共七大項，細項分為十二項。利用品管手法依據問題進行現況分析，運用特性要因圖確認問題、經小組成員定期檢討發現在人員方面：缺乏專人進行護理紀錄系統的輔導和支援工作及無舉辦電子化護理紀錄系統的相關培訓和教育訓練。在流程方面：單位品管護理紀錄稽核組仍延續傳統紙本稽核方式作為稽核基準，未修改電子化系統實施後的稽核標準，造成稽核不一致性。經由品管小組確立問題後修訂電子護理紀錄書寫規範、培訓護理紀錄種子教師、增訂電子護理紀錄稽核標準，每月於品管會議檢討成效討論解決方法及執行可行性，制定稽核標準以達成護理紀錄完整率。

### 結果

113 年 1-5 月護理紀錄完整率平均為 95.9%(2545/2653)，優於護理部中央品管組護理紀錄闕值 94.0%。

### 結論

護理紀錄的完整性能夠增加醫護間的有效溝通，維持高品質的病人照護、病人安全。本院透析護理紀錄多年來的書寫方式皆為書面資料，難以在短時間內改變成電子化紀錄的模式，經由單位品管每月的小組會議進行討論、完成電子護理紀錄的評核標準化和電子系統格式化，依照臨床實務適時的調整是需要長時間的磨合和溝通後方能達到共識，定期對策實施的成效檢討有利於推動和執行，更讓護理同仁在繁忙業務中縮短書寫記錄的時間，增加電子化後帶來的效益。

**關鍵字** 血液透析 護理紀錄 護理專案 書寫完整性



## Enhance the Effectiveness of Nursing Guidance for Patients Undergoing Initial Hemodialysis

### 提升初期血液透析病人護理指導成效

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#### 背景

台灣末期腎臟病盛行率高居全球之冠，高達 98% 病人選擇血液透析治療，初期透析病人於初期透析期間得到完整護理指導可增加自我照護，適應透析治療，自 2023 年 1 月至 2024 年 6 月共收 83 位個案，本文旨在提升護理指導成效，初期血液透析病人接受護理指導可提升自我照護成效，正向態度面對透析生活，預防合併症發生及降低住院發生。

#### 方法

單位檢視 2023 年 1 月至 2023 年 12 月長期血液透析門診平均人數 326 位，期間經由疾病共享決策選擇接受初期血液透析病人共 54 位佔 16.5%，照護護理師依照護理指導項目於病人到院透析時提供相關護理指導，滿 3 個月後查核發現完整率僅 68.7%，小組人員運用查檢表、特性要因圖調查分析發現護理指導成效低的原因為缺乏在職教育、交班不落實、衛教工具不足等，運用對策矩陣圖擬定對策，重新擬定初期透析病人衛教指導進度表、提供即時雲端護理紀錄範本、建立專人諮詢查核機制進行改善方案。

#### 結果

檢視 2024 年 1 月至 2024 年 6 月護理指導完整率由 68.7% 提升至 85.0%，持續探討未完成要因進行 PDCA 循環持續改善，追蹤 2024 年 7 月至 8 月護理指導完整率均達 100%，有良好的成效。

#### 結論

對於初次透析的病人在面臨透析時的不確定感、壓力，為了提升透析病人自主學習，並維持良好的健康狀態，護理人員運用專業、系統性的衛教指導內容，在短暫且不定時會遇到緊急問題的透析治療中，能精簡且有效的達到依病人個別性的衛教項目內容，讓病人及家屬逐步接納參與健康照護，未來著手結合醫院資訊系統，建立提醒機制自動化追蹤初期透析病人需再補強的整合照護部分，亦可協助並簡化護理人員的臨床工作負荷。

#### 關鍵詞

血液透析；疾病共享決策；護理指導

## Uremic toxin level and Quality of Life of Switching From Hemodialysis to expanded Hemodialysis: A Taiwan Controlled intervention Study

### 新式延展性血液透析術對尿毒分子、生活品質的影響

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#### Background :

Although advancements in renal replacement therapy have improved the mortality and morbidity of patients with renal failure, those undergoing long-term hemodialysis (HD) continue to experience issues that affect their quality of life (QoL), such as fatigue and pruritus. Conventional HD effectively removes small uremic toxins, but struggles with larger molecules. Expanded HD (HDx), which uses a medium cutoff (MCO) membrane, has been introduced to enhance the clearance of middle to large uremic toxins. There is limited evidence regarding the clearance of protein-bound uremic toxins. The aim of this study is to evaluate the clearance of middle to large molecular weight and protein-bound uremic toxins by HDx and assesses QoL before and after HDx treatment.

#### Methods :

Patients at Mackay Memorial Hospital who had been on HD for at least 5 years with frequency 3 times per week were enrolled in the study and underwent HDx for 3 months. Exclusion criteria included active malignancy and other organ failures. Laboratory tests and a questionnaire (36-Item Short Form Health Survey [SF-36]) were recorded before and after the HDx treatment.

#### Results :

The study enrolled 23 patients (13 males, 10 females, mean age  $58.26 \pm 8.14$  years). Compared to baseline values, potassium, phosphate, and intact parathyroid hormone levels were significantly decreased after 3 months of HDx treatment. Lambda free light chain levels also significantly decreased, while beta2-microglobulin showed a borderline decrease ( $p=0.053$ ). Hemoglobin and albumin levels remained stable. QoL analysis using SF-36 indicated significant improvements in concepts of fatigue, pain, general health, and health change. However, the levels of protein-bound uremic toxins, indoxyl sulfate and p-cresyl sulfate significantly increased.

#### Conclusions :

HDx improved clearance of middle to large uremic toxins and enhanced QoL without reducing albumin levels. However, its impact on protein-bound uremic toxins requires further investigation.

#### Key words :

Uremic toxin, hemodialysis, expanded Hemodialysis

## Effect of ice compress on improving fistula puncture pain in hemodialysis patients

### 冰敷改善血液透析病人瘻管穿刺疼痛之成效

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#### Background :

臨床上常見病人在瘻管穿刺前感到焦慮、抱怨扎針疼痛、害怕疼痛不願更換注射部位等，導致反覆穿刺同區塊部位，久而久之容易導致血管壁受傷脆弱，最終形成假性動脈瘤、穿刺處易滲血或不易止血。然而臨床中，護理人員僅建議害怕疼痛的病人可在穿刺前塗抹自費止痛藥膏減緩疼痛，但由於價格考量，實際上只有少數病人會常規使用。緩解疼痛是基本護理倫理，期望透過實證策略探討冰敷對於緩解血液透析病人瘻管穿刺疼痛之成效。

#### Methods :

類實驗性研究設計進行，先篩選瘻管穿刺疼痛強度達中度(≥4分)以上患者，再將符合收案條件之受試者依亂數表以電腦隨機分派方式分配為實驗組及對照組，實驗組及對照組於任一日洗腎日執行動靜脈瘻管穿刺時測量疼痛數字等級量表；由研究者使用以乳膠手套裝入冰塊製成的冰敷袋，紗布包覆冰敷袋持續冰敷於非瘻管側合谷穴位處，此穴位點位於第1與第2掌骨之間(拇指與食指間)，距第二掌骨約1.5公分處(虎口後方肌肉豐厚部位)，直至穿刺程序完成後再移開冰敷袋，即介入措施；對照組則未接受任何疼痛緩解措施，接受常規的穿刺動作，兩組穿刺動作均由同一位護理師進行，以避免干擾因子。

#### Results :

由文獻評讀與精粹，依據實證文獻建議以7A轉譯步驟至臨床，將冰敷運用於改善洗腎病人瘻管穿刺疼痛。於瘻管穿刺前10分鐘直至穿刺結束，在非瘻管側食指與大拇指虎口處冰敷，並使用NRS量表作為成果指標監測，結果顯示實驗組於介入冰敷前後疼痛指數顯著下降，與對照組相比，疼痛改善達顯著差異。

#### Conclusions :

目前臨床上使用止痛藥膏作為疼痛控制的方式以成本效益分析結果，止痛藥膏使用量大、所費不貲，並非所有病人均願意自費使用，相較於冰敷袋製作簡單、成本較低及取材容易的優點，較符合經濟效益，因此可作為疼痛控制方式之考量。

#### Key words :

冰敷 血液透析 穿刺疼痛

## Can aromatherapy improve the sleep quality of hemodialysis patients?

### 芳香療法可否改善血液透析病人睡眠品質？

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#### Background :

血液透析患者容易有睡眠品質不佳，睡不好、睡不著，容易疲倦沒精神等問題，故而收尋此篇文獻評讀，因個案睡眠品質不好導致血壓偏高，據文獻指出芳香療法可以舒緩疲勞改善睡眠及緩解焦慮及壓力，因此引發筆者探討「芳香療法可否改善血液透析病人睡眠品質？」。

#### Methods :

此文獻為隨機，雙盲交叉的臨床試驗，研究對象為土耳其兩個城市的血液透析室進行，這項研究有 62 名病人，根據療程選擇實驗組和對照組。符合條件的患者根據其血液透析時段分組。早晨的血液透析時段患者為對照組 35 人，下午的血液透析患者為實驗組 27 人。研究納入標準如下：年滿 18 歲以上、無視聽覺障礙、同意參與研究、規則接受血液透析一週三次至少三個月以上、無服用任何安眠藥、PSQI 得分為 5 分或以上、能說土耳其語溝通。排除標準如下：有呼吸系統疾病、對精油有過敏者、有嗅覺障礙，在治療過程中使用其他中西醫結合療法。研究人員在透析過程中以會談方式，使用問卷和視覺模擬量表 (VAS)、Piper 疲勞量表、匹茲堡睡眠質量指數的數據 (PSQI)，安排七週共四次隨訪，完成 VAS、Piper 疲勞量表和 PSQI。對照組：血液透析治療外未進行芳香療法的組。實驗組在隨訪使用獨立樣本 t 檢驗中的 VAS 疲勞評分顯著低於對照組 ( $p < 0.05$ )。與治療期開始時相比，隨訪時實驗組的 Piper 疲勞量表和所有子量表平均分均顯著降低 ( $p < 0.001$ )。隨訪時間 (第一次，第二次，第三次和最後一次隨訪) 之間的差異顯著 ( $p < 0.001$ )。在對照組中，在第一，第二，第三和最後一次隨訪中，Piper 疲勞量表和所有子量表的平均評分均升高，但差異無統計學意義 ( $p > 0.05$ )。結果顯示，隨訪時實驗組的所有總分和分量表均值低於對照組，且該下降具有統計學意義 ( $p < 0.001$ )。在兩組的開始和最後一次隨訪中，PSQI 平均得分差異之間存在顯著相關性 ( $p < 0.001$ )。

#### Results :

病人表示未使用芳香精油療法，原本匹茲堡睡眠品質量表(PSQI)：15 分，經由芳香療法後匹茲堡睡眠品質量表(PSQI)降至 10 分。

#### Conclusions :

結果顯示芳香精油療法使用於病人身上，睡眠品質明顯改善減少疲勞程度，進而提高生活品質。

#### Key words :

血液透析、芳香療法、睡眠

## The effectiveness of nutritional consultation for hemodialysis patients in regional hospital

### 地區醫院血液透析患者營養會診成效分析

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**Background:** 多數血液透析患者有 2 種以上慢性疾病, 良好的飲食控制有助於維持疾病穩定, 然血液透析室常規照護中尚未建立完整的營養師會診制度, 因此希望強化營養師與血液透析室之跨團隊照護, 為本血液透析室重點改善目標。

**Methods:** 本院自 2022 年 03 月始建立自費營養會診機制, 以本院初接受血液透析治療(透析 3 個月內)之患者為主要對象, 另也針對主治醫師評估有需求者(如電解質異常、血糖異常及營養不良)提供營養會診, 觀察會診前後 1 個月之血液生化值變化, 以評估營養會診之初步介入成效。

**Results:** 本院血液透析室於 2022 年 04 月 1 日至 2024 年 08 月 31 日間共會診 46 位血液透析患者, 其中 78% 為初接受血液透析者, 22% 為醫師評估具會診需求者。結果顯示, 全體個案會診前後之血液白蛋白顯著提升( $3.3 \pm 0.5$ ,  $3.6 \pm 0.4$ ,  $p < 0.001$ )。而針對初透析之個案( $n=36$ ) 會診前後之血液白蛋白亦有顯著改善( $3.3 \pm 0.5$ ,  $3.6 \pm 0.3$ ,  $p < 0.001$ ), 且會診前後之血鉀( $3.9 \pm 0.6$ ,  $4.2 \pm 0.6$ ,  $p < 0.001$ )及血磷( $4.2 \pm 1.2$ ,  $4.9 \pm 1.1$ ,  $p = 0.004$ )皆有顯著提升, 但仍在合理之控制範圍。

**Conclusions:** 血液透析患者接受營養會診後可發現短期內之白蛋白有顯著提升, 但血鉀與血磷也有上升之情形, 因此營養會診時仍須輔助電解質控制之策略, 且營養會診後之長期成效維持仍需有更長時間之追蹤機制。

**Key words:** 血液透析, 初次血液透析, 營養會診

## Using multiple strategies to improve the incidence of hyperphosphatemia in hemodialysis patients

### 運用多元策略改善血液透析病人高血磷發生率

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#### 背景:

長期血液透析個案可能發生許多的合併症，其中以高血磷最常見，長期累積之下不僅導致副甲狀腺功能亢進、腎性骨病變及心血管鈣化 (Shaman&Kowalski, 2016)，增加冠狀動脈及心肌梗塞的罹病率，導致心臟衰竭發生率上升 (許, 2017)。腎臟醫學會建議標準血磷值 $\geq 6$  mg/dl，需佔單位總病人數 20% 以下，但回溯本單位血液透析病人血磷值 $\geq 6$  mg/dl，超過 20% 已持續數年，引發專案小組的動機，藉此專案找出造成高血磷的原因，提供適當介入方案以提升血液透析病人認知程度與血磷控制之自我照顧能力，進而減少高血磷合併症發生率，讓療程發揮最大功效，以改善病人生活品質。

#### 目的:

腎臟醫學會 2023 年評鑑標準中，要求血液透析病人血磷值 $\geq 5.5$  mg/dl 的閾值，發生率需小於 20% 以下，故將專案小組以此為標準，期望病人高血磷值之發生率能由比率下降至 20%。

#### 方法:

每月除了照顧護理師床邊衛教外，醫師查房也會再針對抽血項目進行解釋與衛教，為了瞭解高血磷原因，依據文獻資料整理分析與討論，歸納常見血液透析高血磷原因:1. 高血磷對身體影響; 2. 飲食認知; 3. 降磷劑的使用等 3 項問題原因。為了提升病人對高血磷認知，依上述原因擬定改善措施，於 2023 年 3 月 1 日至 2023 年 9 月 31 日，共計 6 個月。介入措施 1. 單位在職教育規劃 2. 透析病人團體衛教 3. 修訂衛教單張 4. 製作衛教光碟 5. 製作衛教素材 6. 制定高血磷食物圖卡。

#### 結果:

經過專案小組規劃與執行，本專案高血磷比率由 42.1% 降至 19.5%，目標達成率 102% (執行後達成率-執行前達成率)/(目標值-執行前達成率)100。進步率 53.6% (執行前-執行後)/執行前\*100。

#### 討論與建議:

專案小組在執行過程中提到幫高血磷這族群製作小藥盒方便攜帶；但是礙於時間限制還沒有找到較理想的工具故予放棄這項提議；而後仍可以繼續找尋適合病人攜帶藥盒或利用工具改良。專案小組也提到發展 APP 但必須跨單位合作或許未來也可努力。

高血磷會造成病人次發性的副甲狀腺亢進；而導致骨質病變、心臟血管疾病、皮膚搔癢等問題；因此，臨床護理人員應提供更適合病人的衛教模式及小工具；提高病人對高磷食物認識及藥物遵從率；使他們更有效控制血磷；進而改善生活品質。

## Impact of Sodium Profiling on Nursing Workload and Hemodynamic stability in Elderly Patients with Intradialytic Hypotension

鈉濃度調控對護理工作負荷及高齡透析低血壓患者血行動力穩定的影響

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### Background:

Elderly individuals undergoing hemodialysis often present with more comorbidities and are at higher risk of experiencing intradialytic hypotension (IDH). Literature indicates a correlation between low blood pressure during hemodialysis (HD) and higher complication and mortality rates among HD patients. However, there is limited research on the impact of sodium profiling on the workload and quality of care of HD nurses. This study aims to investigate the clinical measures taken by HD nurses to individualize interventions for preventing and managing intradialytic hypotension using sodium profiling, thereby reducing staff working load and improving hemodynamic stability in hemodialysis patients prone to intradialysis hypotension.

### Methods:

A total 90 HD patients with a history of hypotension in HD sessions were enrolled from January to September, 2022, the mean age was 63.9 years, men 31 (34.4%), women 59 (65.6%), diabetes 51 (56.6%). A time-dependent sodium profile (Fresenius 4008S) was applied during HD session in candidate patients. HD nursing care quality and working load were examined via review e-medical records and calculated complete rates of e-records, health education sheets and time consumption in HD machine setting. Strategies implemented include: (1) Customized Dialysis Menu for Elderly Patients: A tailored solution called "One-Touch Safety in Graded and Zoned Care" will be introduced to better meet the needs of elderly patients.

(2) Individualized Free Traditional Chinese Medicine Therapy: A therapy known as "Wang Bu Liu Xing Acupressure" will be offered to patients, providing a personalized approach to care. (3) Communication Bridge with Family Members: A contact book will be established to facilitate better communication between healthcare providers and the families of patients. (4) Integrated Health Education: A diverse range of health education materials will be provided through the creation of an official LINE account called "Dialysis Old Talk," ensuring that patients and their families have easy access to important information.

### Results:

Through interventions for intradialytic hypotension, the HD vascular access obstruction rate decreased from 1.57% to 0.66%. The application of sodium profiling reduced the incidence of intradialytic hypotension from 21.5% to 13.5%, and the incidence of adverse symptoms from 100% to 30.3%. To avoid hypotension during HD, HD nurses typically spend a significant amount of time setting various parameters on HD machines. However, with the use of sodium profiling, the time spent on machine setup decreased from 129 seconds to 30 seconds, and staff walking distance decreased from 3520 cm to 240 cm. The completeness rate of nurse handovers in electronic medical records increased from 61.9% to 90.6%.

The completeness rate of home care health education for patients improved from 77.9% to 99%, and patient and family satisfaction increased from 67% to 99%.

### Conclusions:

For hemodialysis patients experiencing intradialytic hypotension, the use of sodium profiling can improve hemodynamic stability, reduce nursing workload, and achieve target of health-related education program.

### Key words:

hemodialysis, hypotension, nursing workload, sodium profiling.

## Correlation between Bioimpedance Analysis and Clinical Assessment in Evaluation of Extracellular Fluid Volume in Patients on Chronic Maintenance Hemodialysis

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### Background :

Maintaining optimal fluid balance and achieving "dry weight" are critical yet challenging aspects of managing patients on chronic hemodialysis. Current clinical assessments, while commonly used, often lack precision, and objective methods can be impractical or invasive. Bioimpedance analysis (BIA) presents a promising non-invasive, rapid, and clinically feasible alternative for assessing fluid status. However, its correlation with traditional clinical and radiological evaluations remains under-investigated, particularly in specific populations.

### Methods :

This cross-sectional study enrolled 74 patients undergoing maintenance hemodialysis. Comprehensive data collection included pre- and post-dialysis clinical examinations, chest X-rays, and BIA measurements using a multi-frequency BIA device. The study aimed to compare fluid overload assessments derived from BIA with those based on clinical parameters (edema, blood pressure, etc.) and radiological findings (cardiothoracic index).

### Results :

#### Sample Characteristics

The study encompassed 74 patients (55.4% male, 44.6% female) with end-stage renal disease undergoing maintenance hemodialysis. The mean age was  $48.5 \pm 13.2$  years, mean weight  $58.1 \pm 11.2$  kg, and mean BMI  $22.9 \pm 3.7$ . Hypertension was the most prevalent comorbidity (98.6%), followed by other conditions like chronic renal transplant rejection (2.7%).

#### Weight and Clinical Assessment Pre- and Post-dialysis

Clinical assessment revealed a high prevalence of fluid overload (91.9%), with 41.9% mild, 50% moderate, and 8.1% not overloaded. While edema, dyspnea, and other clinical signs did not change significantly after dialysis, the cardiothoracic index (CTR) decreased significantly (from 67.6% to 55.4%,  $p=0.0001$ ). In patients with  $CTR > 0.5$ , 94% showed clinical fluid overload. Hypertensive patients also had a high rate of clinical fluid overload (94.3%). Weight measured by electronic scales decreased significantly after dialysis (from  $58.1 \pm 11.2$  kg to  $55.9 \pm 10.69$  kg,  $p=0.0001$ ), with an average reduction of  $2.19 \pm 1.04$  kg.

#### BIA Assessment of Fluid Status

BIA identified fluid overload in 17.6% of patients, significantly lower than the clinical assessment. Only 31.1% of patients clinically identified as fluid overloaded were also detected by BIA. In hypertensive patients and those with  $CTR > 0.5$ , BIA detected fluid overload in 18.9% and 24.3%, respectively. Weight measured by BIA also decreased significantly after dialysis (from  $57.35 \pm 11.29$  kg to  $55.65 \pm 10.84$  kg,  $p=0.0001$ ), with an average decrease of  $1.7 \pm 0.93$  kg.

#### Correlation between BIA and Electronic Scale Measurements

Both pre- and post-dialysis weights measured by BIA showed a strong positive correlation with electronic scale measurements ( $r = 0.996$  and  $r = 0.999$ , respectively;  $p = 0.0001$  for both). However, Bland-Altman analysis revealed that pre-dialysis BIA tended to overestimate weight compared to the scale (mean difference 1.47 kg). Post-dialysis, the agreement between BIA and the scale improved significantly (mean difference -0.25 kg).

While clinical signs and symptoms showed minimal change pre- and post-dialysis, the cardiothoracic index, a radiological indicator of fluid status, decreased significantly. Weight measured by electronic scales also showed a significant reduction. However, BIA-detected fluid overload was notably lower than clinically assessed overload, highlighting a discrepancy between these methods. This discordance was particularly evident in hypertensive patients and those with an elevated cardiothoracic index,



where BIA identified fluid overload less frequently. Post-dialysis weight measured by BIA demonstrated better agreement with electronic scale measurements compared to pre-dialysis assessments.

**Conclusions :**

The study underscores the potential of BIA as a supportive tool for monitoring fluid status and dry weight in hemodialysis patients. However, it also emphasizes the importance of interpreting BIA results in conjunction with clinical context, especially in patients with specific comorbidities like hypertension. The improved agreement between BIA and electronic scale measurements post-dialysis suggests its particular utility in this phase of treatment. Further research is warranted to refine the use of BIA and establish its role in conjunction with clinical and radiological assessments for optimizing fluid management in this complex patient population.

**Key words :**

Chronic kidney disease, maintenance hemodialysis, dry weight, fluid overload, body composition measurement, bioimpedance analysis

## To improv the Cleanliness of the Environment in the hemodialysis room by Applying Multiple Teaching Models

### 運用多元教學模式提升血液透析室環境清潔成效探討

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**【背景】**院內感染的方式總類繁多有飛沫傳染、空氣傳染、接觸傳染、血液體液傳染影響整個醫療環境，因此環境清潔非常重要，環境清潔是每個人的責任，醫療人清潔醫療器材時須注意消毒溶液的濃度、效期、消毒功效，尤其在血液透析室每個機台內部管路消毒及外部機台清潔與周遭環境清潔，需要消毒完成後才能接下一位病人透析，本單位曾經 B, C 肝分區分床原則與感控小組討論及研究，除了要求人員遵守洗手 5 時機，環境清潔也納入感控稽核，人員必須把握環境清潔的原則。運用多元教學方式教導人員執行治療區環境清潔，不僅可以提供病人優質安全的環境進行透析，也可加強醫療人員對環境清潔的正確觀念。

**【目的】**運用多元教學模式提升血液透析室環境清潔教育成效探討。

**【方法】**本單位是南部某區域教學醫院洗腎室，共 52 床 36 位護理師含 1 位護理長，邀請感控人員 1 位與 5 位護理師組成專案小組，針對本單位環境清潔的教育、流程制定與稽核進行探討，共發出 36 張問卷蒐集人員有關環境清潔的知識、流程、技能、執行性與正確性等相關問題。分析問題的可行性、經濟性、效益性、迫切性、重要性，採總分 80% 為採取行動方案。經由專案小組多次討論針對單位問題改善，採取行動方案有製作位教學影片及舉辦單位在職教育提供人員環境清潔的知識，以實作方式加強流程執行的順暢及注意事項提醒，建立稽核制度確保人員工作過程的執行性與正確性，感控人員不定時於現場進行雜稽核。

**【結果】**經由專案實施後人員對環境清潔的知識面由 60% 提升到 95%，執行力由 70% 提升到 100%，正確性由 70% 提升到 92%，前後測問卷整體提升 20-30%，人員對於環境清潔成效的信心度相對提升。

**【結論與建議】**經由本次的問題改善發現，單位每年都要針對工作流程進行檢討與改善，提升工作效率及病室安全，結合相關團隊共同討論，才能提供更符合臨床現況的改善方案。

關鍵字：血液透析、環境清潔、多元教學

## Clinical treatment and effectiveness of uremia skin itching

### 尿毒症皮膚搔癢之臨床處置及成效

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**背景:**依據台灣腎臟醫學會年報顯示, 全國已有 9 萬多名透析患者, 在長期透析慢性腎衰竭病人中皮膚搔癢是常見問題之一, 搔癢症在透析病人中的盛行率為 50~80%, 此次 45 人個案數, 血磷超過標準值 5.0mg/dl 佔 51%, 其好發於背部、下肢或上肢, 然而搔癢症是許多慢性腎衰竭困擾的問題, 造成原因許多, 在治療上運用適當的透析、全身與局部藥物及物理相關的療法去改善其症狀, 此次運用口服活性碳粉狀劑型、口服藥物及擦拭藥膏、物理照光治療及衛教居家照護之方式後並探討搔癢程度及心情溫度滿意度成效。

**材料與方法:**某透析室病人中篩選 45 名(男性: 25 人 女性: 20 人)分析了臨床基本資料包含(年齡、性別、透析年資、人工腎臟..等)及檢驗數據(磷、鈣磷乘積、副甲狀腺..等)。尿毒症皮膚癢病人予活性碳粉狀劑型早晚各服用一包、輔以口服藥物及擦拭藥膏、物理照光治療及衛教居家照護為期 3 個月並以:皮膚搔癢量表 (VAS 或 5-D 搔癢量表)、心情溫度計量表去做評估效果。

**結果:**在篩選 45 名尿毒症皮膚搔癢病人有服用活性碳粉狀劑型、口服藥物及擦拭藥膏及物理照光治療、服從居家照護的病人結果顯示, 5-D 搔癢評估量表分級, 無搔癢 (5-D:  $\leq 8$  分) 使用前:1 人/使用後:7 人、輕度搔癢 (5-D: 9-11 分) 使用前:4 人/使用後:8 人、中度搔癢 (5-D: 12-17 分) 使用前:19 人/使用後:12 人、嚴重搔癢 (5-D: 18-21 分) 使用前:9 人/使用後:9 人及非常嚴重搔癢 (5-D:  $\geq 22$  分) 使用前:12 人/使用後:9 人, 視覺類比量表 VAS(0 代表不會癢、10 代表非常癢)總和平均值 使用前:5.62 /使用後:4.24, 心情溫度計量表, 總分(身心適應狀況良好 $<6$  分) 使用前:34 人/使用後:38 人、(輕度情緒困擾 6-9 分) 使用前:9 人/使用後:6 人、(中度情緒困擾 10-14 分) 使用前:2 人/使用後:1 人、(重度情緒困擾 $\geq 15$  分) 使用前/後皆:0 人。

**結論:**尿毒症皮膚搔癢其成因為多發性而非單一因素, 然而口服活性碳粉狀劑型是減少毒素產生的替代方法, 口服類固醇、抗癲癇、抗組織胺藥物及使用止癢藥膏、居家衛教包含:洗澡水避免過熱、使用保濕潤膚乳液、穿著棉質衣物及物理照光治療 UVB 波長 311nm 使 T-淋巴細胞凋亡, 多方處置措施下有效降低病人搔癢所造成其不適的困擾, 使得病人有充分休息及情緒緩解。

**關鍵字:**慢性腎衰竭、尿毒症、皮膚搔癢、口服活性碳、居家衛教

## Balloon-assisted maturation accelerate maturation of arteriovenous fistulae without affecting post-maturation patency

球囊輔助促成成熟術能加速動靜脈瘻管成熟而不影響成熟後的通暢度

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**Background:** In end-stage renal disease (ESRD) patients, haemodialysis depends on vascular access (VA) function. Arteriovenous fistulas (AVF) are preferred due to lower risks of thrombosis and infection but have a 20-60% failure rate in maturation. Factors like age, comorbidities, and vessel characteristics contribute to this issue. While balloon-assisted maturation (BAM) aims to improve AVF maturation, the optimal timing and its impact on long-term patency are unclear.

**Methods:** This retrospective cohort study included haemodialysis patients from a Taiwan medical center (2017–2021). Patients with AVF maturation within 6 months were divided into non-BAM and BAM groups. Primary outcomes were AVF maturation time and post-maturation patency over one year.

**Results:** Among 147 patients, 129 (87.76%) achieved AVF maturation. Of these, 57.37% (n=74) were BAM-assisted. The cumulative maturation rate at 6 months was higher in the BAM group (57.36%) compared to non-BAM (42.64%). BAM patients had longer maturation times than non-BAM (112.38±31.59 vs. 82.71±37.09 days, p<0.001). There were no significant differences in post-maturation intervention risk or post-cannulation patency between BAM vs. non-BAM.

**Conclusion:** BAM accelerates AVF maturation without affecting post-maturation intervention risk of AVF.

**Key word:** Balloon-assisted maturation, arteriovenous fistula, haemodialysis, vascular patency, AVF maturation

關鍵字: 球囊輔助促成成熟術、動靜脈瘻管、血液透析、血管通暢度

## Combinations of valvular calcification and serum alkaline phosphatase predict cardiovascular risk among end-stage kidney disease patients

### 瓣膜鈣化與血清鹼性磷酸酶組合預測末期腎臟病患者的心血管風險

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**Background:** Valvular calcification (VC) refers to the calcified valvular remodeling associated with kidney dysfunction, especially end-stage kidney disease (ESKD). ESKD patients with VC had significantly higher cardiovascular risk than those without. Factors interacted with VC regarding prognostic prediction in this population were seldom investigated. We aimed to examine the potential synergetic effects of VC and alkaline phosphatase (Alk-P) on ESKD patients' cardiovascular risk and mortality.

**Methods:** ESKD patients undergoing hemodialysis were prospectively enrolled from a medical center in 2018. We identified patients with echocardiography and available serum Alk-P levels. Cox proportional hazard regression was performed to analyze the risk of major adverse cardiovascular events (MACEs), cardiovascular and overall mortality among 4 participant groups (with or without VC versus low or high Alk-P levels). The models were further adjusted for age, sex, and clinical variables.

**Results:** Of the 309 ESKD patients, 38, 46, 112, and 113 had no VC with low Alk-P, no VC with high Alk-P, VC with low Alk-P, and VC with high Alk-P, respectively. After adjusting for age and sex, patients with VC and high Alk-P had a higher risk of developing MACE, cardiovascular and overall mortality (HR, 3.07, 3.67, 3.65; 95% CI 1.38–6.84, 1.1–12.24, 1.29–10.36, respectively). Patients with VC and high Alk-P remained at higher risk of MACE (HR, 2.76; 95% CI 1.17–6.48) than did those without VC and with low Alk-P.

**Conclusion:** Serum Alk-P could be used to identify a subgroup of ESKD patients with elevated cardiovascular risk among those with VC.

**Key word:** alkaline phosphatase, echocardiography, end-stage kidney disease, valvular calcification, vascular calcification

關鍵字: 鹼性磷酸酶、心臟超音波、末期腎臟病、瓣膜鈣化、血管鈣化

## Continuous aspirin treatment improves cardiovascular events and all-cause mortality in hemodialysis patients with peripheral artery disease

持續阿斯匹靈治療改善血液透析合併周邊動脈疾病患者的心血管事件及全因死亡率

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**Background:** Hemodialysis (HD) patients with peripheral arterial disease (PAD) are at heightened risk of adverse vascular events, and aspirin positively affects those outcomes. We aimed to investigate the association between different patterns of aspirin use and clinical vascular events in chronic HD patients with PAD.

**Methods:** This retrospective nationwide cohort study enrolled 758 chronic HD patients who had been diagnosed with PAD between January 1, 2008, and December 31, 2012, and followed up until the end of 2020. Patients were divided into three groups according to medication possession ratio (MPR) and continued use of aspirin (i.e., low MPR, high MPR but discontinuous prescription, and high MPR and continuous prescription). Percutaneous transluminal angioplasty (PTA), surgical bypass, lower leg amputation, cardiovascular events, cerebrovascular events, and all-cause mortality were evaluated.

**Results:** High MPR and continuous aspirin use had the lowest incidence of all-cause mortality and cardiovascular events compared with the two other groups, and it was significantly associated with low risk of PTA, surgical bypass, cardiovascular events, and all-cause mortality (aHR: 0.58 [0.41–0.83], 0.49 [0.25–0.95], 0.57 [0.40–0.81], and 0.70 [0.55–0.88], respectively). Kaplan–Meier analysis revealed that event-free rates of PTA, cardiovascular events, and all-cause mortality of patients with high MPR and continuous aspirin treatment were the highest among the three groups ( $p < 0.05$ ).

**Conclusion:** Among HD patients with PAD, high MPR and continuous aspirin use significantly reduced the risk of PTA, surgical bypass, cardiovascular events, and all-cause mortality and improved the event-free rates of PTA, cardiovascular events, and all-cause mortality during long-term follow-up.

**Key word:** aspirin, hemodialysis, medication possession ratio, peripheral arterial disease, vascular outcomes

關鍵字: 阿斯匹靈、血液透析、藥品持有率、周邊動脈疾病、血管預後

## The Assessment of Physical performance and Frailty in patients undergoing Hemodialysis

### 血液透析患者身體功能與虛弱評估

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**Background:** Frailty is characterized by physical weakness, decreased mobility, and vulnerability to adverse outcomes, including hospitalization, mortality and reduced quality of life. Poor physical performance and frailty is frequently observed in dialysis patients. This study assesses the physical performance and investigates the prevalence of frailty and its associated risk factors in a cohort of hemodialysis patients.

**Methods:** This cross-sectional, single-center study, was conducted involving 149 hemodialysis patients in our hospital. The physical performance was measured by Short Physical Performance Battery (SPPB, a summary test of gait speed, chair-raises and balance; range 0–12). Frailty was identified as SPBB score less than 9. We used logistic regression (LR) to assess risk factors for frailty.

**Results:** Among the 149 patients (age  $66.4 \pm 10.0$  years, BMI:  $23.9 \pm 3.7$ ), the median and mean SPPB score were 10 points (7-11) and  $8.9 \pm 2.5$  points respectively. The mean seconds of repeated chair stand maneuver 5 times and gait speed over 4 meters were  $15.1 \pm 6.6$  and  $6.2 \pm 2.8$  respectively. Sixty-one participants (41%) were identified with frailty. The significant risk factors associated with frailty included female gender, advanced age, and low serum albumin levels.

**Conclusion:** Our research indicated the frailty is highly prevalent among hemodialysis patients. Further proactive management of identifying key risk factors such as female gender, the elderly, and nutritional status may mitigate their impacts and improve long term clinical outcomes.

Key words: frailty、physical performance、hemodialysis

關鍵字: 虛弱、身體功能、血液透析

## Reduce the Incidence of Falls Among Hemodialysis Patients

### 降低血液透析病人跌倒發生率

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#### 目的：

根據衛服部 113~114 年度【醫院版】醫療品質及病人安全工作目標第四項：預防病人跌倒及降低傷害程度，113 年資料顯示，65 歲以上長者每 6 人就有 1 人跌倒，一半以上發生在室內，更是居國人死因第 7 位，血液透析病人因鈣磷不平衡，易引起骨骼變化，導致骨骼疏鬆，且多數透析病人原發病為糖尿病，因此易引起視網膜病變及神經病變等等，造成行步態不穩情形，而導致跌倒發生，且透析病人多為自行到院就醫，65 歲以上長者佔 71.7%，113 年 1-6 月發生 2 起跌倒事件，有一件傷害嚴重度為 1 級，另一件傷害嚴重度為 3 級，造成病人手部骨折住院開刀，因此防範透析病人跌倒之發生，為刻不容緩之事。

#### 方法：

本院目前血液透析總人數為 290 人，65 歲以上高齡患者為 208 人，佔 71.7%，運用根本原因分析跌倒發生原因及改善對策：一、病人方面：下肢無力虛弱且缺乏預防跌倒認知，使用跌倒評估表，於每次透析前找出評分高於 3 分的跌倒高危險群，予以衛教單張，並於床邊指導病人及家屬如何預防跌倒之技巧；二、醫護方面：未落實評估跌倒高危險群，缺乏查核機制，針對高危跌倒病人，於床尾掛上防跌掛牌，並由副組長查核人員落實情形，納入個人工作評核要點；三、設備方面：單位資材管理設置 3 台輪椅，不敷透析後虛弱無力病人使用，宣導至服務台進行輪椅租借登記，並與服務台協商於透析收針後時段，預留 3-5 台輪椅供透析病人使用。

#### 結果：

經執行改善對策後，已有顯著成果：一、病人方面：病人及家屬對跌倒認知提升，尤其下肢無力患者對輪椅使用之情形，遵從度由 61.5% 提升至 100%；二、醫護方面：經由查核機制後，多數人員皆能於床尾掛上防跌掛牌，少數人因工作忙碌而未達成，執行率由 38.9% 提升至 93.8%；三、設備方面：經由與服務台志工溝通協商後，透析病人未再發生無輪椅使用之情形，輪椅使用滿意度由 61.1% 提升至 100%，對策執行後目前至今跌倒事件為 0 件。

#### 結論：

跌倒於醫院意外事件占首位，不僅造成龐大的醫療支出與社會負擔，更導致家庭結構失衡，因此跌倒的預防是照護上重要課題，我們仍須運用預防、追蹤、落實、關懷及評值等技巧，降低病人傷害，提升照顧品質，以達到病人安全目標。

關鍵字：血液透析、跌倒。



## Improve the urea reduction ratio in hemodialysis patient

### 提升血液透析病人尿素氮清除合格率

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#### 計畫背景：

尿素氮清除率（Urea Reduction Ratio，以下簡稱URR）為腎臟醫學會品質監測指標項目之一，監測閾值URR $\geq$ 65%，合格率 $\geq$ 95%。URR不足會增加病人死亡率與感染率，不僅耗用醫療人力、物力等資源，更影響病人治療品質。因此，提升尿素氮清除合格率可降低血液透析病人的感染率，更能進一步降低死亡率。本單位藉由分析尿素氮清除合格率偏低的原因，進行檢討及改善，增加血液透析病人尿素氮清除合格率，提升透析照護品質。

#### 執行方式：

尿素氮清除率(URR)為本單位醫療照護品質監測項目之一，因未達腎臟醫學會指標閾值，於2023年4月起採回溯性統計2022年1月至2023年3月URR $\geq$ 65%平均值為90.3%。資料收集期間利用各項查檢表分析未達閾值原因為：病人透析時間不足、雙腔靜脈導管再循環率高、病人透析流速不足等。擬定改善對策分別為：1.修訂圖視化衛教單張及海報並張貼於護理站、2.定期播放「足量透析」衛教影片、3.定期播放「血管通路照護」衛教影片、4.舉辦護理人員在職教育、5.安排病人回診評估瘻管功能，並於改善對策實施後進行成效分析。

#### 成果評估：

2022年1月至2023年3月尿素氮清除合格率平均為90.3%，2023年6月實施改善對策至2024年6月，改善後合格率提升至96.2%，達腎臟醫學會監測指標閾值95%以上，成效良好。結果顯示，病人因為不遵從醫囑無法提升尿素氮清除合格率，藉由護理人員個別化指導，給予病人血管照護相關衛教、提高病人治療血液流速及增加透析時間；舉辦護理人員在職教育訓練課程，善用衛教輔助工具，充實專業知能提升照護品質。

#### 結論：

舉辦在職教育訓練，藉由強化護理人員尿素氮清除合格率相關知識，提供病人持續性及個別化的衛教指導，加強醫囑遵從性，使病人了解縮短使用雙腔靜脈導管的時間，建立動靜脈瘻管及維護功能正常對提升尿素氮清除率的重要性，提升自我照顧的能力，配合醫療團隊照護，以提升透析治療及生活品質。

關鍵字:血液透析、尿素氮、尿素氮清除率

## Evaluation of the effectiveness of using FreeStyle Libre 2 (GCM) to monitor blood glucose in hemodialysis patients with type 2 diabetes

### 運用 FreeStyle Libre 2 (GCM) 監測血液透析合併第 2 型糖尿病病人血糖之成效評估

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#### 背景：

連續葡萄糖監測(CGM)系統是一種先進的糖尿病管理工具，能夠幫助個案隨時瞭解當下的血糖狀態。戴在手臂上的葡萄糖傳感器有一個細小的彈性小尖頭插入皮膚下，可連續測量 8 小時的葡萄糖狀態，以智慧型手機下載 FreeStyle LibreLink 應用程式，在 14 天內掃描葡萄糖傳感器，無需傳統指尖採血。依據 2022 年第 2 型糖尿病臨床照護指引適合裝置的個案有血糖控制不佳、糖化血色素超過標範圍、需要頻繁血糖監測者、曾發生低血糖的糖尿病人。

本文個案為血液透析合併 2 型糖尿病(T2DM)患者，因糖化血色素(HbA1C)>9.6%連續 2 個月，因害怕測血糖紮針的疼痛，故從未自我監測血糖，建議個案裝置 FreeStyle Libre 進行監測，讓個案即時了解餐後血糖升降速度、幅度和影響時間長短，有助於日常生活中飲食和藥物的調整，達到更有效的血糖管理。

#### 方法：

將感應器放置在皮膚上，對於血液透析個案，需避開有透析瘻管的手，皮膚應完整無傷口、紅腫或其他皮膚問題，並使用安裝工具將感應器插入皮下，CGM 設備通過皮下監測血糖，當透析時體液變化時可能導致數值的誤差，可以採指尖血糖測試方式以比對誤差值。

#### 結果：

裝置 FreeStyle Libre 持續血糖監測後，可以即時反饋血糖數據，提高個案對空腹血糖、飯後血糖關注，也讓個案瞭解哪些食物會導致血糖升高，從而調整了飲食習慣及飲食的選擇；且個案表示自己常會有飢餓感，擔心會有低血糖，當裝置 FreeStyle Libre 持續血糖監測後，若血糖值 >120mg/dL 後，自己會斟酌飲食的攝取量。裝置了 2 個月，血糖值約 107-209mg/dL、HbA1c 由 9.2-9.6%改善至 7.6 %。

#### 結論：

對於血液透析合併第 2 型糖尿病患者，使用 FreeStyle Libre 是臨床上可以接受的。尤其是害怕測血糖紮針的疼痛、無法達到自我監測血糖 (SMBG) 患者，可以改善血糖控制和自我管理能力，也提高生活上的質量，但仍需根據個別情況進行調整和監控。

**關鍵字：** FreeStyle Libre 2、血液透析、第2型糖尿病

## Reducing the Incidence of Arteriovenous Fistula Percutaneous Trans-luminal Angioplasty in Hemodialysis Patients

### 降低血液透析病人動靜脈瘻管血管氣球擴張術發生率

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#### 目的：

血管通路對血液透析病人是重要的生命線。良好的血管通路提供足夠的清除率，減少透析不足合併症，若血管通路失效則會增加病人的住院率甚至死亡率，影響生活品質及醫療資源。單位藉由改善方法來降低血液透析病人動靜脈瘻管執行血管氣球擴張術(Percutaneous Trans-luminal Angioplasty, PTA)發生率。

#### 方法：

2021 年本院透析平均人數 233 人，使用動靜脈瘻管透析者 210 人，每年透析人次 29712 人次，執行 PTA 71 人次(2.39%)，其中瘻管阻塞 35 人次(49.3%)，瘻管血流量不足 20 人次(28.2%)，靜脈壓偏高 6 人次(8.5%)，末梢腫脹 4 人次(5.6%)，穿刺困難 4 人次(5.6%)，瘻管硬化 2 人次(2.8%)。2022 年問題分析及改善方案介入：

- 一.人員方面：1.瘻管管徑細小、未成熟或脆弱，穿刺失敗率高，由副組長在旁指導；2.穿刺部位未輪流造成阻塞，改鈕扣式打法輪流穿刺，並定期現場評核；3.新病人體重上升，未調升乾體重造成過度調水、血壓下降血管阻塞；4.曾經 PTA 病人未重新評估抗凝劑劑量，造成再度阻塞，增訂瘻管照護規範及瘻管照護評核表。
- 二.病人方面：1.服降壓藥前未測量血壓，造成透析中血壓過低血管阻塞，指導病人測量血壓並記錄，作為調整降壓藥依據；2.抽菸、喝酒習慣造成血管彈性差硬化，建議戒菸酒或至戒菸門診諮詢；3.瘻管自我照護知識不足，衛教看板走廊及瘻管衛教單提供參考。
- 三.工具方面：1.採購遠紅外線儀介入治療，增加病人瘻管血流暢通率；2.定期安排血管超音波檢查，監測血管是否狹小或阻塞，。

#### 結果：

經改善方案後結果顯示：

- 一.人員方面：1.副組長在旁指導穿刺成功率 66%提升至 90%。2.鈕扣式打法更換穿刺位置者 50%提升至 83%。3.人員瘻管照護評核 85%提升至 100%。
- 二.病人方面：1.測量血壓並記錄者由 25%提升至 35%。2.至戒菸門診者有 2 人，戒菸成功者 50%。3.瘻管自我照護認知率由 60%提升至 85%。
- 三.工具方面：1.遠紅外線儀使用率 0%提升至 100%；2.血管超音波檢查圖示清楚了解血管品質大小及流量。經改善方案執行後 PTA 降低為 61 人次(1.86%)。

#### 結論：

好的血管通路對透析病人來說是維持生命極為重要，照顧好瘻管可以讓透析的生活品質更提升，醫療人員應提供全方位的照護，細心呵護血管，減少血管阻塞的發生，讓病人安心及安全透析，增加病人對專業醫療的信任感。

關鍵字：血液透析、血管氣球擴張術(PTA)

## Applying Multi-disciplinary Education Program to Improve Waste Classification Awareness and Implementation Rate Among Hemodialysis Patients and Their Families

### 應用多元衛教提升血液透析病人及家屬的廢棄物分類認知及執行率

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#### Background :

全球暖化及氣候變遷逐漸影響健康與衝擊醫療體系。血液透析治療時所產生的廢棄物已是造成環境負擔的重要議題。在透析室推動環保教育及廢棄物分類，讓病人及家屬將環保觀念帶入生活，可以減少廢棄物量，共同守護地球環境。

#### Methods :

本專案執行時間從 2024 年 05 月 01 日至 2024 年 08 月 31 日。專案執行前，針對血液透析病人及家屬的問卷調查，關於廢棄物分類認知率為 60.2%，觀察廢棄物分類執行率為 68.1%。分析廢棄物分類認知不足及執行率低的原因包括欠缺廢棄物分類觀念、外籍照服員看不懂中文及廢棄物分類認知錯誤。所以，重新擬定多元衛教計畫，包括修訂新病人衛教評量表；提供廢棄物分類衛教手冊、圖卡、海報，尤其圖卡含印尼文、越南文、英文等，協助外籍照服員學習；於 2024 年 05 月 07 日舉辦推廣活動，除了宣導廢棄物減量，利用醫材做成象棋及跳棋，讓病人及家屬玩遊戲、增進情感交流；於 2024 年 05 月 10 日進行一對一衛教，以正確執行廢棄物分類。

#### Results :

專案執行後血液透析病人及家屬，對於廢棄物認知率由 60.2% 提升到 96.7%，廢棄物分類執行率由 68.1% 提升到 94.5%。

#### Conclusions :

本專案經由團隊腦力激盪，利用創新多元化的衛教方式，讓血液透析病人及家屬的學習意願提高，以正確認知執行廢棄物分類，減輕環境負擔，永續發展綠色醫療。

**關鍵詞：**廢棄物分類、血液透析。

**Key Words :** Waste Classification, Hemodialysis

## Reduce the Anxiety Index of New Hemodialysis Patients about Duct Puncture 降低血液透析新病人對瘻管穿刺之焦慮指數

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### 目的：

根據台灣醫學會 2022 年台灣腎病年報統計, 2020 年新增透析患者數為 12,381 人, 其中以 40-64 歲患者居多, 65 歲 (含) 以上患者數亦逐年增加。每百萬人中 90% 選擇以血液透析為主要治療方式來延續生命。當病人在短時間內被迫面對必須經由血液透析來取代腎臟功能時, 研究顯示常規透析是一種壓力, 可能導致患者的焦慮、憂鬱及降低生活品質。血液透析病人每週需執行 2-3 次透析治療, 每次透析需穿刺至少兩針, 穿刺針管徑比捐血使用的針大及粗, 且新病人的血管普遍細小且缺乏彈性、瘻管養成不易, 增加穿刺困難度, 頻繁扎針的疼痛讓病人產生巨大心理衝擊繼而抗拒血液透析治療, 出現焦慮不安又感到無助的情緒反應。因此, 透過探討穿刺焦慮的原因並研擬改善對策, 以降低新病人對瘻管穿刺的焦慮感, 提供適當照護措施。

### 方法：

經現場作業及環境調查發現：1. 人員方面：本單位治療人員共 30 位, 許多同仁在面對新病人瘻管穿刺時, 表示無法一針成功穿刺, 感到壓力。2. 病人方面：本單位 2024 年 1-6 月新增病人 29 位, 選擇血液透析治療者 20 位, 平均年齡  $72.5 \pm 9.8$  歲。透過焦慮程度評估 GAD-7 (Generalized Anxiety Disorder 7) 評估新病人對瘻管穿刺的焦慮程度, 中度至重度焦慮的病人有 15 位, 焦慮指數總分達 178 分 ( $20 \times 15$  分 = 300 分)。改善方案包括：1. 人員方面：教導人員採用鈕扣式注射法, 並由組長現場指導注射技巧；跨團隊由醫師執行血管超音波偵測血管品質與走向, 提供圖示協助穿刺。2. 病人方面：進行瘻管照護知識的衛教, 採一對一教學、回覆示教, 並使用病人瘻管照護評核表, 同時提供情緒安撫。

### 結果：

治療人員 30 位, 平均年資  $13.9 \pm 8.8$  年。無法一針成功穿刺的同仁由 15 位 (50%) 降至 5 位 (16.7%), 這 5 位同仁年資均在 2 年以下, 將繼續由副組長指導穿刺技巧。經醫師使用血管超音波掃描的病人 5 位 (25%), 提供血管圖示後, 穿刺成功率達 100%。病人方面, 瘻管照護評核結果由 60 分提升至 85 分, 照護技巧回覆示教成功率達 90%。病人的焦慮指數由 178 分降至 100 分, 中度至重度焦慮的病人由 15 位降至 6 位, 其中 3 位從重度焦慮降至中度焦慮。針對仍有焦慮的病人, 我們持續提供心理支持, 必要時跨團隊會診精神科共同照護。

### 結論：

新病人面對透析治療與疼痛, 除了生理不適, 心理也常充滿恐懼、憂鬱與絕望。因此, 照護新病人需要醫療人員全方位的協助, 包括專業的醫療知識與精湛的穿刺技巧、關懷同理心的照護方式, 幫助新病人順利適應透析生活, 免除穿刺的恐懼, 建立正面的人生觀, 提升生活品質。

關鍵字：血液透析、瘻管穿刺、焦慮

## Using innovative interactive nursing guidance to improve the self-management care project of early hemodialysis patients

### 運用創新式護理指導提升初期血液透析病人自我管理照護之專案

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#### 背景：

全民健康保險統計顯示:截至 2023 年 3 月底，接受透析治療者達 89,929 人(衛生福利部中央健康保險署，2023)，初期血液透析病人，泛指 6 個月內的病人(謝玉如，2020)，將進入長期透析之路。若初期血液透析病人未落實自我管理能力，會出現致命合併症，統計指出透析後四個月死亡率(17.4%)，其中 65 歲以上 54.4%(謝玉如，2020)。儘早提升初期血液透析病人自我管理可有效降低住院率和死亡率(許，2020)。

#### 方法：

依 IRB 編號:KMUHIRB-E(II)-20240026 執行，現況分析設計初期血液透析病人自我管理計畫紀錄表及活動內容包含如下: 1. 規劃團體衛教、2. 製作護理指導工具:互動電子書、運用 Canva 製作海報、動態影像及影片、3. 訂定初次血液透析病人自我管理計畫標準流程。

#### 結果：

本單位運用創新式互動護理指導成功提升初期血液透析病人自我管理，且對於創意式互動滿意的有 98%，其中 2%病人認為可在更頻繁提供衛教資訊，但礙於本專案人力及時間的配合上有困難，目前做滾動式安排及協調，詢問病人對於互動式電子書滿意度最好，未來在單位可能進行電子書製作。

#### 結論：

資訊時代的來臨及醫療照護品質的提升，由於初期血液透析病人有其特殊性及個別性，需客製化自我管理計畫及與照顧者共享個別性的護理指導，建議由腎臟照護個案管理師收案，避免影響周詳地護理指導；未來可設計行動醫療照護自我管理，運用 ChatGPT 及線上 AI 影音軟體製作教學影片，作為居家監測、疾病護理指導、飲食飲水控制、藥物提醒查詢及及時詢問及時解答等有效自我管理。

#### 關鍵字：

初期血液透析病人、自我管理、互動式護理指導



## Reduce the arteriovenous fistula obstruction rate in dialysis patients

### 降低透析病人動靜脈瘻管阻塞率

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#### Background:

動靜脈瘻管是血液透析病人第二條生命線，動靜脈瘻管阻塞時，病人無法順利進行治療，影響治療品質，嚴重時可能危及生命安全。瘻管功能評估能提供血管通路重要訊息，護理人員可運用理學檢查視、聽、觸的技巧，為早期評估動靜脈瘻管功能最好的方式。血液透析治療血管通路包括：自體動靜脈瘻管及人工瘻管。血管通路功能維持取決於血管本身的品質、手術技術與護理人員穿刺技術也有密切有關。因此，護理人員在病人血管通路照護過程，扮演極重要的角色，希望藉由降低血液透析病人瘻管阻塞發生率，提升透析病人照護品質。

#### Methods:

血管功能異常為單位品質監測項目之一，本次活動以回溯法統計病人血管功能異常登錄資料，收集 2022 年 09 月~2023 年 02 月動靜脈瘻管阻塞發生率為 78%，高於其他同儕單位，進行檢討改善。分析病人動靜脈瘻管阻塞原因：病人水分控制不佳、發生低血壓、血管靜脈壓過高等因素，擬定改善對策：制訂靜脈壓異常處理流程、製作水份控制衛教海報、衛教病人限鈉飲食原則進行介入改善。

#### Results:

2023 年 06 月至 2024 年 06 月執行對策實施後，動靜脈瘻管阻塞發生率由 78%降為 28.1%。結果顯示，持續衛教病人例行檢查瘻管功能及早發現阻塞症狀，病人維持適當的乾體重減少低血壓症狀，加強護理人員教育訓練，落實評估動靜脈瘻管功能，發現異常立即將受刑人外醫轉介處理等改善措施，執行成效良好。

#### Conclusions:

良好的血管通路功能是血液透析治療的基本條件，病人及護理人員皆需盡到維護動靜脈瘻管的責任，藉由強化病人正確照護動靜脈瘻管觀念，提升病人對水分控制及低血壓影響動靜脈瘻管的認知，並加強血管通路自我照顧能力，護理人員持續在職教育訓練及落實標準作業流程執行，持續監測才能降低病人動靜脈瘻管阻塞率，提升透析照護品質。

#### Key words:

血液透析、低血壓、水分控制

## Identification of Gut Microbiome Signatures Linked to the Serotonin Pathway in Tryptophan Metabolism Among Hemodialysis Patients

### 血液透析患者色氨酸代謝中與血清素途徑相關的腸道微菌特徵表現

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#### Background :

Serotonin, a metabolite derived from tryptophan through the serotonin biosynthetic pathway, exerts profound influences on both cerebral and enteric function. Although considerable progress has been made in understanding the complex mechanisms underlying the gut-brain axis, the interrelationship between serotonin pathway metabolites and the gut microbiome in hemodialysis patients remains largely unexplored. Consequently, this study aimed to investigate gut microbiota composition corresponding to serotonin pathway metabolite levels in hemodialysis patients.

#### Methods :

The study cohort comprised 85 hemodialysis patients with gut microbiota analyzed using shotgun metagenomic sequencing and serotonin pathway metabolites quantified using liquid chromatography-tandem mass spectrometry. Six serotonin pathway metabolites (5-hydroxytryptophan, serotonin, 5-methoxytryptophan, 5-methoxytryptamine, melatonin, and 6-hydroxymelatonin) were investigated in this study. Linear discriminant analysis Effect Size (LEfSe) was employed to elucidate gut microbiota signatures associated with individual levels of serotonin pathway metabolites.

#### Results :

Significant differences in  $\beta$ -diversity were observed for 5-methoxytryptamine ( $p=0.037$ ), while  $\alpha$ -diversity remained unchanged across 6 serotonin pathway metabolite levels. The LEfSe analysis revealed enrichment of the *Tannerellaceae* family in the high 5-hydroxytryptophan group, the *Odoribacteraceae* family in the high serotonin group, the *Eubacteriales* order in the high 5-methoxytryptophan group, *Prevotella copri* in the high 5-methoxytryptamine group, the *Clostridium* genus in the high melatonin group, and the *Actinobacteria* phylum in the high 6-hydroxymelatonin group. Conversely, the *Clostridiaceae* family was enriched in both low 5-hydroxytryptophan and low serotonin groups, *Bacteroides ovatus* in the low 5-methoxytryptophan group, *Parabacteroides johnsonii* CAG:246 in the low 5-methoxytryptamine group, the *Bifidobacterium* genus in the low melatonin group, and *Chitinophaga silvisoli* in the low 6-hydroxymelatonin group.

#### Conclusions :

Distinct gut microbiota profiles associated with serotonin pathway metabolites were identified in hemodialysis patients. These findings provide a foundation for future investigations into the gut-brain axis and may inform strategies for modulating the gut microbiome to influence serotonin-related metabolites.

#### Key words :

Gut microbiota, tryptophan metabolism, serotonin pathway, chronic kidney disease, hemodialysis



## Reduce the incidence of coagulation with continuous renal replacement therapy 降低連續性腎臟替代療法套組凝固發生率

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### Background:

連續性腎臟替代療法(Continuous renal replacement therapy, CRRT)是 24 小時連續執行血液透析，過程中若透析器完全凝固，治療無法順利進行，需中斷透析時間更換套組(透析器及管路)，造成透析不足且沒有足夠的治療劑量，而無法有效的移除蓄積的尿毒素、矯正電解質及酸鹼失衡，不僅造成病人血液流失，降低治療成效。根據本單位治療師執行治療時監測，發現 CRRT 凝固發生率有上升的趨勢，因此本單位著手重新探討原因，以降低套組凝固的發生率。

### Methods:

連續性腎臟替代療法執行過程中，腎臟科醫師會依病人情況開立醫囑選擇抗凝劑的使用，治療師依醫囑使用肝素 5000u 以生理食鹽水沖洗透析器及管路，現況調查發現治療師對於預防透析器凝固認知不足，且無法正確評估透析器凝固及未即時處理，造成透析器凝固，因此本單位制訂以下四項改善措施：

- 一、成立 CRRT 專責照護團隊改善套組操作技術標準規範。
- 二、運用 IPE 三元素(知識、態度、技能)，進行 CRRT 教育訓練課程。
- 三、舉辦擬真技術訓練 OSCE 學習，加強對機器的監控和操作，尤其是針對 CRRT 的機器警報“故障排除”與血流停止相關警報的處置。
- 四、建置智能監測系統傳速警示:智能監測系統傳速 24 小時警示數據變化，透過遠端電腦可對儀器問題作初步判斷監測，精準記錄病情、儀器立即回報訊息，即時掌握先機、排除與醫療處置。

回溯本單位 2023 年 11 月至 2024 年 5 月，過濾器完全凝固發生率為:36%，原因分為無肝素透析、導管功能不佳、透析器凝固等三大類，而過濾器完全凝固發生率為:36%為最嚴重。在改善措施介入後：

- 一、CRRT 照護技術標準規範透析治療師執行正確率由 42.9 % 提升至 100%。
- 二、透析治療師對機器警報正確排除率由 66.7%提升至 100%。
- 三、透析器凝固發生率由 22.5%下降至 13.5%。

### Conclusion:

藉由改善套組操作技術標準規範、進行 CRRT 教育訓練、擬真技術訓練 OSCE 學習，加強對機器的監控和操作等，強化治療師的專業知識與技能，同時透過智能監測系統技術輔助治療過程中的品質監控及障礙排除，增加整體工作效能，大幅降低套組凝固的機率，實質改善重症病人的治療成效，並提升團隊整體的照護品質。

關鍵字：血液透析、連續性腎臟替代療法、透析器凝固

## Evidence-Based Nursing Strategies for Thrombosis Prevention in Dialysis Vascular Access

### 實證照護中的透析血管通路血栓預防策略探討

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#### Background :

The global incidence of renal failure is rapidly increasing, and hemodialysis (HD) has become a common treatment modality. Thrombosis is a frequent complication in HD, potentially leading to severe outcomes such as myocardial infarction and stroke. While anticoagulant use has been shown to reduce the risk of thrombosis, the effectiveness of various anticoagulant strategies remains unclear. Further research is needed to evaluate their application in clinical nursing practice.

#### Methods :

This study conducted a systematic review of electronic databases, including the Cochrane Library, covering randomized controlled trials (RCTs), quasi-RCTs, and crossover studies from 2019 to 2024. The impact of anticoagulants on thrombosis rates in HD patients was analyzed.

#### Results :

The first study compared the effects of heparin and low molecular weight heparin (LMWH) on thrombosis rates. It was found that the relative risk for heparin was 0.38 (95% CI: 0.14–1.03), and for LMWH, it was 0.53 (95% CI: 0.27–1.04). When compared to unfractionated heparin (UFH), LMWH had a relative risk of 1.58 (95% CI: 0.46–5.42). The second study demonstrated that antiplatelet therapy significantly reduced the incidence of early thrombosis in dialysis vascular access (relative risk: 0.52, 95% CI: 0.38–0.70). Additionally, patients on antiplatelet medications during dialysis had a lower risk of stroke (relative risk: 0.62) and myocardial infarction (relative risk: 0.83). While these studies suggest that anticoagulants and antiplatelet drugs reduce thrombosis risk, they were small in scale and had limited timeframes.

#### Conclusions :

Thrombosis prevention is essential for maintaining vascular access patency in HD. Heparin and LMWH demonstrate significant potential in reducing thrombosis risk, while antiplatelet therapy effectively decreases early access thrombosis, though with a heightened bleeding risk. Nursing Recommendations: Careful management of thrombosis and bleeding risk through individualized care plans is critical. Regular monitoring of thrombosis indicators, thorough evaluation of patient history, and judicious selection of anticoagulants or antiplatelet agents are necessary to optimize patient outcomes. Continuous education and vigilant safety monitoring are crucial to enhance the effectiveness of anticoagulant therapies. Future studies should focus on extending research duration and conducting large-scale RCTs to strengthen evidence-based nursing practices for long-term HD management.

#### Key words :

Hemodialysis, arteriovenous fistula (AV fistula), anticoagulation, thrombosis prevention, thrombus

# Impact of Insulin Dose Adjustment on Glycemic Control in Hemodialysis Patients with Type 2 Diabetes: Evidence-Based Nursing Recommendations

## 調整胰島素劑量對血液透析合併第 2 型糖尿病患者血糖控制的影響與實證照護建議

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### Background :

The global rise in ESRD and T2DM has resulted in increased mortality and cardiovascular complications. Hemodialysis complicates glycemic control in T2DM patients. Factors contributing to unstable glycemic control include variable insulin sensitivity, changes in medication clearance, dietary restrictions, and the effects of dialysis on glucose regulation. Adjusting insulin doses or hypoglycemic medications can potentially improve glycemic control and reduce the occurrence of hypoglycemia.

### Methods :

We conducted a systematic review of PubMed, CINAHL, and The Cochrane Library, covering randomized controlled trials (RCTs) and systematic reviews up to September 23, 2024. After screening relevant titles and abstracts, we selected three RCTs for further analysis.

### Results :

The first study evaluated insulin dose adjustment in ESRD patients undergoing hemodialysis. It found that reducing insulin doses by 25% on dialysis days increased glucose levels within 2 hours of dialysis ( $154.2 \pm 37.5$  vs.  $136.9 \pm 14.1$ ,  $P = 0.035$ ) and decreased hypoglycemia incidence (3.3% vs. 0.7%,  $P = 0.02$ ). The second study compared closed-loop insulin delivery to traditional therapy and found a significant increase in time spent in the target glucose range (69.0% vs. 31.5%,  $P < 0.001$ ), with reduced glucose variability ( $P = 0.012$ ) and no significant difference in severe hypoglycemia ( $P = 0.82$ ). The third study noted that Liraglutide, compared to placebo, increased mild hypoglycemia ( $P = 0.02$ ) but did not significantly improve overall glycemic control.

### Conclusions :

These three RCTs highlight the impact of insulin dose adjustment and hypoglycemic medications on glycemic control in hemodialysis patients with T2DM. Reducing insulin doses by 25% on dialysis days can stabilize glucose levels and minimize hypoglycemia. Closed-loop insulin systems offer better glycemic control without increasing hypoglycemia risk, while Liraglutide may pose a risk for mild hypoglycemia without notable benefits in glycemic management. Nurses should tailor insulin dose adjustments to individual patient needs, particularly on dialysis days, to prevent hypoglycemia. For hospitalized patients, closed-loop systems may be an effective option. Continuous glucose monitoring and patient education are essential in minimizing risks and optimizing glycemic control. Long-term studies are needed to further validate these findings and provide stronger evidence for clinical nursing practice.

### Key words :

Hemodialysis, ESRD, T2DM, Glycemic control, Insulin adjustment, Hypoglycemia

## Evidence-Based Nursing Application of Chewing Gum for Reducing Thirst in Hemodialysis Patients

探討血液透析病人咀嚼口香糖是否能改善口渴症狀的實證護理應用

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### Background :

Hemodialysis patients often experience dry mouth and thirst due to reduced saliva production and fluid restrictions. Studies suggest that chewing gum may help alleviate these symptoms. This systematic review investigates whether chewing gum can significantly reduce thirst in hemodialysis patients.

### Methods :

A systematic review was conducted, including all prospective controlled trials and systematic reviews retrieved from databases such as PubMed, up to September 9, 2024. The primary focus was on comparing thirst reduction before and after the use of chewing gum in hemodialysis patients.

### Results :

The first study demonstrated a significant reduction in dry mouth ( $P=0.024$ ) and thirst ( $P=0.015$ ) following chewing gum use. Chewing gum effectively decreased perceived dry mouth severity. In the second study, gum-chewing patients showed a significant reduction in thirst levels compared to the control group, as assessed by VAS ( $5.16 \pm 1.64$  vs.  $7.37 \pm 2.34$ ,  $P < 0.0001$ ) and SXI ( $13.89 \pm 3.16$  vs.  $16.79 \pm 3.19$ ,  $P=0.004$ ). The third study revealed that the gum group had significantly lower VAS scores for dry mouth at two and three months ( $P=0.014$ ,  $P < 0.001$ ), with increased saliva production ( $P < 0.001$ ). These studies consistently confirm that chewing gum effectively increases saliva production and significantly alleviates dry mouth symptoms in hemodialysis patients.

### Conclusions :

Evidence indicates that chewing gum significantly reduces dry mouth and thirst in hemodialysis patients, offering valuable clinical implications for nursing care. Nurses should consider recommending sugar-free gum as a simple, non-invasive intervention to help patients manage thirst, particularly those struggling with fluid restrictions. Regular assessments of thirst symptoms and fluid intake should be integrated into nursing care plans, ensuring the effective management of oral health and comfort.

### Key words :

Hemodialysis, Chewing Gum, Dry Mouth, Thirst, Evidence-Based Nursing

## Efficacy of Taurolidine-Heparin Lock Solution in Reducing CRBSI in HD Patients

### 使用 Taurolidine 與肝素封管技術降低血液透析導管感染的實證分析

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#### Background :

Hemodialysis is the renal replacement therapy of choice for most kidney disease patients in Taiwan, but it carries certain risks, including catheter-related bloodstream infections (CRBSI) that can even lead to death. Some studies have indicated that the use of lock solutions containing Taurolidine and Heparin during dialysis treatment can reduce the incidence of CRBSI.

#### Methods :

A systematic review was conducted across databases like PubMed, CINAHL, and The Cochrane Library until September 20, 2024. Eligible studies included recent meta-analyses, systematic reviews, and randomized controlled trials (RCTs) from the last five years. After thorough screening, two RCTs and one retrospective study were included to evaluate the effectiveness of Taurolidine-heparin lock solutions versus standard heparin in preventing CRBSI in hemodialysis patients.

#### Results :

The first study demonstrated a significant reduction in CRBSI incidence in the Taurolidine-heparin group compared to the standard heparin group ( $P = 0.003$ ; hazard ratio [HR] = 0.28), indicating a 72% lower risk of CRBSI. Similarly, the second study found that Taurolidine-heparin was more effective in reducing CRBSI, with lower levels of inflammatory markers such as hsCRP and IL-6 ( $P = 0.001$  and  $P = 0.018$ , respectively). In the retrospective study, the CRBSI incidence was 2% in the Taurolidine-heparin group, compared to 7% in the standard heparin group. Taurolidine-heparin also showed better performance compared to other antimicrobial lock solutions like citrate or cefotaxime. Across the three studies, Taurolidine-heparin demonstrated superior effectiveness in reducing CRBSI without compromising safety.

#### Conclusions :

Taurolidine-heparin lock solutions significantly reduce CRBSI rates and inflammatory markers in hemodialysis patients, making them a safer alternative to standard heparin. These solutions are particularly beneficial for high-risk patients prone to catheter infections. Nurses should be trained on antimicrobial lock solutions and educate patients on proper catheter care to ensure compliance. Regular monitoring for infection signs is essential for early intervention. Taurolidine offers a promising approach for minimizing CRBSI and should be integrated into nursing care for dialysis patients to enhance patient outcomes and reduce healthcare costs.

#### Key words :

Hemodialysis, Antimicrobial lock solutions, Taurolidine, Heparin, Catheter-Related Bloodstream Infections (CRBSI)

## Left-sided Valvular Heart Diseases Predict Outcomes in Patients with End-Stage Renal Disease Receiving Hemodialysis

### 左側瓣膜性心臟病預測末期腎病患者的預後

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#### Background :

With the global rise in valvular heart disease (VHD) prevalence, receiving dialysis has emerged as a significant mortality risk factor in VHD patients. The interplay between Chronic kidney disease (CKD) and VHD, marked by accelerated valvular calcification and increased mortality in dialysis patients, remains underexplored, especially in Asian populations. This study retrospectively examines the prevalence, characteristics, and mortality outcomes of left-sided VHD in dialysis patients, providing crucial insights into the management of this high-risk group.

#### Methods :

We retrospectively analyzed dialysis patients at a tertiary center, tracking clinical data and echocardiograms. Left-sided VHD was defined by moderate to severe aortic stenosis (AS), aortic regurgitation (AR), mitral stenosis (MS), or mitral regurgitation (MR).

#### Results :

Among 200 hemodialysis patients (median age 66 years, 56% male), 15.5% had left-sided VHD. The overall five-year mortality rate was 41.5%, while in the VHD group, it was significantly higher up to 71% ( $p < 0.001$ ). Cardiovascular mortality was also notably higher in the VHD group (32.3% vs. 7.1%,  $p < 0.001$ ). Subgroup analysis revealed a 90% mortality rate among AS patients. Age was a significant risk factor, with mortality increasing by 4.5% per year, and all VHD patients over 80 years old deceased. Multiple regression analysis identified left-sided VHD as a significant risk factor, with an HR of 2.6 (95% CI 1.57-4.28,  $p = 0.000$ ), even after adjusting for diabetes, coronary artery disease (CAD), hypoalbuminemia, higher phosphate, and ferritin levels.

#### Conclusions :

Our study confirmed that left-sided VHD significantly worsens outcomes in dialysis patients, with a 5-year mortality rate of 70% and a 2.6-fold increased risk after adjusting for other factors.

#### Key words :

End-stage renal disease; Hemodialysis; Left-sided Valvular heart disease

## Reduce the rate of acute intra-dialytic complications among outpatient dialysis patients

### 降低門診透析病患透析中發生急性合併症之比率

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#### 研究目的

血液透析可以改善末期腎臟病人的尿毒症狀，維持病患腎臟機能，唯透析治療期間可能出現急性合併症，常見的合併症如：透析中低血壓、抽筋、噁心嘔吐、搔癢、透析不平衡症候群等，造成病患身體不適情形，增加疲憊感，使其身體功能受限制，影響日常生活品質；希望藉由衛教及輔助記憶工具改變病人的行為模式、正確水分控制及自我日常照護，增進透析遵從性，降低住院率及死亡率。

#### 研究方法

##### 一、蒐集及分析門診透析急性合併症數據

(一)收集數據期間 2022/3/1~3/31，血液透析病患 220 位，共執行 2888 透析人次。平均年齡 66.9 歲，透析經歷大於一年者佔 67%。

(二)期間發生急性透析合併症為 47 人次，急性透析合併症發生率 1.6%。

(三)針對發生急性透析合併症個案，透過翻閱透析病歷，進一步分析[低血壓]、[脫水量]及[體重誤差]，顯示低血壓佔 70.2%、當次脫水量小於 5%(實際體重-乾體重)佔 51.1%、體重誤差佔 31.9%。

##### 二、查檢發生原因、擬定改善方案：

運用腦力激盪及參考文獻共收集 44 項原因繪製特性要因，依專案成員經驗法則票選 7 項重要要因，經由三現原則進行真因驗證，以柏拉圖 80/20 法則找出 5 項真因：(1)病人水分控制認知不足、(2)醫師未及時調整乾體重、(3)護理師未依病人最大量執行脫水、(4)病人沒坐好體重量錯、(5)病人扣衣服標準不清楚。進一步擬定 2 大對策群組，共計 5 項改善方案，分別如下：

##### (一)腎友水份有控制、輕鬆洗腎兼運動

1.主題性「水分攝取」健康識能衛教：以圖像式健康識能衛教單及定時影片衛教病患，且定期評值認知正確性。

2.設計體重『紅綠燈』轉轉樂：強化新進透析病人體重控制概念衛教、寓教於樂，讓病患瞭解如何控制適當的體重。

3.透析中適量運動『床上腳踏車』：經醫師評估開立醫囑，病患於透析床上進行「床上腳踏車」運動，有效減少透析中不適感及增強病人肌力。

##### (二)精準評估乾體重、無縫交班有效率

1.參考文獻設立單位「脫水評估量表」，護理師執行脫水量初步評估並隨時與醫師討論。

2.落實主護跟診制度，醫師查房時主護全程跟診，當病患「需調整乾體重」立即醫師討論，隨即更新表單及調整脫水量。

#### 研究結果

一、門診透析急性透析合併症發生率，由改善前 1.6% 降低至改善後 0.4%。

二、門診透析病患認知正確性評值：提升至 87.6%。

三、節省照護耗材費用：平均每月節省約 4,400 元。

四、減少額外照護工時：平均每月減少約 27.5 小時。

五、門診透析病患因急性透析合併症急診或住院就醫為 0 件。

#### 結論

慢性腎衰竭病患倚賴血液透析來維持身體機能，其中水分攝取及體重控制特別重要，藉由護理

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師積極導入主題式健康識能衛教，針對透析新病患輔助記憶工具及制定醫護共同評估工具，達到及時警示功能，適時調整病患體重及透析脫水量，並輔以透析病患適量的日常運動增加肌力，能有效預防透析中急性合併症之發生，減少病患透析後產生疲倦及不適感。如此才能維護透析的效果及提升透析治療後的生活品質，更可降低轉送急診、住院率及相關醫療開支。

Key words：血液透析、急性透析合併症、健康識能衛教



## Exploring Risk Factors and Preventive Strategies for Vascular Access Thrombosis in Hemodialysis Patients

### 探討血液透析病人血管通路血栓形成的危險因子及預防策略

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#### Background :

Patients with ESRD undergoing HD face an elevated risk of vascular access thrombosis, which can lead to compromised treatment effectiveness and complications like venous thromboembolism (VTE). The use of vitamin K antagonists (VKAs), such as Warfarin, is a common anticoagulant strategy to prevent thrombosis. However, the increased risk of bleeding presents a significant clinical challenge. This study explores the comparative effectiveness of different anticoagulants, including Warfarin and Apixaban, in preventing thrombosis while balancing the risks of bleeding and maintaining vascular access patency.

#### Methods :

A systematic review of studies was conducted using databases such as Airiti Library and PubMed, focusing on articles published up to September 26, 2024. The study includes RCTs and systematic reviews that evaluated the impact of anticoagulants, particularly Warfarin and Apixaban, on vascular access patency, thrombosis prevention, and bleeding risk in hemodialysis patients.

#### Results :

Studies showed that in patients receiving Warfarin during dialysis sessions, the INR used to monitor coagulation was significantly higher in the anticoagulant group than in the control group ( $2.13 \pm 0.21$  vs.  $1.04 \pm 0.05$ ,  $P < 0.01$ ). Patients in the anticoagulant group also had a significantly higher 3-year vascular access patency rate (82.6% vs. 51.5%,  $P = 0.003$ ). However, increased Warfarin use was associated with a greater risk of bleeding ( $P = 0.03$ ). In contrast, Apixaban, a factor Xa inhibitor, demonstrated a lower rate of major bleeding events compared to Warfarin (RR 0.53, 95% CI 0.45-0.64,  $p < 0.0001$ ), without significantly increasing all-cause mortality risk (RR 0.90, 95% CI 0.41-1.96,  $p = 0.78$ ).

#### Conclusions :

While Warfarin effectively extends vascular access patency and reduces local infection rates, it is associated with a higher risk of bleeding. Apixaban, on the other hand, presents a safer alternative with lower bleeding risks and no significant increase in mortality. Clinical care should prioritize individualized assessments of patient risk factors when selecting anticoagulant therapies. Nurses play a key role in patient education, emphasizing the risks and benefits of anticoagulants, and should ensure regular monitoring of clinical symptoms, clotting factors, and bleeding risks to optimize patient safety and outcomes during hemodialysis treatment.

#### Key words :

Hemodialysis, Thrombosis, Vitamin K Antagonists, international normalized ratio(INR), Warfarin, Apixaban.

## Use of lower limb exercise training during dialysis to improve sarcopenia in hemodialysis patients

### 運用透析中下肢運動訓練改善血液透析病人肌少症

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#### 背景:

慢性腎臟病會合併慢性發炎，影響肌肉形成，加速肌肉破壞，使肢體肌力減退，肌肉量減少，失去運動能力。規律運動可預防慢性疾病，減少死亡率，改善疲憊、肌耐力，提升生活品質，本單位透析病人年齡層偏高，是肌少症高風險族群，引發專案小組動機，期望運用多元方式，提供醫護人員對於洗腎中病人運動的衛教參考，提升透析個案生活品質，促進健康行為。

#### 目的:

世界衛生組織(The World Organization,WHO)在 2015 年提出「健康老化」的主要目標是維持和提升老年族群的身體功能，而過著快樂滿足和充實的生活，65 歲以上長者約三成至四成在一年中至少發生過一次跌倒，年紀越大，跌倒風險越高，進而引起骨折、頭部外傷、生理功能障礙、住院和死亡。身體活動對人類而言是生活的一部分，高齡族群卻因身體老化之故而普遍缺少活動，故期望能藉由安排合理的訓練處方，運用團體力量帶動單位運動風氣。

#### 方法:

本單位血液透析病人數 220 人，52%為男性、48%為女生，病患的平均年紀為 65 歲。本計劃收案條件為：1. 年齡大於 65 歲 2. 透析年資滿 3 個月以上 3. 高危跌倒(MFS)分數大於 45 分；排除收案期間住院、失智躁動無法配合運動，合計符合條件共 78 人，共佔總人數 35%，將符合條件的 78 人做肌少症風險評估問卷:SARC-F 5 項分數加小腿圍分數總分大於等於 11 分共 46 位，收案 46 人中其中有 16 個男性、30 個女性，實施下肢運動訓練計畫，利用透析時行床上腳踏車運動及肌力等長、等張運動，讓無論能否踩腳踏車個案皆參與訓練計畫；為排除透析脫水後小腿圍誤差，故前後測皆是在透析前執行。

#### 結果:

經過兩個月下肢運動訓練，SARC-F 肌少症風險評估大於 11 分的人數從 46 人下降至 35 人。

#### 討論與建議:

下肢運動訓練計畫實施過程發現腎友間一起運動，從一開始的排斥到熱衷參與且有共同話題，更能持續帶動運動風氣。有腎友分享自己身體功能明顯改善，走路較穩定，對自己更有信心，更願意與他人互動，甚至有腎友說自己在家裡會隨著影片運動；護理人員分享照護過程發現透析中運動更能維持血壓的穩定，且原先有透析後姿位性低血壓患者也較之前改善，若能持續實施，定能使單位腎友透析品質得到提升。經過兩個月的透析中下肢運動訓練計畫，小腿圍並無明顯的增加，尚不能作為評估成效之依據，但另一方面 SARC-F $\geq$ 4 分人數有下降，自我照顧能力提升，未來計畫下肢運動可以跨團隊合作，如復健師，教導更多運動技巧和照護方法，能在血液透析中宣導運動的好處及追縱長期效果。

## The effectiveness of applying Quality Control Circle methods to reduce medication administration error events in the hemodialysis room

### 運用品管圈手法降低血液透析室常規針劑藥物漏打之給藥異常發生率

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**背景：**藥物異常事件是國際衛生保健機構重大的病人安全問題，依據 2022 年衛生福利部台灣病人安全通報統計資料顯示：藥物異常事件佔 29.6%，為台灣近五年首位的通報事件，本單位在 2023 年 8 月 1 日至 2024 年 7 月 31 日期間發生的給藥異常事件中，常規針劑漏打佔所有給藥異常發生率的 80%。醫療品質的根本在於病人安全，用藥錯誤可能對病人造成傷害，更有損醫療人員的專業形象(李建宏等，2020)。本活動目的是維護醫療品質與用藥安全，降低常規針劑漏打的給藥異常事件發生率。通過團隊合作運用品管圈手法，分析常規針劑的給藥異常的根因，擬訂對策，優化給藥流程，並分析執行前後成效及附加價值。

**方法：**成立品管圈，透過團隊會議和相關數據收集，分析活動期間的給藥異常事件，「常規針劑漏打」佔所有給藥異常發生率 80%，設定目標給藥異常發生率為零，繪製給藥現況流程圖，將可能原因經圈員腦力激盪整理成特性要因圖，分析常規針劑藥漏打事件的根本原因，包括人員失誤、流程缺陷和設備問題等，找出問題點，發現「給藥流程複雜」、「多人經手不同針劑處方」、「給藥流程標示不清」，利用決策矩陣分析表讓圈員投票，依投票結果擬定對策。主要對策之一為簡化處方開立流程，由醫師直接將醫療處方正確轉錄至血液透析護理給藥資訊系統，活動後期進行檢討和效果確認，最後修正程序書使其標準化。

**結果：**對策實施後，單位常規針劑藥漏打之給藥異常事件發生率由改善前 80% 下降至 0%，顯示運用品管圈手法確實能有效改善。醫療資訊系統的建置，無非是為了提升醫療工作的便利性，充分利用醫療與護理資訊系統的有效連結，進而簡化給藥流程，遏止給藥異常事件的發生，達到事半功倍的效果。在品管圈活動過程中，雷達圖呈現圈員對於品管圈能力的信心度和對品管圈手法的熟悉度均有所提升。圈員在 6 個項目中均有進步，特別是在運用品管手法及提升活動信心方面進步最為顯著。

**結論：**本專案活動運用品管圈手法不僅降低了給藥異常發生率，也修正了透析室常規用藥的給藥標準技術流程。參與品管圈的護理同仁在學習手法運用及提升活動信心方面進步頗多。

**關鍵字：**給藥異常、QCC、品管圈、血液透析護理資訊系統

## Care experience of a patient with chronic renal failure undergoing hemodialysis for the first time

### 一位慢性腎臟衰竭病人初次接受血液透析之照護經驗

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【背景】截至 2023 年，台灣的透析患者人數持續增長，每年約新增 5000 至 8000 名透析患者。對於初次接受血液透析的患者來說，這是一個重大的轉折點，患者可能會面臨多種挑戰，包括身體不適、對治療的焦慮、社交活動的減少及生活方式的改變，對其心理、社會及經濟狀況產生深遠的影響。

【方法】照護期間運用開放式會談技巧，以傾聽不批判的方式了解個案需求，主動給予關心和支持，獲得個案信任進而建立良好護病關係；運用 Gordon 11 項健康功能型態評估，經由會談、觀察、身體檢查、翻閱病歷方式收集資料，於整合分析後確立個案有體液容積過量：與攝入過多液體有關、特定知識缺失：缺乏血液透析相關照護資訊、焦慮：與首次建立透析瘻管有關等護理問題；教導水分控制相關注意事項，避免過多液體滯留改善體液容積過量情形；提供透析飲食衛教及透析日常照護需知，增進疾病認知提升自我照護能力；介紹腎友分享透析心路歷程，搭配海報圖示並提供衛教單張，向個案及家屬說明手術之流程及術後照護，鼓勵家屬陪伴給予正向支持，減輕個案對建立透析瘻管焦慮，使其勇敢接受瘻管手術並接納長期透析治療。

【結果】個案於衛教後了解水分控制重要性，增進透析日常自我照護能力，並如期順利進行透析瘻管手術，術後依衛教妥善照護透析瘻管，有疑慮時會主動詢問醫護人員，口頭表示已適應透析治療生活，期待恢復原有生活型態。

【結論】初次建立透析瘻管及面臨長期血液透析治療，使個案同時承受生理及心理的雙重壓力，護理人員發揮同理心不厭其煩給予鼓勵及支持，在照護過程運用專業知能，提供個案可接納之個別性護理指導，增強健康維護的意願及成效，此照護經驗獲得正向成果，期盼與醫護同仁一同分享，作為未來照護類似個案之參考。

關鍵字: 老年、慢性腎臟衰竭、初次血液透析

## Nursing experience of a hemodialysis patient with peripheral arterial disease receiving re-amputation

### 照顧一位血液透析病人罹患周邊動脈疾病再次截肢之護理經驗

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**【背景】**根據統計，每四個透析病人中就有一個患有周邊動脈阻塞疾病（PAD），並且面臨截肢的風險，往往會經歷巨大的心理壓力和生活型態改變，導致日常活動受限，在這種情況下，醫療團隊需要提供全面的護理，包括疼痛控制、心理支持和傷口護理等，以幫助病人度過艱難時期，積極參與後續復健治療，盡早適應新的生活型態。

**【方法】**以Gordon十一項健康功能型態為評估架構，藉由直接護理、身體評估、會談、病歷查閱等方式收集資料，評估後確立病人有急性疼痛/與術後傷口有關、營養少於身體所需/與食慾下降，熱量攝取減少有關、身體活動功能障礙/與截肢喪失肢體功能有關等護理問題，在照護期間引導個案表達內心感受，教導個案及家屬以肢體輕撫按摩方式降低殘肢敏感度，運用放鬆技巧及轉移注意力緩解疼痛；教導調整進食順序並以高蛋白飲食為主提高熱量攝取，改善營養攝取不足情形；運用傾聽及同理心，引導個案表達再次截肢後內心感受，鼓勵家屬主動表達關愛與支持，強化個案正向面對雙下肢截肢後的生活改變，並予提供輔具等相關社會資源，鼓勵個案積極參與醫療照護計畫，使其盡早適應新的生活型態。

**【結果】**配合相關衛教後急性疼痛情形可緩解，進食量及種類也可配合飲食指導達到每日所需熱量，且積極配合復健治療，主動參與醫療照護計畫，瞭解有關輔具補助等資訊，協助個案度過情緒低潮，回復常規生活型態。

**【結論】**個案因右腳糖尿病足膝下截肢，穿戴義肢後可完成日常活動，此次左腳趾傷口疏於照顧引發感染導致左腳膝下截肢，面臨雙腳皆截肢的生理改變，雖心情調適良好，但影響日常活動，所幸經由醫療團隊的合作使個案的健康管理漸入佳境，筆者於照護過程獲個案及家屬正向回饋，故予分享此照護經驗供護理同仁照護類似案例之參考，落實全人照護。

關鍵字: 血液透析、周邊動脈疾病、截肢

## Trends in Vascular Access Occlusion in Hemodialysis: Insights from a Six-Year Experience at a Medical Center

### 血液透析通路阻塞的長期趨勢分析：來自醫學中心的六年縱向經驗

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#### Background :

Vascular access is vital for dialysis patients, and occlusion presents a significant clinical concern. Factors like volume status, blood pressure, coagulation, medication, and environmental conditions, such as temperature and season, contribute to occlusions. However, most studies are cross-sectional, assessing only single time points. This study addresses the gap by analyzing the causes, frequency, and trends of vascular access occlusions over six years at a southern tertiary medical center, offering crucial insights for better clinical management.

#### Methods :

To explore long-term trends, a retrospective study was conducted at a southern tertiary medical center, including 166 patients. During the six-year study period, 779 vascular occlusion episodes were recorded. The analysis included patient comorbidities such as age, sex, diabetes, hypertension, and medication use, in addition to environmental factors like season and ambient temperature. The relationship between seasonality and the frequency of dialysis abnormalities was examined using chi-square tests.

#### Results :

Over the six-year study period, 166 patients experienced 779 episodes of vascular occlusion. The three most frequent causes of occlusion were elevated venous pressure (23%), insufficient blood flow (18%), and stenosis (15%). A seasonal analysis revealed that the occurrence of the first occlusion was notably lower in the autumn months.

#### Conclusions :

Elevated venous pressure, observed in 23% of occlusion cases, was the most common sign before vascular occlusion. Future management should prioritize regular vascular ultrasounds in patients with rising venous pressure to identify high-risk individuals early and enable timely interventions to prevent occlusions.

#### Key words :

Hemodialysis, vascular access occlusion, elevated venous pressure, seasonal variations

## Improve Long-Term Dialysis Catheter Patency Rate in Outpatient Hemodialysis Patients

### 提升門診血液透析病人長期性透析導管通暢率

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#### 目的(Background)

血管通路是血液透析病人的透析品質及預後的關鍵，血管通路包括動靜脈瘻管及長期性導管，本單位透析病人中，約有 10% 使用長期性導管執行透析，其中超過六成以上病人使用長期性導管是因已無適當的血管或其他共病而不適合再建置動靜脈瘻管。長期性透析導管之主要併發症為感染及阻塞，而阻塞原因大多是導管內或末端因血塊凝結而造成，其他原因則是因導管吸附在血管壁造成不順或導管放置的位置之深度也會影響導管的順暢度，因此本單位藉由探討長期性透析管阻塞原因，專案改善方案以提升長期性透析導管通暢率。

#### 方法(Methods)

血液透析病人使用長期性導管執行透析治療，若透析導管在透析前或透析中出現抽吸不順暢導致無法透析，其原因常為阻塞。本單位成立導管專責跨領域 (含腎臟科醫師、心臟血管外科醫師及透析治療師) 團隊進行專案改善，現場分析阻塞原因：1. 病人體重指標 BMI (Body Mass Index)。2. 病人胸部 X 光顯示：置入導管之長短及深度，常會隨著平躺或坐姿透析的姿勢不同而影響導管抽吸順暢度，與心臟血管外科醫師共同討論發現提高床頭 30 度角度透析，導管末端會多約 1.0 cm 深度，提高床頭 45 度角度透析，導管末端會多約 2.0 cm 深度。提出改善方案：1. 改變透析床頭-採不同角度透析，BMI > 27 者，採床頭 45 度透析，BMI < 27 者，床頭採 30 度透析。2. 透析前若導管阻塞，依醫囑使用血栓溶解劑 (Urokinase)，使用方式分靜置或滴注，並制定血栓溶解劑操作規範標準化作業流程供人員遵循。

#### 結果(Results)

2023 年 6 月至 12 月期間本單位平均每月透析病人 834 人，使用長期性導管透析病人平均每月 116 人，女性占 60.3%、平均年齡 70±0.5 歲、平均透析年資 12.9 年、BMI > 27 者占 24.4%，分析專案改善後顯示：導管阻塞率由 0.59% 降低至 0.32%，住急診就醫率由 7.1% 降低至 5.5%，生活滿意度由 64.7% 提升至 93%，通暢率提升且照護成效顯著。

#### 結論(Conclusions)

透析治療師藉由建置完善的長期性血液透析導管照護流程，協助病人改變透析時姿勢-採不同角度透析，依醫囑遵從標準化作業流程使用血栓溶解劑以降低導管阻塞率及血栓溶解劑注射風險，進而提升導管通暢率，減少病人再次進入開刀房重新換管之醫療處置，提升病人良好的生活品質及透析照護成效。

#### 關鍵字(Key words)

長期性透析導管、通暢率、血栓溶解劑

## **Intermittent pneumatic compression of upper arm vessels significantly beneficially in maintaining patency of hemodialysis arteriovenous fistula**

### **間歇性上臂血管加壓顯著改善透析用動靜脈瘻管功能**

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### **Introduction**

Dysfunction of native arteriovenous fistula (AVF) is highly associated with poor outcome in hemodialysis (HD) patients and maintaining the patency of AVF is crucially important. In this study, we aimed to evaluate the effectiveness of intermittent pneumatic compression (IPC) of the upper arm in maintaining AVF patency.

#### **Patients and Methods**

A total of thirty-five patients aged 18 years and above, undergoing maintenance hemodialysis for more than three months, were included and divided into two groups: the IPC group (17 patients) and control group (18 patients). Pertinent serum biochemistries were measured and parameters (blood flow rate and vascular diameter) associated with AVF function were assessed via ultrasonography at month 0 and month 3 of study. Six cycles per day (taking nine minutes) of IPC was conducted on the non-HD day.

### **Results**

Patients in IPC group were significantly older than control group. Other general characters, prevalence of comorbidities and biochemistries were shown no difference between the two groups. The baseline blood flow rate of arterial end of AVF, venous end of AVF and anastomosis site were worse in IPC group albeit insignificant. Notably, vascular diameters were prominently smaller in IPC group. After IPC intervention, a significant increase in blood flow rate was revealed in the anastomosis site and venous end of AVF (135.6% vs. 22.1%,  $p = 0.042$  and 63.3% vs -6.6%,  $p = 0.003$ , respectively).

### **Conclusion**

IPC appears rapidly achieve an significant improvement of AVF function its simplicity makes it feasible for application among elderly or frail hemodialysis patients.



## Did the mode of Vancomycin administration reach the therapeutic effect in hemodialysis patients?

### 血液透析患者萬古黴素給藥方式是否達到治療效果

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#### Background

The hemodialysis patients were high risk for infection especially catheter related infection. Vancomycin was traditionally used to treat the catheter related infection. As the medication, Vancomycin, will not be traditionally removed by hemodialysis, and a high single-dose long-interval pre-dialysis prescription (1g Q3-7D) is used. The vancomycin blood concentration is not easy to reach the therapeutic range, so we reviewed the literature to formulate a protocol for vancomycin administration mode for hemodialysis patients, including a loading dose of 15-20 mg/kg, and 5-10 mg/kg administered after hemodialysis. The study aimed to track vancomycin prescribing appropriateness and effectiveness of recommendations dose and therapy.

#### Methods

In retrospective analysis, hemodialysis patients who received at least two doses of vancomycin was selected and had at least one Cpre-HD monitoring between January 1, 2020, and December 31, 2021, were included. The primary aim was to evaluate vancomycin prescription. The secondary objective was to assess the appropriateness of the drug and achieve the Cpre-HD target value (10-20 mg/L) based on the recommended protocol.

#### Results

A total of 21 cases were included in the study, with a total of 23 Cpre-HD. Of these, 65.21% (15/23) of prescriptions were considered appropriate. Appropriate vancomycin prescription achieved a mean Cpre-HD of  $18.61 \pm 6.39$   $\mu\text{g/ml}$ , which was within the therapeutic range of 10-20  $\mu\text{g/ml}$ . The proportion of Cpre-HD in the range of 10-20 mg/L was 73.33% , while the proportion in the range of 15-20 mg/L was 46.67%. Although the sample size of the study was limited, our result showed that the vancomycin recommended regimen was effective in achieving appropriate Cpre-HD in hemodialysis patients. However, a significant proportion of hemodialysis patients still have not received the correct prescription of vancomycin. In the clinical practice, the concentration of the drug level was very fluctuated. So, we should need to consider checking the level again if we have the change the dose and interval.

#### Conclusions

The vancomycin dosing interval and recommended regimen in hemodialysis patients was effective in achieving appropriate Cpre-HD. The clinical outcome of these patients would not be matched with the concentration. This might be due to the change of the dosage interval and dosage amount. The result suggests that the Vancomycin level should be checked after changing the dosage interval or dose amount of Vancomycin.

#### Key words

Vancomycin, Hemodialysis, pre-hemodialysis vancomycin concentration.

#### Abbreviations

HD = hemodialysis, Cpre-HD = pre-hemodialysis vancomycin concentration.

## Serum phenylacetylglutamine is a potential risk factor for aortic stiffness in patients with chronic hemodialysis

血清苯乙醯谷氨醯胺濃度是血液透析患者中樞動脈硬度的潛在危險因子

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**Background:** Phenylacetylglutamine (PAG) is an emerging gut microbiome-derived metabolite that regulates inflammation, glucose intolerance, and insulin sensitivity and is associated with atherosclerotic disease and its severity. Aortic stiffness predicts cardiovascular disease and is associated with aging-associated vascular diseases. This study evaluated the relationship between serum PAG levels and carotid-femoral pulse wave velocity (cfPWV) in chronic hemodialysis (HD) patients.

**Methods:** 138 patients with chronic HD were enrolled in this study. cfPWV was measured using the SphygmoCor system. Patients with cfPWV >10 m/s were defined as the aortic stiffness group. Serum PAG level was performed with high-performance liquid chromatography and mass spectrometry.

**Results:** Forty-six HD patients (33.3%) had aortic stiffness and higher percentages of diabetes ( $p = 0.030$ ), hypertension ( $p < 0.001$ ), were of older age ( $p = 0.016$ ), and had higher systolic blood pressure (SBP,  $p < 0.001$ ), diastolic blood pressure ( $p < 0.001$ ), serum glucose level ( $p = 0.005$ ), and PAG levels ( $p < 0.001$ ) compared to control group. Multivariate logistic regression analysis found serum PAG levels (odds ratio [OR]: 1.903, 95% confidence interval [CI]: 1.171–3.094,  $p = 0.009$ ) and old age (OR: 1.042, 95%CI: 1.001–1.084,  $p = 0.044$ ) to be independently associated with aortic stiffness in HD patients. Multivariate forward stepwise linear regression analysis showed that PAG level ( $\beta = 0.313$ , adjusted  $R^2$  change = 0.193,  $p < 0.001$ ), age ( $\beta = 0.180$ , adjusted  $R^2$  change = 0.025,  $p = 0.013$ ), SBP ( $\beta = 0.292$ , adjusted  $R^2$  change = 0.095,  $p < 0.001$ ), and glucose level ( $\beta = 0.162$ , adjusted  $R^2$  change = 0.019,  $p = 0.024$ ) were independent predictors of cfPWV values in HD patients. The area under the curve for the receiver operating characteristic curve to predict aortic stiffness by serum PAG level was 0.707 (95% CI = 0.616–0.798,  $p < 0.001$ ).

**Conclusions:** Serum PAG level is an independent marker of aortic stiffness and is positively associated with cfPWV values in patients with chronic HD.

**Key Words:** Phenylacetylglutamine, Hemodialysis, Aortic stiffness, Carotid-femoral pulse wave velocity.

## Music Therapy as an Intervention for Depression Among Hemodialysis Patients: Clinical Implications and Outcomes

### 音樂治療作為血液透析患者抑鬱的輔助療法：臨床效益分析

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#### Background :

In 2020, Taiwan recorded over 12,000 new chronic kidney disease (CKD) patients requiring hemodialysis (HD), many of whom suffer from depression due to factors like loss of kidney function, employment limitations, and a decline in quality of life. Uremic toxins and dialysis complications further contribute to anxiety and depression. Research shows that approximately 70% of HD patients experience varying degrees of depression. This study evaluates the efficacy of music therapy in alleviating depressive symptoms in this group.

#### Methods :

Using the PICO framework, a systematic review was conducted, involving Cochrane and PubMed databases, targeting studies published from 2020 to 2024. Of the 44 studies screened, two randomized controlled trials (RCTs) evaluating music therapy's effects on dialysis patients were closely analyzed.

#### Results :

According to the Oxford Centre for EBM (2009) standards, this study is categorized as Level 2 evidence. A 12-week RCT conducted by Dixon et al. (2020) assessed the impact of music therapy on 12 ESRD patients. The intervention group, which received 30-minute weekly music therapy sessions, showed a significant reduction in PHQ-9 depression scores (-0.57 points/week, CI: -1.07 to -0.07,  $p=0.0283$ ), whereas the control group exhibited no significant change (-0.54, CI: -1.54 to 0.45,  $p=0.26$ ). Although anxiety reduction was not statistically significant, the findings highlighted the therapy's potential for future research. In another study by Antonella Silletti et al. (2023), 16 HD patients participated, with the intervention group receiving 30 minutes of live music therapy, and the control group watching animated videos. Results indicated a significant decrease in heart rate, systolic and diastolic blood pressure, along with reductions in anxiety and depression symptoms (all  $p < 0.05$ ). Both studies collectively demonstrate music therapy's positive impact on mental health outcomes for HD patients.

#### Conclusions :

Music therapy is an effective, non-invasive, and low-cost intervention for improving the mental health of HD patients. It can be integrated into patient care plans, especially for those experiencing anxiety and depression. Customized music therapy regimens tailored to patient preferences, alongside regular monitoring, can improve quality of life and treatment adherence. Further research should explore its long-term benefits and broader application in clinical care.

#### Key words :

Hemodialysis, Music therapy, Depression, Clinical dialysis care.

## Reducing Arteriovenous Fistula Puncture Failure Rates in Hemodialysis Using Team Resource Management Techniques

### 運用團隊資源管理手法降低血液透析動靜脈瘻管穿刺失敗率

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#### Background :

末期腎臟病是不可逆疾病，目前治療模式仍以血液透析為主，而血管通路是腎友第二條生命線，每次透析治療至少需扎針兩次，一年至少需扎針 312 次以上，統計本單位 2023 年 1-6 月平均穿刺失敗率上升至 1.01%。文獻指出不當的穿刺或穿刺失敗皆會造成血管通路許多合併症發生，進而需要中心靜脈導管暫時置放或影響血管通路功能及使用年限。穿刺失敗造成護病關係的磨擦及不信任，亦會讓透析護理師裹足不前，因而減少困難穿刺經驗和處置機會，處於「永遠的新手」狀態，因應單位人員結構改變，4 位未有透析經驗之護理師加入團隊後，依文獻建議可運用 TRM 手法提升同仁對困難穿刺的成功率。

#### Methods :

一、Shared Mental Model 設定共同頻道

1-1. 安排規劃相關在職教育

自製多媒體教材，錄製「透析瘻管評估技巧、穿刺技術」等課程影片、辦理「重點式超音波動靜脈瘻管穿刺導引技術」工作坊。

1-2. 設定穿刺前輪替施打位置之共同頻道

增設血管圖交班工具，描繪於透明板上，統一穿刺點施打，規劃紅、黑點識別並註記於行事曆由 Leader 佈達。

二、Handoff 交班於血管模版上註記施打注意事項

困難穿刺施打點包括狹窄、分岔處、瓣膜等圖示，運用圖示及彩色瘻管圖雙重標記，以實體彩色照片張貼於交班工具，並標註符號交班不可施打區域。

三、Call-Out、Huddle 主動呼叫、共識呼叫代號及支援人力

設計床邊指導及支援機制：

面對困難穿刺個案或穿刺異常，增設 505 求救訊號，由主責護理師啟動支援需求，資深護理師至床邊藉由手持超音波影像進行床邊教學討論，進行穿刺針重新定位。

四、Brief、Debrief 明定救援、獎勵機制、增設目視化看板及晨會討論

當挪針或穿刺失敗則每班登錄於「品管指標登錄表」，張貼於目視化看板，晨會中針對失敗及困難穿刺個案進行討論，每月統計 TRM 505 救援次數、設計支援英雄榜及獎勵方案激勵同仁。

#### Results :

一、完成 8 堂在職教育課程、1 場「重點式超音波動靜脈瘻管穿刺導引技術」工作坊、自製 3 堂數位在職教育課程。

二、完成血管圖交班工具、圖示及彩色瘻管圖標記，表單建置完成率 100%(87/87)。

三、運用 TRM 建構困難穿刺流程，困難穿刺啟動 TRM 件數由 27 件提升至 54 件，執行率由 63% 進步至 80%。

四、將 TRM 救援流程、獎勵機制納入作業標準。

五、動靜脈瘻管穿刺失敗率由 1.01% 降至 0.58%。

#### Conclusions :

建置困難穿刺流程且運用 TRM 手法降低瘻管穿刺失敗率，提升透析護理師穿刺能力，減少對血管不必要傷害，維繫良好的護病關係讓醫療服務品質達到有效的提升。

**Key words :** 團隊資源管理、動靜脈瘻管、困難穿刺

## Exploring the Learning Outcomes of Using a Multimodal Teaching Approach to Train Dialysis Nurses in Focused Ultrasound Skills

運用多元教學模式培訓透析護理師重點式超音波導引穿刺技能之學習成效探討

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### Background :

末期腎臟病病人接受血液透析為常用的一種治療方式，透析治療則須仰賴建置血管通路，且面對治療時須由專門透析護理師進行瘻管評估、選擇穿刺針(15-17 號)，穿刺至成熟的瘻管；每次透析需要扎針兩次，一年至少需扎針 315 次，然臨床上瘻管穿刺皆透過護理師「觸覺」評估病人瘻管功能、走向血管特性為依據進行「盲刺」，當遇到困難穿刺(看不到、摸不到)問題時，不僅影響治療時效，反覆穿刺的過程對於病人除了造成痛苦、恐懼、焦慮等，還有可能造成許多合併症如:血腫、阻塞或狹窄、感染、浸潤、動脈瘤形成；進而需要進行通路重塑、中心靜脈導管置時置放或影響血管通路的功能及使用年限，亦造成護病關係的磨擦及不信任，嚴重則影響透析品質；故透過跨領域合作、翻轉教學、製作擬真仿體等教學技巧，探討【重點式超音波引導穿刺技術】學習成效，及此技術於臨床應用之成效。

### Methods :

研究對象為中部某地區醫院血液透析中心護理師共計 14 位，依文獻指出若血液透析護理師仍處於「永遠的新手」的狀態，無法在穿刺動脈-靜脈瘻管技能上從新手逐漸發展成專家，故運用翻轉教學理念由單位同仁自主學習，搜尋同體系之數位學習網尋找合宜之重點式超音波簡介、超音波導引技術操作等進行課前觀看教材；自製多媒體教材錄製透析瘻管評估技巧、穿刺技術等教學課程影片；自製血管穿刺仿體進行教學與練習；運用跨領域團隊資源邀請心臟血管外科醫師、教學型主治醫師進行【重點式超音波引導穿刺技術】工作坊及標竿學習等教學活動。

### Results :

重點式超音波引導穿刺技術可降低血液透析病人動靜脈瘻管穿刺失敗率從 1.01%降低至 0.58 %，及顯著減少困難穿刺的護理照護時間約 10-25 分鐘。

### Conclusions :

當護理師遇到困難穿刺瘻管時，可利用【重點式超音波引導穿刺技術】提高技術信心，提升病人對血液透析治療的信心，降低病人恐懼、增進護病關係、及協助維持良好的透析品質。

### Key words :

重點式超音波引導穿刺技術、動靜脈瘻管穿刺、困難穿刺

## Sharing experiences in predictive care through various strategies to enhance the safety of hemodialysis patients

### 運用多元策略提高血液透析病人安全的預測性護理經驗分享

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**Background:** Chronic kidney failure is an increasing global health concern. End-stage renal disease (ESRD) patients often require renal replacement therapy, with 92% opting for hemodialysis (HD). However, HD is associated with complications such as intradialytic hypotension (IDH), fatigue, cramps, and headaches due to rapid fluid shifts during the process. The aging population and rise in hypertension and diabetic nephropathy have contributed to the prevalence of IDH, which affects 20-30% of patients. These episodes can reduce cerebral blood flow, leading to cerebrovascular disease and increased fall risk due to decreased muscle tone and postural instability. Elderly and diabetic patients are particularly susceptible to these complications, making it a critical area for clinical intervention.

**Methods:** A total of 430 HD patients from a medical center were included in this study, with an average age of  $66.00 \pm 14.73$  years. Predictive nursing interventions were implemented to prevent complications such as hypotension, angina, myocardial infarction, and heart failure. Evidence-based strategies included low-temperature dialysis to lower cardiovascular mortality by 24%, intradialytic exercise to improve solute clearance, muscle strength, and quality of life, and the position of Trendelenburg to manage acute hypotensive episodes. Additionally, patients were instructed on how to rise slowly after dialysis using electric beds, and progressive posture changes were recommended to minimize the risk of dizziness and falls. The nursing team continuously monitored blood pressure and provided oxygen therapy and medications as needed, while maintaining close communication with patients to detect any abnormal physiological responses.

**Results:** By employing risk assessment tools and early identification of high-risk patients, the frequency of hypotensive episodes and falls was significantly reduced. Patients received individualized fall prevention strategies, and rehabilitation consultations were arranged for those requiring strength and balance training. Regular review of risk factors and appropriate clinical interventions were instrumental in reducing adverse events, and patients and caregivers were educated on fall prevention strategies to further mitigate risks.

**Conclusions:** Implementing a predictive care model that focuses on individual patient needs is essential to improving safety and outcomes for HD patients. Through a patient-centered approach that emphasizes proactive risk identification, personalized nursing interventions, and patient education, healthcare providers can significantly reduce the incidence from 0.04% to 0% of hypotension and fall-related. This model not only aligns with hospital quality improvement goals but also enhances patient well-being by minimizing complications associated with hemodialysis.

**Keywords:** Hemodialysis, Hypotension, Falls, Patient Safety, Predictive Care

## Improvement Strategies for Bacterial Colony Count in Newly Established Reverse Osmosis Water System That Do Not Meet Standards

### 新建 RO 水系統菌落數未符合規範之改善策略

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**背景:** RO 水處理系統於血液透析作業為必備且極重要設備，一般原水處理必須經過過濾、軟化、活性碳處理之後，最重要的是逆滲透處理過程，除了重金屬需符合 AAMI 要求，水質菌落數必須 <100 CFU/mL，依評鑑要求，菌落數大於 50 CFU/mL 時就應該啟動改善機制，大於 100 CFU/mL 則必須下機，不能使用直到改善。應透析用水品質評鑑要求，透析液內毒素監測，可避免病人透析過程中因內毒素進入血液，造成熱源反應甚至發燒，依評鑑要求內毒素需 <0.25 EU/mL。

本院為新建立醫院，最大透析床設定為 60 床，使用單獨一套 RO 系統，配有 3 套迴路，興建過程中因 RO 系統建置與 RO 管路系統完工日期相差太久(2 個月)，致使 RO 系統停滯使用期間過長，於管路初次消毒後未能達到透析水質要求的標準，故一系列的改善策略相繼進行並持續追蹤。

**方法:** 本院 RO 系統為專業廠商與工務室共同維護，水質採檢依照南部某醫學中心標準技術執行，檢驗科專人負責水質菌落數培養。

針對 RO 菌落數未符合規定，組織透析 RO 感管團隊，進行團隊討論會議，共同檢視 RO 管消每一環節的執行狀況，進行拍照記錄，羅列未符合標準的操作與任何可改善的方法，於小組提出討論；期間造訪類似 RO 系統設置的透析院所，吸取他人經驗，擬定各項改善策略；透過不斷的修正與監視 RO 管路消毒步驟的一致性，並加強執行檢體採檢的無菌技術，包含 RO 採檢之排水管消毒，與採檢前 RO 水放流時間；透析室未營運前，考量 RO 膜造水少，易增加 RO 膜茲菌，於每一 UF 濾心之排水管加裝定時器，每日 8:00~17:00 自動排水，以增加 RO 膜造水量，並增加 RO 管路消毒頻次，由每週一次管消與水質採檢，視水質檢驗結果逐次減少為兩週一次，待菌落數達正常值則改為常規每月一次 RO 管路消毒與追蹤。

**結果:** 整個 RO 水質改善過程自 113//05/31 至 113/08/05 歷時兩個多月，透過團隊共同討論與執行改善措施，RO 系統各採水口菌落數均達 <50 CFU/mL 之標準，內毒素檢驗數值為 <0.005 EU/mL。追蹤 8/6 與 8/12 RO 機房，UF1 & UF2 水質菌落數分別高於行動值，經原水水塔清消與連續每週的 RO 管路消毒，於開始營運前 RO 機房所有採水口菌落數均達正常值。

**結論:** 透析用水水質對血液透析治療品質有極重要的相關性，除水中重金屬之外

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，菌落數的控制直接與醫療照護感染有關。新建置的 RO 系統因閒置過久造成系統滋菌，透過腎臟科團隊、感染控制小組與系統維護人員(工務與廠商)全面檢視系統可能因素，並尋求各種解決方法，甚至從原水端檢視水質問題，乃至於檢驗誤差的排除，每一個環節都嚴以視之，雖然過程中每一機台水質檢驗都是正常，但不能排除是機器附加的濾心發揮功效，若只仰賴這最後一道防線的標準，如果因故失效，病人將暴露於嚴重的風險中。

**Keywords:** 血液透析用水、菌落數



## Introduction of Standard Operating Procedure and Development of Specialty-Specific Technical Evaluation Mechanism in Hemodialysis Units Enhancing the Consistency of Nursing Care in "Verbal, Written, and Practical" Aspects

### 血液透析單位導入標準作業流程制定專科性技術評核機制

#### 提升護理人員說、寫、作一致之照護品質

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**背景:**以患者為中心的高品質照護是每個透析中心的核心使命，血液透析照護過程中攸關病患的生命安全，臨床第一線血液透析護理人員，除了依照透析醫囑外，還須兼顧操作複雜的血液透析技術，並且在透析過程中持續、密切監測病患隨時可能迅速產生的病情變化，能掌握且有效的處理，以維護血液透析病患安全，因此標準作業流程的遵循以及熟練的技術操作是基本的要求。在成大醫院血液透析室，除了應具備一般的共通性護理如：條碼給藥、物理性約束、預防跌倒及 Hub Care 之外，更需相關專業技術及作業流程，包括血漿置換(PE)、雙重血漿過濾術(DFPP)、連續性腎替代性治療(CRRT)、血液透析病人執行碘-131 治療作業、移動式 RO 機操作作業等。有鑑於病人安全及護理品質提升的兼顧下，我們成立了「專科性臨床技術監測組」，主要目標包括：標準化流程、作業一致性及持續改進，確保護理人員能夠不斷提升其專業能力及照護品質。

**實施細則:**新的年度開始，將會制定出預計考核的項目與技術，時程表內包含專科性與共通性技術；「共通性技術」指適用於所有護理單位的通用性技術，「專科性技術」指工作領域內應具備的專業能力，有其特殊性及專業性始能操作之。監測之具體內容和方法包括以下幾個面向：

1. **一致性：**確保所有護理人員遵循相同的操作規範，減少個別差異導致的護理品質不均。
2. **除錯機制：**通過明確的流程和技術要求，降低錯誤發生的機會，以確保病人安全。
3. **專業評核：**評核機制促進人員持續學習和技能提升，確保其技術符合最新的護理標準。
4. **品質監測：**定期評估人員的表現，提供反饋和改進建議，持續改進護理品質和流程。
- 5.

**預期效果:**透過「專科性技術」評核機制，希望可以達到以下目標，讓臨床護理人員產生歸屬感及成就感：

1. **提升護理品質：**確保所有護理人員遵循相同的操作規範，提高護理服務的一致性和可靠性，減少因操作不當造成的錯誤或併發症，定期的技能測試和實地觀察將促進護理人員的專業技能和知識持續提升，增強其在臨床工作中的表現。
2. **提高病人滿意度：**提高護理人員的專業能力和標準化操作，讓病人得到更安全、更準確的護理服務，減少醫療差錯，提升患者的滿意度和信任感，尤其在複雜的透析治療中，有助於預防併發症及促進整體就醫體驗。

**關鍵字:**血液透析、標準作業流程、專業性、評核機制

## Reduce the incidence of peritonitis in peritoneal dialysis patients

### 降低腹膜透析病人之腹膜炎發生率

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#### Background :

本單位共有 439 位腹膜透析病人，每月品管會議上逐案分析腹膜炎病人發生原因，以改善照護品質，統計 2023 年 Q3 發生率為 1.86/100 病人月，超過單位設定閾值 1.70/100 病人月，故啟發改善動機。依腹膜透析訪評標準，將腹膜炎發生率目標值定為  $\leq 1.70/100$  病人月。

#### Methods :

分析此期間發生腹膜炎的病人共有 24 位，由主護與病人討論分析出可能原因，其中輸液接頭汙染、食用過期食物比例較高，其次為未戴口罩、未落實手部衛生與未關門窗及空調，其他如便秘、腹瀉、與血液感染為次要原因，針對發生要因擬定改善方案，針對以上腹膜炎發生要因擬定多項改善方案，(1)衛教如不慎碰觸汙染接頭的即時處理方式(2)衛教並示範可運用智能回覆系統平台 Line@查詢處理方式。(3)製作衛教小叮嚀紙張，強化病人對飲食正確認知，隔餐勿食。(4)製作「預防腹膜炎」飲食篇衛教短片，門診時段於候診區循環式撥放。(5)衛教病人配戴口罩得重要性並可將口罩放於換液處，以提醒自己須配戴口罩。病人門診回診換液時檢視洗手步驟是否確實。(6)製作「腹膜炎危險因子排行榜」宣導海報並張貼於診間明顯處，提醒病人遵行正確標準流程之重要性。(7)加強衛教指導換液技術，新病人與常規每六個月加強評核，腹膜炎發生後，加強衛教指導換液技術。(8)病人門診回診換液時檢視洗手步驟是否確實。(9)針對腹膜炎個案進行實地或視訊家訪，檢視居家換液環境。(10)當病人需要進行侵入性檢查，例如大腸鏡，拔牙等，應告知醫師開立預防性抗生素使用，避免細菌經由血流至腹膜引起感染，教導檢查後觀察透析引流液清澈度變化。

#### Results :

2023 年 Q3(改善前)發生率為 1.86/100 病人月，經由改善措施，2023 年 Q4(改善中)下降至 1.21//100 病人月，2024 年 Q1(改善後)持續下降為 1.15//100 病人月，已達目標值，2024 年 Q2 持續追蹤為 1.14/100 病人月。

#### Conclusions :

腹膜炎是腹膜透析病人常見併發症，反覆且嚴重的感染，常導致腹膜結構改變，甚至引發腹膜硬化，脫水衰竭，或是死亡。如能從平時做起，加強透析衛教，增強病人對腹膜炎的疾病認知，將腹膜炎風險降到最低，相信病人能有更好的生活品質。

#### Key words :

腹膜炎，腹膜透析

## Experience of using Urokinase in Peritoneal dialysis Relapsing Peritonitis Urokinase 運用於腹膜透析 Relapsing Peritonitis 之經驗

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### 背景:

腹膜炎是腹膜透析最常見的感染性合併症。然而腹膜炎個案在接受完整抗生素治療後四周內；再次合併相同病原體感染，或無法培養出結果再次復發 (relapsing)，個案又強烈表達不願意拔管治療，故嘗試使用抗生素合併 Urokinase 治療之經驗。

### 目的:

復發型腹膜炎合併 CoNS 感染代表管路已形成生物膜(biofilm);故嘗試使用 Urokinase 溶解有可能附著於 tenckhoff 之生物膜再加上抗生素使用，讓腹膜炎治療成功,以避免個案再次復發而拔管。

### 現況分析:

#### (1)臨床檢驗:

腹膜炎日期	2024/02/02	2024/03/16	2024/05/07
Cell count WBC(/UL)/Neut(%)	WBC:290 Neut:66.5	WBC:337 Neut:60.1	WBC:127 Neut:53.5
Culture Data	CNS	CNS	CNS

#### (2)臨床運用:

腹膜炎日期	2024/02/02	2024/03/16	2024/05/07
抗生素使用	2024/2/3-2/16 Cefazolin+Fortum	2024/3/16-4/7 Cefazolin+Fortum	2024/5/7-5/20 Vancomycin
Urokinase 使用	第一次腹膜炎	3/25 作法:將透析液引流完畢，使用 Urokinase6000u/5ml 直接由輸液管打入 tenckhoff 留置 2 小時，後引流出來,再進行換液並且加入抗生素治療。	5/10 作法:將透析液引流完畢，使用 Urokinase12000u/5ml 直接由輸液管打入 tenckhoff 留置 2 小時，後引流出來,再進行換液並且加入抗生素治療。

### 結論:

- 1.個案第一次使用 Urokinase6000u/5ml 後仍復發,第二次將劑量增加 Urokinase12000u/5ml 及抗生素(依藥物敏感報告)使用.追蹤個案四個月內無復發性腹膜炎發生。
- 2.在 Urokinase 使用於復發性腹膜炎相關研究中，雖然可以在 CoNS 無症狀腹膜炎治療上的個案，增加腹膜透析導管的保存率，但復發率或死亡率並無改變，因此目前仍有爭議。
- 3.在 CoNS 感染腹膜炎之個案，仍回歸其換液技術及居家環境問題,故予換液技術及居家環境的再訓練及衛教，定期居家訪視(三個月)，可以有效的降低腹膜炎發生率。

## Use diversified education to reduce the incidence of peritonitis in peritoneal dialysis

### 運用多元化衛教以降低腹膜透析腹膜炎發生率

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#### 目的:

腹膜炎為腹膜透析（Peritoneal dialysis，簡稱PD），最常見且嚴重的併發症。不僅造成腹膜沾黏損傷，進而導致腹膜功能衰竭，也和病人住院率和死亡率息息相關，不僅增加醫療照護成本，更嚴重影響透析品質。統計本單位近三年來腹膜炎案例，發生率高於醫學中心平均。2022年因腹膜炎須接受治療者50人，發生率為1.95次/每100人月(衛生福利部中央健康保險署統計，2022年醫學中心腹膜透析病人腹膜炎發生率為1.57次/每100人月)；其中因腹膜炎治療成效不佳，需移除腹膜透析導管改血液透析治療者有15人，佔30%；因腹膜炎導致死亡1人，佔2%，故成立『腹膜炎改善特攻隊』，以降低PD病患腹膜炎發生率為目標，進而提高病人自我照顧認知與技巧，對於提升整體透析照護品質有所裨益。

#### 方法:

本單位腹膜透析現存病人210人，全責腹膜透析護理師7人。經由腹膜炎案例病歷回溯，運用Excel統計、PDCA品管手法、PD病人技能稽核資料分析及參閱文獻，並與醫療團隊(醫師及護理主管)，進行討論並擬定解決方案。

- 一、修訂「腹膜透析雙連袋換液技術標準」，更改透析液袋連接及分開方式，使操作技術更安全流暢。
- 二、擬定「腹膜炎相關認知衛教表單」，強化病人對輸液管接頭『乾、濕染污認知與處理技能』(常規病人每半年執行衛教，新病人及感染腹膜炎者，則連續三個月加強衛教)。
- 三、腹膜炎病人增加換液技能稽核。針對未通過稽核者，重複訓練及評核，直至技術正確，最後由『腹膜炎改善特攻隊』成員再次評核確認；以掌握換液技術正確性。
- 四、製作換液技術影片。使用動態圖像與文字解說，於病人每月常規回診時播放，達到生動及多元衛教的目的。
- 五、腹膜炎感染資訊透明化。公告每季腹膜炎感染原因、感染人數、治癒人數，提醒PD病人重視感染原因及預防。
- 六、運用手機  App『奇醫管家』執行定期線上推播『腹膜透析殺手-腹膜炎』及『腹膜炎病了，我該怎麼辦?-腹膜炎加藥技術』，使知識及訊息的傳遞更快速，也方便病人在家可以複習相關資訊。
- 七、針對感染腹膜炎者，由主護協助病人完成腹膜炎認知前測及衛教，並針對測試答題錯誤予以解析，直到後測評核完全正確。

#### 結果:

上述方案施行後，腹膜透析病患腹膜炎發生率由1.95次/每100人月(2022年)，降至1.19次/每100人月(2023年)，低於醫學中心平均值1.57次/每100人月，達改善目的。

#### 結論

『腹膜炎改善特攻隊』歷經十個月努力，藉由換液技術標準修訂、強化病人腹膜炎相關認知、病人腹膜透析技能再教育、製作換液衛教影片及增加手機App線上衛教平台，定期發佈衛教資訊，有效提升病人換液技能與腹膜炎認知，獲得更完善照護。運用多元化衛教方式，不僅能提升病人衛教成效，更能減輕護理人員臨床工作負擔。希冀將本單位執行經驗，推廣至其他腹膜透析院所，以降低腹膜炎發生率，讓更多病人可受惠，降低國家醫療資源的支出。

**Key words:** 腹膜透析、腹膜炎、衛教

## Using body composition analysis to improve fluid overload in peritoneal dialysis patients

### 運用身體組成分析改善腹膜透析病人體液過多之成效

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#### 背景：

心臟血管疾病是造成腹膜透析病患死亡重要的危險因子，左心室肥大在透析病患中的盛行率極高，主要原因是容積過量造成左心室肥大，腹膜透析患者又比血液透析患者更容易有體內水分過多的情形。胸部 X 光心臟與胸廓比例 CTR(Cardiothoracic Ratio)是藉由 X 光穿透以得到心臟與胸廓之投影影像，經過計算可提供臨床醫師對於病患心臟肥大的初步診斷，胸部 X 光 CTR > 0.5 顯示有心臟擴大的情形。身體組成監測儀 BCM (body composition monitor) 藉由生物電阻譜通過體內傳送安全的微電流，測量身體各部分對電流的阻力阻抗值，提供患者體內水分、肌肉和脂肪組織詳細信息，分析數據以確定水分過多或不足的情況及脂肪和肌肉的分布情況，可以幫助確定患者體內是否有體液過多 OH(Overhydration)的情形，有助於減少透析相關的併發症。本單位品質監測腹膜透析病患 CTR > 0.5 比率超過閾值，團隊運用監測 BCM，分析腹膜透析病患體液體量(OH)的狀況，做為進行水分控制及濃度調整之依據，有效降低 CTR > 0.5 的比率，降低病人死亡風險，提升透析病人照護品質。

#### 方法：

腹膜透析中心每年追蹤胸部 X 光檢查，CTR 由專科醫師以測量方法:A(心臟最大徑÷胸廓最大徑)進行測量，由品管組同仁進行測量結果追蹤，2018 年 12 月發現 CTR > 0.5 比率佔 50% 超過閾值 40%，2019 年 1 月開始進行 BCM 監測專案，每位病患每半年監測一次，總共收案 111 人，過程由專科醫生依據 BCM 報告、血壓、CTR 及身體評估等，調整患者的乾體重，針對體液過量的病人進行個案討論。

#### 結果：

持續追蹤 2019 年 1 月~2021 年 12 月 BCM 的結果，監測結果：OH 平均值由 1.6L 降至 1.35L、OH ≥ 1L 的比率由 56.6%降至 53.9%、OH ≥ 3L 的比率由 20%降至 14.9%；CTR > 0.5 比率由 50%降至 31.94%。

#### 結論：

身體組成分析可以準確的測量身體體液分部的比例，臨床上可作為調整乾體重的參考依據。本單位藉由 BCM 監測，提供更準確的數據，制定更正確的透析治療計劃，有效降低 CTR > 0.5 的比率，減少單位透析病患心臟擴大的情形，降低心血管疾病死亡風險，減少不必要的影像學檢查，提高生活品質。隨著身體組成分析方法的精進，已廣泛應用在營養學、運動醫學上，期待單位能持續監控，監控患者的身體成分變化，掌握病患體液及營養狀態的變化，有助於疾病的治療及預後的評估，透析團隊能提供更完整的醫療照顧。

**關鍵字：**腹膜透析、體液過多、身體組成分析、心臟與胸廓比例

## Effectiveness of using decision aids to control serum phosphorus in peritoneal dialysis patients

### 運用決策輔助工具表於腹膜透析病人血磷控制之成效

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#### 背景:

慢性腎臟病無法藉由尿液有效地排除磷，使的磷離子持續在體內堆積，造成高血磷問題。長期高血磷會出現全身皮膚發癢、暗沉、骨頭痠痛、疲倦的感覺，並造成副甲狀腺機能亢進引發腎骨病變，增加心血管疾病風險及死亡率，因此血磷的控制對透析病人極為重要。磷的控制包含飲食控制、足量透析、藥物治療。

#### 方法:

由主治醫師啟動醫病共享決策(SDM)「我是慢性腎臟病人且有高血磷問題，但過去控制不佳，我該使用何種降血磷藥物？」並由主護護理師使用決策輔助工具表(PDA)表單協同病人及主要照顧者進行訪談，訪談時間約 30-60 分。主要幫助病人了解高血磷的成因、症狀及如何控制血磷，並選擇適合自己的磷結合劑藥物，內容包含疾病簡介、控制血磷的方法、口服降磷藥物的總類、成分、優缺點及使用方式等。

#### 結果:

2023 年 5 月 1 日至 2024 年 7 月 31 日，收案人數共為 45 位，以男性居多(53.3%)，平均年齡 54.3 歲，病人在面對目前高血磷的醫療問題，進行 SDM 提供決策輔助工具表，追蹤個案前後焦慮程度有明顯改善，訪談過程中有 97.8%病人表示能幫助其思考每個選項的優點及缺點，並讓其準備好做出一個更好的決定，訪談結束後有 93.2%能表示自己的想法並做出明確決定。血磷的控制情形由 2023 第一季平均值 5.7mg/dl 降至 2024 第二季平均值 5.1mg/dl，顯示運用決策輔助工具表於腹膜透析病人血磷控制是有成效。

#### 結論:

良好的血磷控制對慢性腎臟疾病病人來說是重要的課題之一，除了透過飲食控制及規則透析治療外，正確的磷結合劑的使用是最重要的，臨床上我們常看見的是病人無法遵從正確的藥物服用。單位運用決策輔助工具表於腹膜透析病人，希望可以讓病人參與決策過程，藉由提升認知、了解並選擇治療用藥，達到改變行為目的，進而提高血磷的控制降低合併症的產生。血磷是透析病人需要長期追蹤的數值，並非短時間的報告代表治療成效，需持續長期的追蹤監控，未來單位會持續努力將腹膜透析病人全數納入收案，透過這些努力，期望穩定控制病人的血磷值，減少合併症的發生，提升生活品質。

**關鍵字:** 血磷控制、腹膜透析、決策輔助工具



## A Survey on Medical Attendance for Peritoneal Dialysis: A Case Study of a Medical Center in Northern Taiwan

### 腹膜透析就醫情況調查：北部某醫學中心為例

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**Background:** The rapid development of the healthcare industry has significantly expanded the choices available to the public, necessitating that healthcare institutions not only focus on medical expertise and service quality but also prioritize patient needs, experiences, and interactions with healthcare professionals.

**Aim:** This study aims to investigate the satisfaction of patients undergoing peritoneal dialysis in relation to the environmental facilities, medical processes, and overall service quality. By surveying patient satisfaction across these dimensions, the research seeks to provide insights for healthcare institutions to improve service quality and thereby strengthen their competitive position in the healthcare market.

**Methods:** The study focused on patients attending peritoneal dialysis outpatient clinics, using a questionnaire-based survey to collect data. The survey was conducted over a 30-day period from May 16 to June 15, 113. During this time, all patients attending the peritoneal dialysis clinic were given the option to complete a paper-based questionnaire or an online Google Form survey, distributed by nursing staff. A total of 193 questionnaires were distributed, with 135 completed and returned, resulting in a response rate of 70%.

**Results:** The survey results indicated that the majority of respondents were aged between 55 and 64 years (30.83%), with males comprising 42.2% and females 57.8%. The primary residential area of the respondents was Taipei City (43.6%). The satisfaction scores for the different dimensions were as follows: Environmental Facilities Mean  $\pm$  SD = 85.25  $\pm$  13.89 ; Medical Processes Mean  $\pm$  SD = 95.18  $\pm$  7.61 ; Overall Service Mean  $\pm$  SD = 93.04  $\pm$  10.07. The predominant primary causes of illness were systemic diseases (57.71%), followed by renal parenchymal diseases (34.78%). In terms of dialysis methods, continuous ambulatory peritoneal dialysis (CAPD) accounted for 69.57%, while automated peritoneal dialysis (APD) represented 30.43%. Among the dialysis quality indicators, Kt/V  $\geq$  1.7 was 92.43%, Protein Catabolic Rate (PCR) Mean  $\pm$  SD was 1.04  $\pm$  0.24 gm/kg BW, serum albumin  $\geq$  3.5g/dl was 73.13%, serum Hgb  $\geq$  8.5g/dl was 75.14%. In addition, 60.18% of dialysis patients under 55 years of age were enrolled for transplantation.

**Conclusions:** The results reveal that 85% of patients expressed satisfaction with the dialysis care provided by the institution and were willing to recommend it to family and friends. The feedback obtained from this survey offers valuable insights into patient experiences during medical service delivery. These insights and recommendations will serve as a basis for improving healthcare service quality. This study provides a quantitative assessment of patient satisfaction with healthcare services, offering an empirical foundation for healthcare institutions seeking to enhance service quality.

**Key words:** Medical Attendance, Peritoneal Dialysis

## Experience and Outcomes of Video Conferencing for Peritoneal Dialysis Visits 腹膜透析視訊訪視經驗及成果分享

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### Background :

腹膜透析是一種在家自我執行換液技術的居家治療，需重視病人的教育訓練、居家透析環境與相關設備。透析過程中最重要的就是預防發生腹膜炎，故需藉由居家訪視去發現問題並給予衛教。以往，居家訪視為實地到宅方式進行，但此方式在人力與時間運用上，會使家訪人數受限、更導致醫院成本的增加，醫護人員也可能因外出而產生風險。因應 113 年全民健保對腹膜透析政策的推行，增加可利用視訊訪視來評估居家照護情形，故本透析中心開始利用視訊訪視提供持續性個別化的衛教和再訓練。

### Methods :

本中心依通訊診察治療實施計畫規定，向所屬衛生局經報備同意後，運用 Webex Meetings APP 為訪視工具，於視訊訪視前，利用病人回診時先進行視訊教學與實際演練並簽署同意書，視訊當日依單位制定之視訊訪視查核表，評核病人關於居家換液設備、居家環境衛生與對醫囑和服藥的遵從性，優先選擇腹膜炎或新病人作為訪視對象，視訊過程中若發現問題則立即回饋病人，提出改善方案並持續追蹤。

### Results :

2024 年 6 月迄今，共執行 45 例視訊訪視，平均每位病人視訊時間為 31 分鐘。訪視後發現病人居家環境衛生完成率 95.5% 為最高、次之為對醫囑與服藥的遵從性完成率 95.3%、最低為居家換液設備完成率 85.3%，故後續應再增加換液設備準備之衛教來預防腹膜炎的發生。

### Conclusions :

因應健保政策的推動，本中心於 2024 年 6 月開始執行視訊訪視後，發現相較於實地訪視，利用視訊訪視不但可降低人力與時間的成本，亦可達到確認病人是否落實居家自我照護準則之目的與成效，但對於視訊訪視工具不擅長者，仍須進行實地訪視；未來可再增加病人對訪視方式滿意度調查與回饋，供後續執行視訊訪視之參考。

### Key words :

腹膜透析、居家訪視、視訊訪視



## Analyzing Risk Factors and Prevention Strategies for Peritonitis in Elderly Peritoneal Dialysis Patients

### 分析老年腹膜透析病患發生腹膜炎的危險因子及預防策略

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#### Background :

腹膜透析是末期腎病患者的腎臟替代療法之一，佔全球 11% 的患者使用。隨著醫療進步，老年病患進入洗腎的比例增加。腹膜透析可在家中進行，適合老年病患操作，並可由家人或外籍移工/看護協助。然而，老年人因學習能力下降、肌力衰退、平衡能力下降、視覺障礙、關節炎、低活動量、心血管疾病及精神疾病等因素，增加了腹膜炎的風險。當高齡末期腎病患者需選擇透析治療時，患者及其家人面臨巨大的決策壓力。

#### Methods :

以電子病歷回溯 2019 年 1 月到 2023 年 12 月本單位 65 歲以上發生腹膜炎病患資料，進行基本特性、腹膜炎原因及菌種分析，共有 97 位、125 人次的腹膜炎發生（21 位病患重覆感染）。

#### Results :

統計本單位 2019 年 1 月到 2023 年 12 月 65 歲以上腹膜透析患者共 371 位，當中曾罹患腹膜炎人數有 97 位、不曾發生有 274 位。腹膜炎感染率 2019 年 13%、2020 年 11.4%、2021 年 15.4%、2022 年 16.8%、2023 年 16%，透析平均總年資 5.4 年，其中年資 1-5 年發生腹膜炎佔多數（51.6%），透析方式以 CAPD（57.4%）居多，主要換液者為病患本人佔 49.5%，感染原因以技術層面缺失（53.6%）最多，感染菌種以革蘭氏陽性菌（36.6%）（staphylococcus 41 人次，31.3%）為主，感染前當月抽血結果血色素平均 10.8mg/dL，白蛋白平均 3.3mg/dL。其中老人共病症高血壓最多 84.5%、其次糖尿病 52.6%、心臟病 48.5%。

#### Conclusions :

『技術層面缺失』導致革蘭氏陽性菌感染，是老年腹膜透析病患腹膜炎的主要原因。高危險因子包括老年、自體免疫力低下、預防知識欠缺、營養不良、無菌操作意識不強及手部衛生不合格。CAPD 因導管分離次數多，增加感染風險，因此建議病患攝取高蛋白飲食（1.2-1.5 g/kg），學習正確手部衛生及配戴口罩的重要性。依病人及家屬的學習能力，鼓勵使用 APD，減少導管分離次數。透過訓練和簡化教學，提高操作準確性，降低感染風險。

#### Key words :

老年人、腹膜炎、腹膜透析、共病症

## Care experience in assisting peritoneal dialysis patients to adapt to hemodialysis 協助腹膜透析病人適應血液透析之照護經驗

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**背景：**末期腎病 (ESRD) 是不可逆的腎臟疾病，因身體無法代謝的水分及廢物持續累積下，導致病情惡化需接受腹膜透析或血液透析來延續生命。本文探討一位接受腹膜透析 7 年之病人，因面臨到殘餘腎臟功能衰退導致毒素清除率不夠及水分移除不足等窘境發生，因此病人接受腹膜透析時，須合併接受血液透析治療，除需面對不同的透析治療外，日常生活上自我照顧亦需重新適應合併兩種透析後的生活模式，將此腹膜透析併血液透析兩種透析之照護經驗分享於臨床醫護人員。

**方法：**運用生理、心理、靈性及社會層面進行整體性評估，於 2023 年 3 月 1 日至 2023 年 5 月 20 日，藉由病歷查閱、溝通、觀察、傾聽、身體評估及電訪等收集相關資料，歸納出主要健康問題為：體液容積過量、知識缺失、調適障礙等。

**結果：**健康問題三項：1.體液容積過量／與水分移除和透析廓清不足相關，經由提供透析病人需攝取足夠的熱量及適量的蛋白質，避免體液容積過量及高血鉀問題，水分及飲食控制的策略，有效降低體液滯留。2.知識缺失／缺乏血液透析治療相關居家飲食控制自我照護資訊，藉由衛教病人每日餐點拍照或記錄飲食日記，與病人共同擬定照護計劃，認識高磷食物種類，告知降磷藥需咬碎或磨粉隨餐服用，達到有效的飲食自我控制。3.調適障礙/與透析治療模式改變有關，藉由主動關懷病人，接受其負面情緒的表達，陪伴、傾聽與了解其對透析模式改變的擔憂，教導放鬆技巧及看電視、電影、聽音樂等降低不安、無助、焦慮、沮喪情緒，衛教家屬成為病人有力的依靠及完整的支持系統，提升病人心理健康的狀態，改善同時兩種透析之調適障礙。

**結論：**透析廓清率不足需合併血液透析治療，改變病人原本生活步調，故生理、心理及日常生活出現調適障礙。與病人建立良好的治療性人際關係，主動陪伴、傾聽與了解其對透析模式改變的看法及擔憂，並藉由醫護人員、家人支持，及正向態度的傳遞，幫助病人成功渡過調適過程；給予病人正確自我照顧行為知識，瞭解其對透析治療模式的想法及擔憂。建議護理人員在病人腹膜功能變差初期，安排其逐步了解血液透析及參加病友會或病友間經驗分享，給予個別性建議，需改變治療模式時，使其可盡快面對及適應。腹膜透析併作血液透析治療可預防病人發生腹膜硬化症，改善病人貧血、降低鐵蛋白、與高血磷等症狀，主動關懷並讓其接受血液透析治療，藉此經驗分享醫護人員，做為日後病人照護指引病人，提高病人整體醫療品質滿意度。

**關鍵字：**血液透析、腹膜透析、調適障礙

## Clinical Efficacy of Daptomycin In Treating Peritoneal Dialysis-associated Peritonitis – Preliminary Clinical Insights

### Daptomycin 在治療腹膜透析相關腹膜炎之臨床療效-臨床初探研究

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#### Background :

Peritonitis is a serious complication in patients on peritoneal dialysis (PD). More evidence demonstrated increasing failure rate of Vancomycin treatment against methicillin-resistant Gram-positive pathogens. This study aimed to analyze the preliminary clinical effects of Daptomycin on peritoneal dialysis-associated peritonitis (PDAP).

#### Methods :

A retrospective study was conducted in a northern medical center from January 1, 2015. All enrolled patients initially diagnosed with PDAP and received standard treatment in accordance with the ISPD peritonitis guideline. Intraperitoneal and/or intravenous Daptomycin were administered for those with initial treatment failure or those infected with methicillin-resistant Gram-positive organisms with Vancomycin MICs  $\geq 1\mu\text{g/mL}$  or Vancomycin-resistant Enterococci. We collected and analyzed the patient's characters, clinical data and biochemistries to observe the treatment effect and clinical outcomes.

#### Results :

In this study, 12 PD patients (7 male and 5 female) with mean age of 58.5years were enrolled. Among these patients, more than half had hypertension or undergoing APD and five had diabetes. Initial microbiology reported 8 gram-positive pathogens, 2 gram-negative bacilli (GNB) and 2 culture-negative. Daptomycin was introduced into the treatment regimen at a mean dose of 9 mg/kg. The overall treatment response rate achieved 75%, with no recurrence within 3 months after treatment completion. Notably, PD catheter salvage was successful in one GNB case and one culture-negative case. The all-cause mortality rate was less than 30% after one-year follow-up.

#### Conclusions :

These results demonstrated that Daptomycin can reach high response rate and successfully salvage PD tube removal for patients infected with methicillin-resistant Gram-positive pathogens. Both recurrent and mortality rate were quite low after administering Daptomycin. It seems Daptomycin might replace Vancomycin as first-line empirical therapy for high risk of methicillin-resistant Gram-positive PDAP in the future.

#### Key words :

Peritoneal dialysis, Peritonitis, Gram positive bacteria, Daptomycin

## Analysis of Hand Hygiene Awareness and Techniques Among Peritoneal Dialysis Patients

### 腹膜透析病人手部衛生認知及技術現況調查

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#### Background :

腹膜炎是腹膜透析病人的併發症之一，嚴重甚至危及生命。本中心 2024 年 7 月腹膜透析人數 441 人，腹膜炎發生率 2.01/100 病人月，高於腎臟醫學會腹膜炎發生率 $\leq 1.7/100$  病人月之標準，而且以未正確執行手部衛生技術(佔 44.5%)為主因，故推行手部衛生再訓練活動，落實正確洗手認知與技能，並使病人了解正確執行手部衛生的重要性。

#### Methods :

本中心於 2024 年 8 月份，利用病人當月回診時段，安排病人與主要照顧者參與此活動，選擇螢光劑作為輔助手部衛生檢測工具，自製紫外燈光箱，先請病人以螢光劑均勻塗抹雙手，配合 i-pad 相機模式，在紫外燈光下，透過螢光劑殘留情形，模擬細菌沾在手上情形，病人執行完整手部衛生後，再次於紫外燈下確認螢光劑殘留部位，發現問題立即給予回饋，並完成手部衛生認知問卷。

#### Results :

本次活動參加人數為 420 人，洗手認知問卷平均 96.5 分(總分 100 分)，其中 44 人(10.5%)對正確使用乾洗手時機與方式認知有誤，技術實測部分，病人雖自認已確實執行手部衛生，但結果顯示完全無螢光劑殘留 303 人(72.1%)，而有殘留者達 117 人(27.9%)，殘留者三大部位依序為指尖 38 位(32.5%)、指甲面 33 位(28.2%)、掌心/手背 31 位(26.5%)，表示病人未落實執行手部衛生。

#### Conclusions :

經由活動發現病人未正確洗手比例高達 3 成左右，後續應針對洗手時容易忽略部位進行護理衛教以提高洗手正確率；醫療感染發生的重要媒介是雙手，使用螢光劑+紫外燈光箱，並配合 ipad 相機使用，有助於提高辨識手部搓揉位置的正確度與功效，讓病人看到洗手時容易被忽略部位，合併認知評核給予提醒及再訓練，引發病人學習動機與增加執行手部衛生的正確性，使病人將正確洗手的觀念落實於日常自我照護，藉以降低發生腹膜炎的風險。

#### Key words :

腹膜透析、手部衛生、衛生教育

## Using Board Game to improve peritoneal dialysis quality care 運用桌遊提升腹膜透析照護品質

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### Background :

提供護理指導是護理師重要功能角色之一，可降低病人因疾病產生未知的恐懼與焦慮感，但護理師進行護理指導時，因時間限制給予衛教資訊過多、內容單調乏味並忽略病人接受訊息時專注力與負荷度，導致病人覺得枯燥、無趣、有聽沒有懂情形，而降低護理指導成效。磷普遍存在日常食物中，因腎功能變差，導致排除磷的能力下降，累積在體內容易導致血磷上升，易造成心血管併發症、住院率及死亡率提升。故希望增加多元創意環遊腹透大富翁桌遊，提升病人對食物成份認知，並運用於平日飲食之選擇，達到提升腹膜透析照護品質。

### Methods :

由 3 位腹膜透析護理師參考文獻及桌遊玩法設計出「環遊腹透大富翁」，收案人數為 30 位腹膜透析血磷值大於 5.5mg/dL，透析未滿一年之病人。大富翁主題：「提升腹膜透析病人對食物成份認知」，玩法為 2-5 人一組，使用骰子、食物卡牌、棋子、食物答案卡等，遊戲中利用記憶大考驗、搭配機會與命運、骰出數字得知題目後，翻出卡牌需與題目相對應，配對正確可得到卡牌 1 張，最先獲得 5 張正確卡牌為贏家。因遊戲過程容易上手、讓病人實際參與及遊戲中互相鼓勵合作，藉以達到提升病人學習之動機。

### Results :

經由為期 3 個月環遊腹透大富翁遊戲後，檢視 30 位高血磷病人，血磷值由平均 8.5mg/dL 下降至 6.2mg/dL、護理指導滿意度由 88% 提升至 95%。病人原本對護理指導內容單調不感興趣、吸收度差，因參與飲食桌遊後產生興趣而提升學習動機，將高磷食物認知學習生活化，以降低因血磷增加導致併發症之風險。

### Conclusions :

透過視覺影像啟動右腦圖像記憶，再經由平日篩選食物之訓練，可將圖像記憶轉換為腦海中之長期記憶，透析病人自我效能越強，則飲食控制遵從行為越好。希望將遊戲元素注入認知學習中，達到提升病人對學習動機與成效，創意衛教遊戲中能透過玩圖卡次數越多與過程中藉由翻卡時對食物圖像產生記憶及認識食物，再加上遊戲中需靠病人本身些許運氣，讓人想一玩再玩，病人也會透過玩遊戲後的認知改變及學習，增加對自我照顧之信心。

### Key words :

腹膜透析、護理指導、大富翁桌遊

## The Impact of Mortality Salience on Learning Attitudes of Peritoneal Dialysis Patients: A Terror Management Theory Perspective

### 死亡突顯對腹膜透析病患學習態度之影響：恐懼管理理論之觀點

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#### Background :

全球軍事衝突加劇加上兩岸的特殊背景，在各種媒體報導之下，是否影響腹膜透析病患的學習態度。本研究在「恐懼管理理論(Terror Management Theory)」的架構下，探討以下議題：

(一)戰爭引發的死亡突顯(Mortality Salience; MS)，是否引發病患內心的死亡感(Death-thought accessibility; DTA)。

(二)戰爭引發的死亡突顯(MS)，是否會藉由上升的 DTA，而弱化病患學習健康知識的態度。

(三)健康自尊心(Health Self-esteem; HSE)及遵從性(Patience Compliance; PC)對病患在死亡突顯下學習健康知識的影響。

#### Methods :

本研究採用實驗法及問卷法：步驟一：調查某北區醫學中心腹膜透析中心 102 位病患的健康自尊心(HSE)，分為高、低兩群；針對血磷指數分成高、中、低三群，作為病患遵從度的指標(PC)；步驟二：隨機指派實驗組(54 人)閱讀來自 CNN 對烏俄戰爭的報導及回答關於台海戰爭擔憂程度，另控制組(48 人)不提醒；步驟三：兩組接受 15 分鐘的腹膜透析知識測驗及教育；步驟四：回答關於 DTA 及學習健康知識態度的中文量表。

#### Results :

(一)戰爭引發的死亡突顯(MS)降低了病患的學習態度引發了較高的 DTA，較高的 DTA 與較差的學習態度有關；DTA 中介 MS 與學習態度的關係，而 HSE 與 PC 是調節因子，影響了 MS 與 DTA，以及 MS 與學習態度間的關係。

(二)高健康自尊心(HSE)及較佳遵從性(PC)的病患，在 MS 影響下，學習態度反而變差；低健康自尊心(HSE)及遵從性(PC)的病患反不受 MS 的影響。

#### Conclusions :

戰爭的報導，造成了『重視健康(高 HSE)及遵從性(PC)佳』的病患，在內心死亡感增加之下，弱化了他們學習健康知識的態度。依據恐懼管理理論，戰爭的報導會降低正努力尋求健康的病患之自尊心，引發認知衝突，造成學習態度下降。同時，他們可能會採取其他的偏好行為，作為(遠端)防禦策略，例如：娛樂、過度飲食、運動等，以降低恐懼。故避免上述病患接觸與戰爭相關的報導，有助於病患教育；另外培養有益身心健康的興趣，可以減緩死亡訊息的影響力。

#### Key words :

腹膜透析、死亡突顯、健康自尊心、學習態度

## Whether evaluation of dialysate exchange techniques can improve the incidence of peritonitis

### 換液技術評值是否可以改善腹膜炎發生率

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#### 目標：

腹膜透析是病人在植管後由護理師提供完整的訓練，讓病人或主要換液者可以在沒有護理師協助的情況下正確執行技術的一種居家透析治療方式。接受腹膜透析的病人每日需3-5次的換液過程，經年累月之下會有簡化步驟或改變技術的行為，因而容易發生腹膜炎。本腹膜透析室於112年Q3腹膜炎發生率2.41次/100病人月，因此我們想了解確實執行換液技術評值是否可以改善腹膜炎發生率。

#### 方法：

- 一、現況分析：以病歷回溯方式統計112年Q3在本室接受PD治療共有30位，腹膜炎發生率2.41次/100病人月，依單位規定應完成17次換液技術評值，但實際只完成10次，完成率58.8%，比率偏低。
- 二、原因分析：小組討論發現：1. 未確實依照單位規定時間評值病人或主要換液者換液技術(111年度規定新病人於植管後1、3、6個月、常規病人每6個月評值一次)。2. 同仁反映在換液技術評值時會受電話或處理其他狀況而中斷，所以無法確實且完整地當次評值。3. 護理人員未確實於當次完成評值表。4. 對於護理人員無評值規範。
- 三、改善措施：1. 經小組討論後，確立評核方式：(1). 修改評值表內容：包括環境的準備、用物的準備及是否確實檢查、正確戴口罩及洗手、換液過程、換液後的處理等5大項。(2). 將評值時間統一規定於病人換管及腹膜功能檢查時執行。(3). 將評值表先放至於當月需完成評值病人的病歷本內，以提醒評值的護理人員當次完成；並於評值時了解病人在家換液的過程。(4). 每年1月、7月評值護理人員換液技術。(5). 將換液評值表與居家訪視紀錄表整合，統一評值方式。

#### 結果：

1130101-1130630 在本室接受PD治療有29位，共執行病人及主要換液者32次換液技術評值，完成率121.7%，每位護理人員各完成一次評值，腹膜炎發生率0.56次/100病人月，發現確實執行換液技術評值可改善腹膜炎發生率。

#### 結論：

腹膜透析病人每日在家執行多次換液，經年累月之後會偷懶或心存僥倖，常會自行改變換液技術。護理人員透過密集且確實的評值機制來評核換液技術，以維持正確換液技術之外也藉由觀察了解病人在家執行之狀況，適時提出修正；再利用居家訪視時評核在家實際操作狀況，進而達到改善腹膜炎發生率。

關鍵字：腹膜透析、腹膜炎、換液技術

## Improve the qualification rate of serum hemoglobin in peritoneal dialysis patients

### 提升腹膜透析病人血色素合格率

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#### Background:

血色素(Hemoglobin, Hb)為腎臟醫學會及醫學中心評鑑透析照護品質監測指標之一，監測閾值為 Hb $\geq$ 10g/dL 合格率 $\geq$ 65%。腎性貧血是透析病人常見且主要的併發症，症狀包括頭暈、疲倦、食慾不振、認知記憶功能下降、活動能力下降、生活品質變差，進而導致營養不良、免疫力降低、感染率增加、住院率增加、心血管罹病率及死亡率增加。血色素偏低常見原因有紅血球生成素(Erythropoietin, 簡稱 EPO)不足，因病人未依醫囑施打 EPO 及施打方式錯誤、鐵質缺乏、葉酸或 B12 缺乏、透析不足、營養不良、發炎感染、出血等，充足透析加上適度補充紅血球生成素及鐵劑即可解決大部分貧血問題。

#### Methods:

以回溯法統計 2022 年 1 月-2022 年 12 月腹膜透析病人 Hb $\geq$ 10g/dL 為 58.6%，從腎性貧血常見原因找出容易解決且基本原因來進行改善，發現病人檢驗報告中運鐵蛋白飽和度(transferrin saturation, TSAT) $<$ 30% 及廓清率 Kt/V $<$ 1.7 比例偏高，進行原因分析後擬定對策，改善措施於病人方面則利用衛教輔助工具加強指導病人對貧血認知及自我照護能力，於醫護方面則加強護理人員專業知識能力，增進醫護溝通及照護共識，提升照護品質，雙管齊下來改善血色素偏低情形。

#### Results:

2023 年 2 月至 12 月執行對策實施，統計 Hb $\geq$ 10g/dL $\geq$ 65%由 58.6%提高至 68.9%，改善幅度為 17.6%，TSAT $<$ 30%由 62.4%降低為 56.1%、Kt/V $<$ 1.7 由 13.4%降低為 5.9%，2024 年 1 月至 6 月 Hb $\geq$ 10g/dL 病人為 68.2%，改善成效良好

#### Conclusions:

藉由提升透析護理師專業能力，介入改善措施加強病人對貧血的認知及增進病人自我照護能力，提升血色素可以改善病人生活品質、降低病人心血管疾病罹病率及死亡率，減輕醫院及健保署醫療成本負擔，共創四贏!



## Evidence-Based Investigation on the Role of Potassium Supplementation in the Prevention and Treatment of PD-Related Peritonitis

### 鉀離子補充對腹膜透析相關腹膜炎的預防與治療的實證探討

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#### Background:

Hypokalemia is a common electrolyte disorder in PD patients, associated with a higher incidence of peritonitis, particularly infections caused by Enterobacteriaceae. While hypokalemia's link to peritonitis is established, whether maintaining optimal potassium levels can prevent PD-related peritonitis remains unclear. This study evaluates the impact of potassium supplementation on peritonitis incidence in PD patients and provides evidence-based recommendations for nursing practice.

#### Methods:

A systematic review was conducted using PubMed and The Cochrane Library, supplemented by manual searches. The search cutoff was September 16, 2024. MeSH terms and Boolean logic were applied. The review included RCTs and systematic reviews assessing different potassium supplementation strategies and their effects on peritonitis incidence in PD patients.

#### Results:

Two RCTs were included. Both compared peritonitis incidence in PD patients receiving potassium supplementation. In the intervention group, potassium levels were maintained between 4-5 mEq/L with 25 mEq/day of potassium chloride, while the control group received 12 mEq/day only when serum potassium dropped below 3.5 mEq/L. The intervention group had significantly lower peritonitis rates. In the first study, peritonitis occurred in 10.6% of the intervention group vs. 23.4% of the control group (RR: 0.41, 95% CI: 0.18-0.92, p=0.03). The second study reported 15% vs. 29% (HR: 0.47, 95% CI: 0.24-0.93, p=0.03). Hyperkalemia (>6 mEq/L) was observed in 2.3% and 3.5% of the intervention groups but without significant ECG changes or symptoms.

#### Conclusions:

Maintaining potassium levels between 4-5 mEq/L significantly reduces PD-related peritonitis, particularly infections by Enterobacteriaceae. Although the risk of hyperkalemia was minimal and without serious clinical effects, careful monitoring of potassium levels is essential. Nursing Implications: Potassium supplementation should be integrated into routine PD care, with individualized plans and close monitoring to enhance patient outcomes. Further large-scale studies are needed to refine optimal potassium management strategies, ensuring safe and effective nursing interventions.

#### Key words:

PD, potassium supplementation, peritonitis, hypokalemia

## The effectiveness of Tc-99m peritoneal scintigraphy and CT peritoneal radiography in the diagnosis and treatment of mechanical complications of peritoneal dialysis

### 探討 Tc-99m peritoneal scintigraphy 與 CT peritoneal radiography 於腹膜透析機械性合併症診斷治療之成效

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#### Background :

透析液滲漏是腹膜透析機械性併發症之一，本文探討本院 Tc-99m peritoneal scintigraphy 及 CT peritoneal radiography 2 種檢查方式，於腹膜透析機械性併發症診斷及治療結果之成效。

#### Methods :

本文採回溯性資料分析，資料蒐集對象為南部某醫學中心，將病人分成接受 Tc-99m peritoneal scintigraphy 檢查及 CT peritoneal radiography 檢查 2 組，收案時間各 2 年。

#### Results :

在接受 Tc-99m peritoneal scintigraphy 檢查共有 13 例，診斷為腹膜透析機械性併發症滲漏有 61.54%。治療方式：暫停腹膜透析轉為血液透析者：38.46%、減量腹膜透析 23.08%；在接受 Tc-99 檢查後接受治療，最後有 92.31%重返腹膜透析治療，有 7.69%因持續滲漏轉血液透析。在 CT peritoneal radiography 檢查共有 18 例，診斷為腹膜透析機械性併發症有 83.33%，包括：疝氣 27.78%和滲漏 55.55%。治療方式：接受外科手術修復：27.78%，暫停腹膜透析轉為血液透析 27.78%、減量腹膜透析：27.78%；接受 CT peritoneography 檢查後接受治療，最後有 94.44%重返腹膜透析治療，有 5.56%於暫轉血液透析期間接受腎臟移植手術。

#### Conclusions :

Tc-99m peritoneal scintigraphy 與 CT peritoneal radiography 兩者相比，CT peritoneal radiography 更能夠為腹膜透析機械性併發症治療提供準確的診斷，在透析液滲漏、生殖器腫脹、腹壁疝氣……等，做此影像學檢查，可提供外科手術重要資訊，縮短外科手術剖腹探查時間，特別是 CT-P 檢查後診斷為腹壁疝氣 1 位；腹股溝疝氣 4 位，因有明確的診斷都立即進行外科手術處置，讓病人能持續執行腹膜透析治療。

#### Key words :

腹膜透析機械性合併症、Tc-99m peritoneal scintigraphy、CT peritoneal radiography

## Quality Improvement to Reduce the Average Time for per-Visit Preparations in Peritoneal Dialysis

### 縮短腹膜透析回診前置作業平均時間之品質改善

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**背景：**腹膜透析病人每月僅回診一次開立藥物及透析液，並接受透析相關護理指導及再教育，為了提升醫護病之共同照護品質及回診順暢，設立了腹膜透析回診前置作業共 10 項。觀察病人於回診時因無法久坐引起身體不適、沮喪，且無法配合交通車接送時間及影響透析治療時間感到焦慮、憤怒等因素，激發執行改善之動機。專案統計資料共收案 63 人，單次回診平均時間為 2150 秒/人，其中須書寫作業有 7 項平均耗時 1394 秒，占 64.84%；等待回診評估時間平均耗時 420 秒佔 19.53%；護理衛教與指導平均耗時 241 秒，僅佔 11.21%。期盼藉由專案改善促使回診前置作業進行順暢並提升透析病人更貼切需要的照護指導。

**目的：**制定病人回診前置作業平均時間下降 16%、提升病人及護理人員滿意度。

**方法：**運用時間統計、繪製回診動線圖、距離量測、問卷調查收集資料並分析作業價值，歸納腹膜透析前置作業時間長的原因為：1.前置作業多 2.動線雜亂 3.書寫資料多 4.書寫錯誤 5.人工傳送病歷至診間 6.需護理師及書記協助掛號 7.未依報到時間前來，共 7 項。依序擬定解決方案。

**結果：**專案措施介入後，回診前置作業平均時間 1603 秒下降 25%，達成率 159%；回診前置作業簡化為 6 項，須書寫作業僅剩 1 項耗時 48 秒；等待回診評估時間 112 秒下降 73%；護理衛教與指導時間 514 秒提升 53%，病人予以正向反饋，表示將枯燥乏味的等待時間轉為居家照護技術指導與透析飲食衛教，是件兩全其美、事半功倍之舉，滿意度達 100%。護理人員亦藉由此改善措施得以減少重複之作工，提升準時下班率，工作滿意度達 100%。

**結論/實務運用：**照護作業環環相扣，各步驟經常出現等候、動作、搬運等浪費，因而運用重組、簡化、合併及刪除等手法，縮短病人等候的時間，增加行程安排的便利性並減少群聚感染，數位化系統介入減少手寫錯誤的發生，更能專注於護理照護提升病人生活品質。

**關鍵字：**腹膜透析、精實管理、護理資訊化

## Home visits are associated with peritonitis

### 居家訪視與腹膜炎相關性

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#### 目的：

腹膜透析是一種居家治療方式優點是不用頻繁的往返醫院時間自由，文獻證實腹膜炎與換液技術、居家環境有相關，患者在學習換液技術後在家自行操作，但是在無人檢視狀況下容易自行改變操作順序、省略步驟，如濕洗手改為乾洗手原因是可節省時間圖方便，長期在家透析後容易造成感染導致腹膜炎而退出治療，經由居家訪視察覺發生原因，藉由結果更正錯誤並加強技術遵從性有效降低腹膜炎發生。

#### 方法：

確立問題：平時技術監測都是利用換管後，讓病患實際操作換液技術，單位環境固定來醫院操作時謹慎不易出錯，但居家環境有其個別性，無人監督下環境髒亂、燈光昏暗、沒乾濕洗手、變更操作換液順序、欠缺無菌觀念、透析液儲存潮濕等問題。

#### 改善措施：

1. 排訂每位病患半年須居家訪視一次。
2. 整合醫護人員意見，統一居家訪視紀錄表內容。
3. 修改訪視紀錄表內容包含整體大環境、換液空間、動線、實地換液操作、透析液庫存方式、庫存量、管路善後，並完成日記本書寫及特殊狀況處理。
4. 個別性提出相關問題，患者與家屬溝通改善。
5. 加強患者自信心，提供相關知識，提升自我保護意識

#### 結果：

執行後腹膜炎發生率，改善前 112 年 1 月-12 月發生率 1.86 次/每 100 人月，改善後 113 年 1 月-8 月發生率 0.85 次/每 100 人月，下降 1.01 次/每 100 人月有達到目的，故持續執行改善措施。

#### 結論：

經由實地訪查可發現問題，主要是換液技術操作不當及無菌觀念缺乏，安排患者返回腹膜透析室評值換液技術並討論結果，因此避免了發炎感染也降低腹膜炎發生率，過程中由護理人員逐一解釋會造成之原因與後果，並與患者、家屬間取得改善共識，使得透析品質提高，延續生命。

關鍵字:腹膜透析、居家訪視、腹膜炎

## Encapsulating Peritoneal Sclerosis Outcomes: Significance of the Nutritional Parameter Variations

### 營養狀況對腹膜硬化症的預後影響

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### Background :

Encapsulating peritoneal sclerosis (EPS) can result in abdominal organ encasement, and bowel obstruction, and is associated with a high mortality rate. While various risk factors have been identified for the development of EPS, the factors influencing patient outcomes in EPS are less well-studied. This study aims to investigate the prognostic factors that affect the clinical course and survival of EPS patients.

### Methods :

In this retrospective study, we examined a cohort of 1,406 peritoneal dialysis (PD) patients over an 18-year study period. Among them, 35 individuals were diagnosed with EPS. We collected data encompassing demographic characteristics, comorbidities, PD-related parameters, clinical symptoms, computed tomography scores, laboratory results, and treatment modalities. The survival analysis incorporated both univariate and multivariate Cox regression models, as well as the Kaplan-Meier method.

### Results :

Patients with EPS exhibited a spectrum of clinical symptoms, with the most common being intestinal obstruction and ultrafiltration failure. The five-year survival rate was alarmingly a mere 26.3%, and it is noteworthy that malnutrition and gastrointestinal infections contributed to the deaths of three-fourths of these patients. A notable finding from our study was the one-month drop in albumin levels as a marker of ongoing malabsorption, demonstrating its predictive value for both overall (HR 2.01, p=0.042) and EPS-related (HR 2.79, p=0.017) mortality.

### Conclusions :

This study emphasizes the crucial role of monitoring the one-month albumin drop after EPS diagnosis, providing valuable insights for the improvement of clinical management and patient care.

### Key words :

peritoneal dialysis, encapsulating peritoneal sclerosis, outcome risk factors, malnutrition.

## **Microbiologic analysis of peritoneal dialysis-related peritonitis in Cathay General Hospital: A single medical center experience**

**國泰醫院腹膜透析相關覆膜炎菌種分析:單一醫學中心經驗**

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### **Background :**

Peritoneal dialysis (PD) related peritonitis is a common complication of patients with PD and may lead to failure of PD. Identifying the pathogens is important for the choice of appropriate antibiotics. The aim of the study is whether or not the microbiologic distributions in PD peritonitis changing in these years.

### **Methods :**

We collect data retrospectively involving patients diagnosed with PD peritonitis from 2004 to 2022 in Cathay Memorial Hospital. The microbiological data with peritonitis and frequency of bacterial species were analyzed by statistical method, also compare the two periods(2004-2013 and 2014-2022)and determine if there's a significant difference between the distributions.

### **Results :**

There were 431 episodes of PD-related peritonitis during 2004 to 2022 in Cathay Memorial Hospital. There are 218 isolates of Gram-positive organisms, the main pathogens of PD-related peritonitis, Gram-negative organisms 115 isolates, mix organisms 19 isolates. The most common three bacteria species during 2004 to 2022 are CoNS, E.coli. and streptococcus spp., the same as in the period of 2004-2012 and the period of 2013-2022. There is no statistical difference significantly between the two periods.

### **Conclusions :**

Gram-positive organisms is the main pathogens of PD-related peritonitis during 2004 to 2022 in Cathay Memorial Hospital. There is no statistical difference significantly between the two periods(2004-2013 and 2014-2022). The top three bacteria species are CoNS, E.coli. and streptococcus spp.

Keyword: peritoneal dialysis, peritonitis, microbiology

## **Peritoneal Dialysis in Acute Coronary Syndrome with Pulmonary Edema: A Single-Center Retrospective Analysis of Clinical Feasibility**

### **急性冠心症患者合併肺水腫之腹膜透析治療-單中心可行性分析**

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#### **Background :**

The management of acute coronary syndrome (ACS) complicated by pulmonary edema presents significant challenges, particularly in patients undergoing dialysis. Hemodialysis (HD) is traditionally preferred due to its rapid and efficient fluid removal capabilities. However, peritoneal dialysis (PD) may offer distinct advantages in preserving hemodynamic stability. This study investigates the clinical feasibility of maintaining PD in patients with end-stage renal disease (ESRD) who experience ACS and pulmonary edema.

#### **Methods :**

A retrospective, single-center analysis was performed on 13 ESRD patients who collectively experienced 15 episodes of ACS accompanied by physical or radiological evidence of pulmonary edema while on PD. Data were extracted from medical records, encompassing patient demographics, comorbid conditions, Killip classification, PD prescription modifications, and clinical outcomes. Adjustments to PD protocols during ACS events were documented, and the clinical efficacy of PD management was evaluated.

#### **Results :**

Among the 15 ACS events, 73.3% (n=11) were effectively managed using PD alone, while 20% (n=3) necessitated temporary conversion to HD due to insufficient fluid control. The majority of ACS episodes were classified as Killip Class II (20%) or III (73.3%). The mean length of stay in the intensive care unit (ICU) was 4.1 days, and the in-hospital mortality rate was 20%.

#### **Conclusions :**

Based on these findings, patients on PD who develop ACS with pulmonary edema do not necessarily need to switch to HD. Most patients can continue PD with individualized adjustments to the PD prescription, tailored to their clinical condition. However, careful consideration of each patient's specific needs is essential to ensure optimal outcomes.

#### **Key words :**

Acute coronary syndrome, chronic kidney disease, hemodialysis, end-stage renal disease, peritoneal dialysis, pulmonary edema.

## The potential causes of hypoalbuminemia in peritoneal dialysis patients – a cross-sectional study in a medical center in Southern Taiwan

腹膜透析病患白蛋白低下之潛在原因分析：一南臺灣醫學中心之橫斷性研究

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### Background :

The presence of hypoalbuminemia in dialysis patients is an unfavorable prognostic marker and is associated with increased all-cause mortality. We hypothesize that poor oral intake and peritoneal membrane transport may be associated with hypoalbuminemia in peritoneal dialysis patients.

### Methods :

Among the 220 prevalent peritoneal dialysis patients in the National Cheng Kung University Hospital, we collected demographic data, comorbidities, marital status, activity of daily living, and routine laboratory data. Data regarding dialysis adequacy, peritoneal membrane transport were obtained too. Patients were categorized into hypoalbuminemia (serum albumin < 3.5 g/dL) and normal albuminemia (albumin ≥ 3.5 g/dL). Multivariable logistic regression was conducted to evaluate the potential causes of hypoalbuminemia.

### Results :

Patients with hypoalbuminemia were older, had poor self-care, and reduced work capacity, and had higher prevalences of diabetes and cerebrovascular diseases (CVD). They also had higher serum ferritin, relatively low cholesterol, calcium, phosphorus, Ca\*P products, and a slightly higher cardio-thoracic ratio. Using multivariable logistic regression analyses, the presence of CVD, those with impaired self-care abilities, and high peritoneal membrane transport rate were associated with higher risks of hypoalbuminemia, odds ratio (OR) 5.24 (95% CI 1.07-25.56), OR 10.71 (95% CI 2.36-48.52), OR 4.21 (95% CI 1.33-13.31), respectively.

### Conclusions :

The presence of CVD, high peritoneal transport rate, and reduced self-care capabilities were associated with higher risks of hypoalbuminemia in peritoneal dialysis patients. This implies that poor daily coping ability or fluid control may be related to hypoalbuminemia and thus worse patient outcomes.

### Key words :

Peritoneal dialysis, hypoalbuminemia, cerebrovascular disease, peritoneal membrane transport rate, self-care ability



## Analysis of a nurse-provided on-call peritoneal dialysis support – Experience from a medical center in southern Taiwan

### 南部某醫學中心腹膜透析緊急事件呼叫之現況分析

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#### 背景：

腹膜透析病患，由於受過腹膜透析護理師之專業訓練，可以居家透析治療，但當病患面臨腹膜透析相關緊急問題，也提供值班人員 24 小時腹膜透析緊急事件呼叫，讓病患面臨問題得以即時諮詢並應變處置，避免更嚴重合併症或感染發生，提高腹膜透析治療品質。

#### 方法：

一、根據收集的呼叫紀錄，回顧性分析 2023 年到 2024 年 8 月 31 日止，緊急事件呼叫處置結果常見為：透析液及衛材諮詢(19%)、APD 操作及治療警訊問題 (18%)、CAPD 換液技術衛教 (13%)、腹膜透析病況諮詢 (13%)、腹膜透析感染、技術污染、合併症衛教或回院處置(12%)。二、分析常見緊急事件處置可能原因：1.透析液及衛材諮詢：病患在急診或住院時心理緊張，忘記帶換液用物；院內醫護同仁開立透析液諮詢。2.換液技術方面：CAPD 及 APD 操作技術與治療警訊處置，其中以 APD 操作問題最為集中，顯示在操作過程中可能在處理機器警訊上存在知識或技能上的不熟悉。3.病況之諮詢：對團隊依賴度過高，認為緊急值勤電話可詢問非必要緊急事情或其它醫療上問題。4.感染和技術污染風險：已經感染或在操作過程上有疑慮。

#### 結果：

護理師透過電話指導的溝通技巧和實務經驗及時的介入措施至關重要，能夠改善臨床結果和預防合併症發生，病患也可能出自於主觀心理不安而打電話尋求諮商，措施如下：1.病患再教育：針對高頻率發生呼叫事件，如 APD、CAPD 操作問題，透過增加培訓次數（如回診時再訓練技術、視頻教學）來加強學習；透析相關感染及技術污染方面，每次出現異常事件後進行再教育，預防嚴重的併發症。2.定期追蹤：在電話呼叫事件發生之前，主動電話關懷，定期來識別潛在問題，特別是易出現操作問題或感染風險的病患，增加其自信心。

#### 結論：

單位建立完整的緊急呼叫記錄系統，持續記錄與統計分析，可以準確地識別常見問題，根據處置的統計分析和病患反饋，也能為後續提供改善，持續優化流程，幫助病患解決腹膜透析多面向問題，提高生活品質。

關鍵字：peritoneal dialysis、on-call

## Comparisons Of Clinical Outcomes of Peritoneal Dialysis Patients Before and After Using Remote Patient Monitoring System

### 腹膜透析病人使用遠端監測 RPM-APD 前後之臨床結果概況比較

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#### Background :

應用遠端連線監控的自動腹膜透析 RPM-APD(Remote Patient Management APD,RPM-APD)具有進行遠程治療監控以及遠端更改處方的能力，可以提高照護效率和病人治療效果。本研究之目的為了解台灣南部某醫學中心進行遠程監控前後的此族群病人臨床併發症與住院頻率相關結果概況比較，並作為未來的分析與預防之參考。

#### Methods:

本研究回溯分析自2019年09月至2024年09月30日期間，台灣南部某醫學中心曾使用傳統 Home Choice APD且轉換為遠端監控RPM-APD模式的79位腹膜透析病人，分析比較使用 RPM-APD前後之臨床結果概況。

#### Results:

轉換 RPM-APD 後腹膜炎的發生頻率由 1.185 降至 1.086(次/每百人月)，導管出口由 0.530 降至 0.395(次/每百人月)，隧道感染由 0.281 降至 0.222(次/每百人月)，總體感染發生頻率由 1.996 降至 1.702(次/每百人月)；轉換 RPM-APD 後的非感染性合併症發生頻率由 0.873 降至 0.642(次/每百人月)，轉換 RPM 後住院治療的發生頻率由 3.27 降至 3.06(次/每百人月)，臨床結果皆優於轉換前。

#### Conclusions :

使用 RPM-APD 後發生感染性和非感染性合併症，以及因緊急問題而需住院的頻率減少，使用 RPM-APD 對臨床結果有正面助益，未來可再從其他面向更進一步分析，以達到全面品質管理的成效。

Key words：遠程治療監控 RPM-APD、腹膜透析臨床併發症與住院率

## Experience in caring for peritoneal dialysis hernia patients in a medical center in Southern District

### 南區某醫學中心腹膜透析疝氣病人之照護經驗

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#### Background :

腹膜透析治療需將大量透析液灌入腹腔，腹內壓力增加將會出現疝氣或滲漏等機械性合併症，常見於肥胖、咳嗽、用力等造成腹內壓力增加，或曾接受腹部手術、多胎妊娠、長期類固醇使用等，皆有可能導致疝氣或滲漏。本文探討一名 27 歲診斷為紅斑性狼瘡 (Systemic lupus erythematosus, SLE)，長期接受類固醇治療之男性病人，因腎衰竭接受內視鏡腹膜透析導管植入手術，開始接受腹膜透析治療，因雙側腹部及睪丸不對稱腫脹，予以安排腹膜電腦斷層檢查 (CT peritonealgraphy)，協助臨床鑑別性診斷。

#### Methods :

一、確認發生疝氣或透析液滲漏鑑別性診斷之檢查：

腹膜電腦斷層檢查 (CT peritonealgraphy)：腹膜透析護理師協助病人將腹腔內腹膜透析液排空後，陪同病人至放射科，由放射科將顯影劑加入 2L 腹膜透析液，協助病人將透析液灌入腹腔後，請病人儘可能到處走動，促進顯影劑於腹腔分佈，有助於鑑別性診斷疝氣/滲漏及部位。

二、治療：

經腹膜電腦斷層檢查，確認疝氣囊造成之滲漏，疑似為 2022 年腹膜透析植管手術前，腹腔鏡闌尾切除術之切口疝氣。會診外科醫師，於 2022 年 8 月 17 日進行疝氣修補 (hernia repair with mesh)。

#### Results :

疝氣修補術後依外科醫師建議暫停腹膜透析治療一個月，因病人無殘餘腎功能，故暫時採取血液透析治療。一個月後恢復腹膜透析治療，採取連續性循環式腹膜透析治療 (CCPD)，以自動腹膜透析機 (APD) 於病人夜間睡覺平躺於床上進行 1500ml\*4 個週期，並於白天活動長時間留置 1000ml 腹膜透析液，且搭配使用束腹帶，減少白天活動時的腹壓。病人繼續腹膜透析治療與常規追蹤。

#### Conclusions :

腹膜電腦斷層檢查 (CT peritonealgraphy) 應用於臨床上發生滲漏、疝氣之病人，可提供準確的鑑別性診斷，可縮短外科手術腹部探查時間、提升成功率，減少影響病人生活品質，使病人能持續接受腹膜透析治療，享有良好的生活品質及彈性的治療時間，讓病人可回歸社會。

#### Key words :

腹膜透析、機械性合併症、CT peritonealgraphy

## Case discussion of intra-abdominal catheter disconnection in a peritoneal dialysis patient

### 一位腹膜透析病人腹腔內斷管案例討論

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#### 前言：

導管斷裂是腹膜透析導管一種罕見的併發症，多數腹膜導管斷裂發生在外部，腹腔內部的斷管並不常見。腹膜透析導管斷裂雖然不常見，但可能由機械創傷、局部藥物的化學反應或感染引起。

#### 病程：

一名 60 歲女性病人，有糖尿病、高血壓、高血脂之病史，接受腹膜透析治療 3 個月，2023/09/20 執行 SIPD 導管植入，於 2024/01/25 建立出口並開始接受常規透析治療，採連續性可活動式腹膜透析(CAPD)，透析處方為 2.5% dextrose 2000ml Dianeal \* 4bag/day，期間標準體重從 85Kg 調降至 75Kg，每日脫水量大約 1700-2200ml，無顯著異常。回顧病史，病人曾於出口建立前兩日，側身遭汽車撞擊但當下無就醫，於 2024/04/04 因左腰痛就醫，由胸部 X 光影像中發現腹腔內斷管，經與病人討論，遂於 2024/04/06 移除腹膜透析導管。

#### 結果：

發生此次斷管事件，腹膜透析醫療團隊以回朔分析檢視，從植管至腹膜透析治療之相關病程，發現病人在出口建立後，期間因撞擊導致的疼痛曾於 2024/01/30 至骨科就診，當下並無發現明顯異常，但回朔檢視 X 光顯示 Tip 尖端早已斷裂。透過問診得知，病人因無法久坐故經常採臥姿換液，每次換液皆由案子執行，透析過程病人無不適，且由每月回診紀錄及居家紀錄本未察覺有導管流出異常之問題，因透析期間體重下降幅度及脫水量亦有顯著增加。經與病人及家屬討論後，於 2024/04/06 移除腹膜透析導管後即銜接血液透析治療。

#### 結論：

腹膜透析導管斷裂是一種罕見但重要的併發症，當發生時仍需著手分析斷管原因。此病人透析期間無不適，且體重及脫水量無異常，檢視居家紀錄本亦無差異。雖導管流出問題為鑑別診斷之一，以此病人為例，若病人有疼痛或反應身體其他問題，皆應提高警覺，持續追蹤以及早發現異常並給予處置。

**關鍵字：** peritoneal dialysis catheters、peritoneal dialysis

## **Making good use of video media for remote health education to reduce the incidence of peritonitis in patients on peritoneal dialysis**

### **善用視訊媒體遠端衛教以降低腹膜透析病人腹膜炎發生率**

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#### **摘要**

腹膜炎是腹膜透析常見的合併症，也是退出腹膜透析治療的主要原因之一，透過早期發現病人潛在問題，觀念澄清及技術的再訓練，可以有效降低腹膜炎的發生率。研究區間為2023/01/01-2023/12/31，年感染率從2022年4.24次/100個病人月，2023年年感染率下降到2.84次/100個病人月，降幅33%。透過即早發現問題，及再教育，可以有效降低病人腹膜炎感染的比例及合併症的發生。

#### **背景：**

腹膜透析對尿毒症病人是一個擁有高度生活品質的治療方式，但腹膜炎卻是導致腹膜透析病人退出治療的最常見原因。腹膜炎發生時，越早啟動腹膜炎的治療，是可提高治癒率。每年的技術再訓練，更可以有效降低腹膜炎的發生，減少病人退出腹膜透析治療的比例。2022年年感染率高達4.24次/100個病人月，原因分析主要為病人認知錯誤及操作技術錯誤。

#### **方法：**

2023年開始，腹膜透析人員透過Sharesource檢視雲端治療紀錄，異常狀況，即時電訪，line@影像傳輸，確認感染情形，ZOOM會議室的課程再訓練，上傳相關透析紀錄及異常狀態或技術相關影音檔，即早發現問題後，啟動緊密追蹤與相關問題原因之確認與澄清。

#### **結果：**

腹膜炎感染率從4.24次/100個病人月下降到2.84次/100個病人月，降幅33%。

#### **結論：**

透過資訊媒體的遠端衛教與追蹤，可以早期發現問題，確認問題的嚴重性，配合影音媒體的再訓練，可以降低病人腹膜炎的感染。

#### **關鍵字：**

腹膜炎， Sharesource， 視訊媒體

## Clinical Effects of Belatacept in Kidney Transplant Recipients: Evidence-Based Nursing Considerations

### Belatacept 對腎移植患者的臨床效果及護理實證探討

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#### Background :

Kidney transplantation is the most effective treatment for end-stage renal disease (ESRD).

Immunosuppressive therapy is essential to prevent rejection and prolong graft function. Belatacept, a novel immunosuppressant, has been shown to improve renal function (eGFR) and reduce rejection rates in kidney transplant patients. Compared to traditional immunosuppressants, Belatacept offers better long-term outcomes, particularly for patients with compromised graft function.

#### Methods :

A systematic review was conducted using databases such as PubMed and Cochrane Library, covering randomized controlled trials (RCTs) and systematic reviews from 2019 to 2024. The focus was on the use of Belatacept in kidney transplant patients and its impact on renal function.

#### Results :

A total of 660 kidney transplant patients were included, receiving either high-intensity or low-intensity Belatacept regimens. After 84 months of follow-up, patients in the high-intensity group had an average eGFR increase of 1.30 ml/min/1.73 m<sup>2</sup> (95% CI: 0.83–1.77), while those in the low-intensity group had an increase of 1.39 ml/min/1.73 m<sup>2</sup> (95% CI: 0.93–1.84). Additionally, Belatacept reduced the risk of death over seven years by 38% in the high-intensity group and 45% in the low-intensity group.

#### Conclusions :

Based on the evidence, nurses should consider incorporating Belatacept into the long-term immunosuppressive treatment plans for kidney transplant patients. Compared to traditional immunosuppressants, Belatacept shows superior outcomes in reducing rejection and nephrotoxicity. Regular monitoring of renal function (eGFR), medication-related complications, and infection markers is crucial, especially during early and late-stage transitions to Belatacept. Personalized care plans should be continually adjusted to optimize treatment outcomes. Additionally, nursing education should emphasize patient and family guidance on Belatacept therapy, ensuring adherence and understanding of potential side effects to reduce complications.

#### Key words :

Belatacept, Kidney Transplant, Renal Function, Immunosuppression, eGFR

## Increased serum indoxyl sulfate level is a risk factor for aortic stiffness in patients with kidney transplantation

血清硫酸吲哚酚濃度升高是腎臟移植患者中樞動脈硬度的危險因子

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**Background:** Indoxyl sulfate (IS)-induced oxidative stress is detrimental to vascular structures through the altered functions of endothelial and smooth muscle cells and is associated with arterial stiffness. Aortic stiffness predicts cardiovascular disease and is associated with aging-associated vascular diseases. This study evaluated the relationship between serum IS levels and carotid-femoral pulse wave velocity (cfPWV) in kidney transplantation (KT) patients.

**Methods:** The present cross-sectional, single-center study included 94 KT patients. cfPWV was measured using the SphygmoCor system. Patients with cfPWV >10 m/s were defined as the aortic stiffness group. Liquid chromatography-mass spectrometry was used to assay serum total IS levels.

**Results:** 26 KT patients (27.7%) had aortic stiffness and higher percentages of diabetes ( $p = 0.043$ ), were of older age ( $p = 0.017$ ), and had higher systolic blood pressure (SBP,  $p = 0.011$ ), serum glucose level ( $p = 0.002$ ), and serum IS levels ( $p = 0.002$ ) compared to the control group. The multivariable logistic regression analysis revealed that serum levels of IS (odds ratio [OR]: 1.354, 95% confidence interval [CI]: 1.060–1.730,  $p = 0.015$ ) were independently associated with aortic stiffness in KT patients after adjusted associated cofounders. After multivariable forward stepwise linear regression analysis, serum log-transformed IS level (log-IS,  $\beta = 0.219$ , adjusted  $R^2$  change = 0.054,  $p = 0.016$ ), older age ( $\beta = 0.192$ , adjusted  $R^2$  change = 0.027,  $p = 0.035$ ), SBP ( $\beta = 0.251$ , adjusted  $R^2$  change = 0.092,  $p = 0.006$ ), and log-glucose ( $\beta = 0.289$ , adjusted  $R^2$  change = 0.137,  $p = 0.002$ ), was positively associated with cfPWV values in KT patients. By Spearman correlation analysis, log-IS levels were significantly positively correlated with cfPWV ( $p = 0.001$ ), age ( $p = 0.042$ ), and negatively correlated with high-density lipoprotein cholesterol (HDL-C,  $p = 0.046$ ); estimated glomerular filtration rate (eGFR,  $p = 0.017$ ). The area under the receiver-operating characteristic curve for serum IS was 0.709 (95% CI: 0.595–0.822,  $p = 0.0003$ ) to predict the development of aortic stiffness in KT patients.

**Conclusions:** In this study, serum IS levels positively correlated with cfPWV values and were associated with aortic stiffness in KT patients.

**Key Words:** Indoxyl sulfate, Kidney transplantation, Aortic stiffness, Carotid-femoral pulse wave velocity.

## Using cross-team shared care of Home Hospice Care to help end-stage peritoneal dialysis patients good death

### 運用跨團隊共照協助末期腹膜透析病患居家安寧善終

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#### 背景：

台灣於 2000 年通過安寧緩和醫療條例，並在 2009 年將八大非癌末疾病的安寧療護納入健保，包含末期腎臟病(ESRD)，2015 年進一步通過病人自主權利法；依據 2022 年台灣腎病年報，65 歲以上的透析患者共病率和死亡率隨年齡增加而上升；2016-2020 年期間，接受透析死亡患者中，曾接受安寧共同照護的比例從 8.5% 上升至 16.7%。對於高齡長期透析且合併多重疾病的患者，需忍受疾病造成的不適感，事先預立醫療決定，讓我們尊重生命自主權，避免維生醫療延續生命，讓生命最後一哩是尊嚴善終。

#### 方法：

護理期間自 2022 年 12 月 1 日至 30 日，透過直接照顧、身體評估、會談、傾聽、觀察個案及家屬間互動、病歷查閱及電訪方式，收集生理、心理、社會、靈性四大層面的資料，進行整體性護理評估。經評估後，確立了三項主要健康問題：醫療決策衝突/病患疾病惡化家屬對醫療抉擇不確定感、身體舒適感改變/生命末期造成生理不適、預期性哀傷/家屬即將面臨摯愛離世。

#### 結果：

個案是長期腹膜透析的病患，多重共病惡化進入生命末期。護理過程中，個案出現呼吸喘、水腫等症狀，面臨對醫療決策的不確定，經透析團隊整體評估，透過家庭會議溝通後，決定尊重病人自主權，依生前簽屬預立醫療決定(AD)，選擇居家安寧，並啟動安寧跨團隊共照。護理期間，教導家屬漸進式減量腹膜透析、利用半坐臥姿勢和翻身促進透析液引流順暢、並採取雙足墊高及按摩雙足，增進病患的身體舒適感。同時，引導家屬面對個案即將死亡事實，透過傾聽、關懷悲傷情緒，並以生命回顧方式讓家屬表達對個案的四道，將透析導管處理及臨終準備，最終個案在家中親人陪伴下安詳離世，實現尊嚴善終。

#### 結論：

高齡透析合併多重共病，死亡風險高，應提前為自己做出醫療決定，避免家屬在緊急情況下感到無措或陷入道德困境，並減少無效的延命治療。透析醫療團隊是透析病患和家屬最常接觸及最信賴的，因此應提升安寧療護的專業知識與溝通技巧，利用專業評估篩選需求者，適當轉介安寧共照，提供透析病患全方位持續性照護。未來應持續推廣安寧緩和醫療，讓更多民眾了解並行使病人自主權，使尊嚴善終權利向前邁進。

**關鍵詞：**居家安寧、腹膜透析、善終



## Patient Attitudes Toward End-of-Life Preference: DNR and Hospice Care in End-stage Renal Disease

### 末期腎病患者對生命末期治療偏好的態度：DNR 和安寧療護

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**Introduction:** Patients with end-stage renal disease (ESRD) often experience sudden deterioration trajectory and that frequently hinders their ability to practice autonomy or express their preferences regarding life-sustaining treatments. Understanding patients' end-of-life (EOL) care preference is important for helping them to achieve their goals of EOL plan. We report preliminary findings from an on-going study to explore ESRD patients' preferences for life-sustaining treatment if deteriorating and toward EOL.

**Methods:** This cross-sectional study recruited cognitive-intact adult patients with stage 5 chronic kidney disease or ESRD in the renal units and hemodialysis outpatients at a medical center in Northern Taiwan. Subjects were asked about their preferences of life-sustaining treatment for EOL. We report the analysis from the first 148 subjects' preference for Do-Not-Resuscitate (DNR) and hospice.

**Results:** Our preliminary report includes 148 participants with an average age of 58.9±14.5 years. 64% are men, most of them have college-or-above education, are married and unemployed, function independently and are receiving hemodialysis (77%). Among them, 59% prefer DNR, 21% prefer to receive resuscitation, and 20% are uncertain about their preference. Preferences for DNR and hospice do not differ by education, functioning, marriage, and employment. Those who prefer DNR (63.02±13.07) are significantly older than the refused (52.03±14.76) or uncertain groups (53.64±14.29) ( $F=10.049$ ,  $p<.001$ ). The dialysis group reports higher likelihood to prefer DNR than not-dialysis group (88.6% v.s. 11.4%,  $p<.001$ ). There are 54% definitely and 33% probably prefer hospice care.

**Discussion:** Our finding suggests a greater inclination among ESRD patients in Taiwan towards hospice and goal of good death for EOL care. However, substantial of them favor life-sustaining treatment, or haven't decided on their directives. More recruitment and further analysis are needed to gain more comprehensive understanding of ESRD patients' preferences for life-sustaining treatment as toward EOL and associate factors influencing EOL preferences.

**Key words:** End-Stage Renal Disease, Preference, End-of-Life Care

## Improving a Friendly Dialysis Environment for Elderly Dalysis Patients 提升高齡透析病人友善之透析環境

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### 目的：

依據聯合國世界衛生組織的定義，65 歲以上人口占總人口比例達 7%時，稱為「高齡化社會 (ageing society)」，達到 14%時稱為「高齡社會(aged society)」，比例達到 20%時，則稱為「超高齡社會(super-aged society)」；依據行政院國家發展委員會預估，台灣將於 2025 年迎向「超高齡社會」，高齡者面對老化延伸的健康問題，如聽力、視力、肌無力、謔妄、憂鬱、營養不良、認知功能問題等。本單位為讓高齡透析病人獲得適切之醫療照護並兼顧生活品質，因此提供高齡透析病人友善的就醫環境。

### 方法：

血液透析室有 5 位腎臟專科醫師、30 位透析治療師，人員多次反應與高齡透析病人有言語溝通障礙、或病人老化視力不佳，看錯透析前體重導致透析後調水量錯誤，影響病人生命安全。透過問卷調查，分析及改善高齡者障礙問題：一.視力方面：因視力模糊，導致病人錯看數字，錯報透析前體重。二.聽力方面：因聽力不佳，需要大聲溝通，導致醫囑執行困難，並影響病室安寧。三.肌無力方面：因高齡及合併症發生，導致病人在透析後容易發生步態不穩的情況。透過改善方法：視力不佳：運用無線射頻刷卡及電腦 AI 智能系統記錄病人體重、櫃台設置放大鏡以利書寫；聽力障礙：添購手持式輔助溝通器、在櫃台隔板處增設小型擴音系統；肌無力：運用跌倒評估表來篩選高危跌倒病人、衛教透析後不適可使用輪椅返家，建立並管控病人使用輪椅清單及情形、提供居服員申請管道，以協助陪伴病人維護行走安全、發放跌倒衛教單張，指導居家安全。

### 結果：

血液透析總人數為 290 人，高齡透析病人( $\geq 65$  歲)共 208 人(71.7%)，女性佔 62.5%，平均年齡  $76.9 \pm 6.6$  歲；透析年資平均  $7.1 \pm 5.5$  年；病人共病：糖尿病者 50.0%、高血壓者 66.7%、心血管疾病者 54.2%、惡性腫瘤 12.5%、失智者 12.5%、紅斑性狼瘡 4.2%。改善環境結果顯示：一.視力方面：錯報透析體重者由 51 人(24.5%)降低至 0 人(0%)，未再發生錯報透析體重的情况。二.聽力方面：有效溝通者由 168 人(80.7%)提升至 208 人(100%)病人能清楚明白醫囑，病室安寧也得到改善。三.肌無力方面：使用輪椅者 74 人(35.5%)，其中有 22 人(29.7%)透析前後未使用，經衛教後 100%均使用輪椅。未使用輪椅之病人，申請居服員陪伴為 69 位(51.4%)，協助陪伴病人以防止步態不穩引發的不良影響。

### 結論：

高齡者老化不僅涉及身心靈的變化，還會因環境危害使其暴露於高風險中。世界衛生組織高齡友善照護的三大原則是：以提升長者健康、尊嚴與參與為願景，提供高齡人口全人照顧。因此，我們運用電腦 AI 智能系統、軟硬體友善空間，營造維護高齡透析病人尊嚴及安全的友善醫療環境。

關鍵字:血液透析、高齡友善

## Analysis of the Current Status of Case Management for Chronic Kidney Disease Patients Transitioning to Palliative Care

### 慢性腎臟病人個案管理結案進入安寧緩和照護現況分析

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#### Background :

末期腎衰竭為不可逆的腎功能損壞，此時需依賴腎臟替代療法以取代逐漸喪失的腎臟功能，醫療團隊須告知病人除了血液透析、腹膜透析、腎臟移植之外，2009年9月1日，中央健保署將八大非癌末期安寧療護納入服務範圍，末期腎臟病多了接受安寧緩和照護不透析之選項，因此在臨床需評估末期腎臟病或慢性腎臟病合併癌症病人介入與協助接受安寧緩和照護條件與時機。本研究分析慢性腎臟病人個案管理結案進入安寧緩和照護之現況。

#### Methods :

本研究針對某中部醫學中心接受慢性腎臟病個案管理結案進入安寧緩和照護，使用回顧性病歷，統計2020年至2024年5月31日共147人。採用SPSS V25進行T檢定、卡方檢定進行資料分析，探討慢性腎臟病人個案管理結案接受安寧緩和照護方式及病人屬性、共病對安寧緩和照護之影響。

#### Results :

個案管理結案進入安寧緩和照護共147人，在門診追蹤已選擇安寧緩和有33人佔22.4%，其中病人未住院直接居家安寧12人（36.4%），有住院接受安寧緩和照護21人（63.6%）。有114人（77.6%）因病情變化經住院才選擇安寧緩和照護，出院後返家接受居家安寧死亡17人（14.9%），住院中安寧往生97人（85.1%）。分析147人，男性80人（54.4%）、年齡80歲以上居多共88人（59.9%）。門診追蹤已選擇安寧高齡80歲以上者有22人（66.7%），安寧介入時eGFR $9.6\pm 9.6$  ml/min/1.73m<sup>2</sup>。接受安寧有合併癌症病人安寧介入時eGFR $24.9\pm 19.8$  ml/min/1.73m<sup>2</sup>。介入居家安寧至死亡天數 $80.6\pm 99.9$ 天，介入住院安寧至死亡天數 $13.8\pm 17.6$ 天。選擇安寧緩和病人有一種共病以癌症41位（27.9%）居多、心衰竭19位（12.9%）、中風10位（6.8%），以兩種共病組合分別為癌症與中風、癌症與心衰竭、心衰竭及中風。

#### Conclusions :

分析結果顯示高齡、癌症、多重共病（癌症、心衰竭、中風）有較高比率接受安寧緩和照護，多數的病人在個案管理期間未決策而是於住院時因疾病惡化而同意安寧緩和，因此門診個案管理銜接住院照護持續介入安寧緩和是很重要的。藉由分析結果提供醫療團隊對安寧緩和的評估及推動。

#### Key words :

慢性腎臟病、安寧緩和照護、個案管理

## **Risk assessment of urinary tract stones in patients with spinal cord injury: a retrospective cohort study in Taiwan**

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### **Introduction:**

Spinal cord injury is an acute and highly destructive disease, with the main site of injury being the cervical spine. The primary functional damage is limb paralysis, followed by tetraplegia, with a higher incidence rate in males and young adults. Common complications include pulmonary infections and pressure ulcers, as well as urinary dysfunction, urinary tract infections, and urinary stones.

### **Objectives:**

In a retrospective cohort study, this study will use national health data from 2004 to 2015 to assess the risk of urinary tract stones (UTS) in spinal cord injury (SCI) patients.

### **Methods:**

This study uses the health insurance database and the cause of death file of the Ministry of Health and Welfare from 2004 to 2015 for data analysis. The ninth edition of the International Diagnostic Code of Diseases (ICD9-CM) defines spinal cord injury, comorbidities, and complications. The medical order code defines medical treatment, such as catheterization and rehabilitation. A control group was established by a 1:4 case-control matching method. Then, stratified Cox regression was used to compare the risk of urinary tract stones between the spinal cord injury patients and the control group.

### **Results:**

In patients with spinal cord injury, the proportions of urinary tract stones in males and females are 11.5% and 8.3%, respectively, with males having a 1.54 times higher risk than females (aHR=1.54, [1.37-1.72]). Compared to ages 20-44, the aHR (95%CI) for ages 45-64 and  $\geq 65$  are 1.41 (1.24-1.61) and 1.33 (1.16-1.53), respectively. The highest risk of urinary tract stones occurs in patients with paraplegia (aHR=1.44, [1.13-1.84]). Involvement of sacral/caudal vertebrae and multiple sites damaged is associated with the occurrence of urinary tract stones, with the highest risk seen in multiple site damage (aHR=1.62 [1.50-1.75]), followed by upper and lower urinary tract stones at aHRs of 1.36 and 3.74. Urinary obstruction is most strongly correlated with urinary tract stones in spinal cord injury patients both before or after SCI onset (aHR=1.66, [1.20-2.29]). When categorized by location, the correlation between upper urinary obstruction and obstructive uropathy is highest (aHR=3.97, [3.34-4.72]), while lower urinary obstruction has the strongest association with urethral stricture (aHR=4.04, [2.47-6.61]). Risk of developing urinary tract stones significantly increases when using aspirin, antacids, anti-gout drugs, sulfonamides. After SCI surgery treatment increases the risk of developing UTS (aHR =1.10).

### **Conclusion:**

Gender, age, neurological damage, urinary obstruction, and urethral stricture, as well as the use of specific medications are related to the risk of urinary tract stones in patients with spinal cord injury.

**Keywords:** spinal cord injury, urinary tract stones, retrospective study, risk assessment

## Factors Associated with Immune Humoral Response Following Receipt of a COVID-19 Vaccine among Patients Undergoing Dialysis

### 透析病人接種新冠疫苗後免疫體液反應相關因素分析

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**Background:** Owing to uremic status, impaired immunity leads to the poor immune response following vaccination in patients with end-stage kidney disease on dialysis therapy. As these patients were excluded by the COVID-19 vaccine trials, factors related to vaccine-induced immunogenicity remains unclear. The aim of the study was to investigate the factors associated with the immune humoral response following the COVID-19 vaccine in dialysis patients.

**Methods:** This is the follow-up report of our prospective observational study of 204 study participants including 171 patients receiving hemodialysis therapy, and 33 patients receiving peritoneal dialysis therapy. The immune humoral response following a third dose was assessed by measuring neutralizing antibodies against the SARS-CoV-2 spike receptor-binding domain and presented as geometric mean titers (GMT) with 95% confidence intervals (CI). Demographic, clinical, and laboratory parameters were collected and ratio of GMT with 95% CI was analyzed using general linear regression to assess the factors related to immunogenicity.

**Results:** Mean ( $\pm$  SD) age of the study participants was  $63 \pm 11$  years, and female accounted for 43%. Half of the patients had diabetes, and their body mass index (BMI) was  $24 \pm 4$  kg/m<sup>2</sup>. Factors including age, gender, diabetes, BMI, vintage, vaccine type, albumin, hemoglobin, ferritin, parathyroid hormone, normalized protein catabolic rate and cardiothoracic ratio were explored. Multivariate analyses showed that younger patients (age < 65 years) had a higher neutralizing antibody titers than older patients (age  $\geq$  65 years) (ratio of GMT, 1.6 [95% CI, 1.2-2.3]), and patients with higher BMI  $\geq$  25 kg/m<sup>2</sup> tended to have a 1.5 fold increase in neutralizing antibody titers than those with lower BMI < 22 kg/m<sup>2</sup> (ratio of GMT, 1.5 [95% CI, 0.9-2.3]). There was no significant association between the other factors and humoral response.

**Conclusion:** Our result showed that younger age and higher BMI were associated with stronger COVID-19 vaccine-elicited immune humoral response among dialysis population.

關鍵字：年齡、新冠肺炎、透析、抗體、疫苗

**Key words:** Age; COVID-19; dialysis; antibody; vaccination.

## Immune Humoral Response and Breakthrough COVID-19 Infection Disease Severity Following Reception of COVID-19 Vaccines among Patients Undergoing Dialysis

### 探討透析患者接種新冠疫苗後的免疫體液反應及突破性感染後疾病嚴重度

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**Background:** Our previous studies revealed that both hemodialysis (HD) and peritoneal dialysis (PD) patients had a poor neutralizing antibody response after a second dose of COVID-19 vaccine. However, the protective effect of a third dose of COVID-19 vaccine was still unknown. We aimed to evaluate the immune humoral response and breakthrough COVID-19 infection disease severity among patient undergoing dialysis (including both HD and PD) after a third dose of COVID-19 vaccine.

**Methods:** In this prospective observational study, 595 participants, including 497 dialysis patients (437 HD patients and 60 PD patients) and 98 health care workers (HCWs) were enrolled. We evaluated the immune humoral response at first and third month after COVID-19 vaccination by measuring the binding antibodies against the SARS-CoV-2 spike receptor-binding domain (RBD). We assessed the Cycle Threshold Value (Ct value) to represent the breakthrough COVID-19 infection disease severity. The primary end point was the immune humoral response and the breakthrough COVID-19 infection disease severity following vaccination.

**Results:** Among study participants, 23 (5%) dialysis patients and 12 (12%) of HCWs got COVID-19 infection. Of them, the anti-RBD titers were remarkably lower in dialysis group than HCWs (1529 U/mL vs 4707 U/mL,  $P = 0.03$ ). In addition, 16 dialysis patients and 8 HCWs accepted Polymerase Chain Reaction examination. Among them, the Ct value was significantly lower in dialysis group than HCWs (16.6 vs 22.6,  $P < 0.01$ ). Anti-RBD titer was also decreased in dialysis group than HCWs (1179 U/mL vs 4562 U/mL,  $P = 0.02$ ).

**Conclusion:** Dialysis patients with a lower anti-RBD antibodies titer after a third dose of COVID-19 vaccine experienced a lower Ct values after breakthrough COVID-19 infection when compared with HCWs.

關鍵字：新冠肺炎、Ct 值、血液透析、中和抗體、腹膜透析、疫苗

**Key words:** COVID-19; Ct value; hemodialysis; neutralizing antibody; peritoneal dialysis; vaccination.

## Analysis of the Current Status of Latent Tuberculosis Prevention and Treatment Strategies in Outpatient Hemodialysis Patients

### 門診血液透析病人潛伏性肺結核防治與治療策略現狀分析

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#### 目的(Background)

為達成2035年消除結核病之目標，2023年政府推動高風險族群潛伏結核感染及治療之健康服務專案，以強化結核病防治。慢性腎衰竭病人因抵抗力差，結核病發病率高，研究顯示，透析病人結核病的發生率比正常人群高10到25倍不等。血液透析病人與醫護人員有著高就診頻率、高治療時間、高群聚風險等特性，這些可能潛在的開放性結核病與潛伏性結核病病人對其他透析病人亦或醫護人員的健康都有著極大的威脅。為確保本院腎臟病照護品質及病人就醫之安全，對長期接受透析的腎友來說，如何早期發現潛伏肺結核及避免群聚感染，是單位防治結核病的重點。

#### 方法(Methods)

血液透析病人每週三次執行血液透析治療，每年執行胸部 X-ray 檢查一次，單位制定明確的篩檢流程，採衛生署通用肺結核七分篩檢法加上胸部 X-ray 為執行肺結核篩檢的工具，並透過 IGRA 篩檢早期發現疑似個案、早期治療避免群聚感染。於 2024 年 1 月 31 日至 3 月 05 日針對血液透析室病人進行丙型干擾素釋放試驗(Interferon- $\gamma$ release assays, IGRA)檢測，IGRA 陽性者進行潛伏結核感染(Latent tuberculosis infection, LTBI)評估及治療，運用跨領域(腎臟科、胸腔內科、感染管制科)照護團隊將 IGRA 陽性個案轉介至胸腔科，進行合適之潛伏結核感染治療，並採個案管理師追蹤病人接受治療處方用藥之現況。

#### 結果(Results)

收案人數 80 位病人，接受 IGRA 試驗共 55 位(68.8%)、篩檢陽性者 7 位(12.7%)；男性 5 位(71.4%)、女性 2 位(28.6%)；年齡層：50-59 歲:1 人(14.2%)、60-69 歲:4 人(57.2%)、70-79 歲:2 人(28.6%)；透析年資：未滿 1 年：1 人(14.2%)、1-5 年：2 位(28.6%)、6-10 年：2 位(28.6%)、超過 20 年：2 位(28.6%)；共病病史：分別為高血壓 5 人(71.4%)、糖尿病 3 人(42.8%)，位居前兩位；健康體重( $18.5 \leq \text{BMI} < 24$ ) 4 位(57.1%)及肥胖( $\text{BMI} \geq 27$ ) 3 位(42.9%)。接受藥物治療結果顯示：5 位透析病人接受處方為 3HP 複方(71.4%)、2 位接受處方為 3HP 單方(28.6%)；追蹤服藥治療狀況，1 人服藥 2 次 3HP 後，因感染住院暫停服藥，出院後持續追蹤已於 6 月 27 服藥療程完畢，目前 7 人(100%)皆已完成治療，且無重大不良反應報告。

#### 結論(Conclusions)

透析病人有較高的結核病發生率和盛行率，受到結核菌感染後，日後有 5-10%發病可能性。因此透過早期篩檢，提供正確的醫療新知，接受潛伏結核感染治療，預防未來發病，以減少傳播及群聚，除保護自己與親友的健康外，也降低醫護人員在照護上的健康威脅，達到雙贏局面。

**關鍵字(Key words)**：血液透析、潛伏性肺結核、丙型干擾素釋放試驗(IGRA)

**Dysregulated immunity and wound microbiota interactions are associated with outcomes of diabetic foot syndrome in chronic kidney disease stage 4-5D patients**  
慢性腎臟病第4至5D期病人的免疫失調與糖尿病足症候群傷口微生物群相之間的交互作用和其預後相關

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**Background:** Diabetic foot syndrome (DFS) is highly prevalent in chronic kidney disease (CKD) patients and causes high mortality and morbidity. It is well known that dysregulated immune system and altered DFS wound microbiome would contribute to impaired wound healing process. In this study, we aimed to decipher the interactions between DFS wound microbiome and host immune profiles, and their associations with the patient outcomes.

**Methods:** We prospectively recruited CKD stage 4 to 5D (D = dialysis) patients who were diagnosed with DFS and were scheduled to receive wound debridement surgery from Shuang Ho Hospital, Taipei Medical University, after informed consent signed. At baseline (before operation), each patient received peripheral blood sampling for routine hemogram and biochemistry tests. Meanwhile, peripheral blood mononuclear cells (PBMC) were isolated for immunophenotyping through a multi-color Attune NxT Flow Cytometer (Thermo Fisher Scientific) using fluorochrome-conjugated antibodies, including CD3, CD4, CD14, CD16, CD19, CD25, CD45RA, CD56, CD62L, CCR7. Upon operation, debrided wound tissues were sent for conventional bacteria cultures and microbiota study. For microbiota study, DNA was extracted from wound tissues and collected for 16S rRNA gene V3-V4 regions amplification and high-throughput sequencing (Illumina Miseq). Subsequently, integrated data analysis with unsupervised clustering methods were performed.

**Results:** A total of 27 patients were enrolled in this study. Of them, 24 patients are under maintenance dialysis and 3 patients were CKD stage 4/5. Through the unsupervised clustering approach, 3 major clusters of wound microbiota were identified: ‘Bacteroidia predominant (n=10)’, ‘Gammaproteobacteria predominant (n=11)’ and ‘Bacilli predominant (n=6)’. Among the 3 groups, PBMC immunophenotyping data revealed that ‘Gammaproteobacteria predominant’ group is associated with significant increase in effector memory cytotoxic T cells. There was no significant difference in patient's outcome among 3 different microbiota clusters. By stratifying patients into two distinctive immunophenotypes, study revealed that patients with higher T cells is associated with more favorable DFS outcome (free from death or limb amputation).

**Conclusions:** Our study has shown that host immune dysregulation could be associated with a distinct DFS wound microbiota pattern, which may also link to different patient outcomes.



## Effect of Circadian Rhythms on COVID-19 Vaccine Efficacy in Hemodialysis Patients

### 晝夜節律對血液透析患者新型冠狀病毒疫苗免疫效能的影響

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**Background:** The circadian clock system, comprising multiple transcription factors, orchestrates 24-hour molecular rhythms that significantly modulate the metabolic functions, cytokine production, and migratory patterns of key immune cells. Circadian variations in vaccine responses have been documented in previous studies, demonstrating enhanced antibody production for several vaccines, including BCG and influenza. However, the impact of circadian rhythms on vaccine efficacy in hemodialysis (HD) patients remains to be elucidated.

**Methods:** This observational cohort study enrolled 123 HD patients. All participants received a comprehensive vaccination regimen comprising two doses of adenoviral vector-based vaccine followed by two doses of mRNA monovalent vaccine and one dose of bivalent mRNA vaccine. Subjects were stratified into three groups based on their vaccination timing: morning (0900-1200), midday (1200-1700), or evening (1700-2100) and the differential vaccine-induced humoral and cellular immune responses between groups were evaluated. Primary endpoints encompassed markers of humoral immunity, including anti-SARS-CoV-2 receptor-binding domain (RBD) antibody titers and neutralizing antibody levels against both the ancestral strain and selected variants. Cellular immunity was assessed through quantification of interferon gamma (IFN- $\gamma$ ) production.

**Results:** Demographic analysis revealed median ages of 68, 65, and 62 years for the morning, midday, and evening groups, respectively. Median dialysis vintage were 5.6, 4.3, and 6.7 years for the corresponding groups. Following administration of two doses of vector-based vaccine, median anti-SARS-CoV-2 RBD antibody titers were 2.71, 2.67, and 2.78 log<sub>10</sub> U/ml for the morning, midday, and evening groups, respectively ( $p=0.4315$ ), without statistically difference between groups. Subsequent to two additional doses of mRNA vaccine, neutralizing antibody titers against the ancestral virus (97.77, 97.97, 97.85%;  $p=0.0072$ ), delta variant (98.31, 98.34, 98.28%;  $p=0.6222$ ), BA.1 (21.58, 43.92, 17.07%;  $p=0.0968$ ), and BA.2 (78.39, 80.3, 80.72%;  $p=0.4142$ ) also showed no statistically significant circadian variations between groups. Furthermore, IFN- $\gamma$  responses to both ancestral and variant strains antigen following four monovalent vaccinations demonstrated no significant inter-group differences (ancestral: 2.05, 2.36, 1.94 IU/ml; variants: 0.85, 1.25, 1.06 IU/ml). Similar phenomenon was also revealed in the post-administration of one dose of bivalent vaccine.

**Conclusions:** In HD patients, the timing of vaccination administration does not significantly influence the vaccine-induced humoral and cellular immunity. The absence of circadian variation in immune responses is consistently observed across diverse vaccine platforms, encompassing adenoviral vector-based vaccines, mRNA vaccines, and bivalent vaccine formulations.

**Keywords:** Circadian rhythm, COVID-19 vaccination, kidney failure, humoral immunity, cellular immunity.

## Preliminary Evaluation of Generative AI Assistance in Clinical Nephrology: Assessing ChatGPT-4, Gemini Pro, and Bard in Patient Interaction and Renal Biopsy Interpretation

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### Background:

Taiwan, known for its digital advancement, had 21.68 million internet users in early 2023, with a high internet penetration rate of 90.7%. Despite this, a significant challenge remains for the public and patients in interpreting health-related information online due to limited medical knowledge, leading to confusion and potentially misleading conclusions. While hospitals provide health education online, the content is often too technical for the general public. The Taiwan National Health Insurance Administration's pre-End Stage Kidney Disease (pre-ESKD) program, launched in November 2006, has raised awareness among high-risk individuals with Chronic Kidney Disease (CKD). However, patients, especially in nephrology, struggle to understand the generic and rigid information available on these websites, which does not cater to individual needs.

The advent of Generation AI technology in early 2022 presents a promising solution to this information gap. This technology offers tailored answers and mimics diverse roles based on user inputs, potentially making complex medical information more accessible and personalized. A study was conducted to evaluate the effectiveness of Generation AI in assisting with nephrology-related medical inquiries in Taiwan. It compared responses from three AI models – ChatGPT-4, Gemini Pro, and Bard – to common nephrology questions and assessed their ability to interpret and explain renal biopsy reports to patients and their families. This study aims to explore the potential of AI in enhancing patient communication and education in nephrology.

### Methods:

This study, conducted at a central Taiwan medical center aspiring to become a smart hospital, explored the integration of AI platforms ChatGPT-4, Gemini Pro, and Bard in renal clinical settings. Experienced nephrologists curated 21 nephrology-related questions and 3 fictitious renal biopsy reports to reflect common inquiries. The questions were categorized into dialysis-related issues, kidney examinations, and general kidney-related topics, with biopsy reports diagnosing IgA nephropathy, focal segmental glomerulosclerosis, and membranous nephropathy.

From December 8 to 12, 2023, IT engineers queried the AI platforms with the predetermined questions and biopsy reports, assessing consistency by inputting each query three times. The outputs were anonymized for evaluation. The responses were analyzed using Term Frequency-Inverse Document Frequency (TF-IDF), BertScore, and ROUGE metrics to compare the performance of the three AI models in terms of appropriateness, helpfulness, and consistency across renal issues.

Four nephrologists, blinded to the source of the responses, evaluated the AI-generated answers on a 4-point scale for appropriateness, helpfulness, and consistency, as well as a binary scale for human-like empathy. The model with the highest ratings provided references, which were verified for accuracy.

Data analysis included calculating means, standard deviations, and employing ANOVA tests to

determine significant differences among the AI models. The study aimed to assess the potential of AI in enhancing patient communication and education in nephrology, with a focus on consistency, empathy, and relevance in clinical decision-making.

**Results:**

In terms of appropriateness, ChatGPT-4 averaged a score of  $2.68 \pm 0.94$ , Gemini Pro  $2.58 \pm 0.86$ , and Bard  $2.53 \pm 0.85$ . For helpfulness, the scores were  $2.58 \pm 0.91$  for ChatGPT-4,  $2.59 \pm 0.83$  for Gemini Pro, and  $2.54 \pm 0.88$  for Bard. Consistency scores were  $3.36 \pm 0.78$  for ChatGPT-4,  $3.40 \pm 0.78$  for Gemini Pro, and  $3.30 \pm 0.87$  for Bard. ChatGPT-4 had slightly better consistency, while Gemini Pro showed uniform performance, and Bard was competitive in consistency but lower in other areas.

In the Dialysis-Related Issues category, ChatGPT-4 led in consistency with a score of  $3.54 \pm 0.27$ , while Bard excelled in helpfulness with  $2.76 \pm 0.73$ . For Kidney Examinations, ChatGPT-4 and Bard both scored  $2.62 \pm 0.73$  in appropriateness, with Bard leading in helpfulness and consistency. In Kidney-Related Queries, ChatGPT-4 scored highest in appropriateness ( $2.61 \pm 0.66$ ) and consistency ( $3.57 \pm 0.42$ ), while Gemini Pro led in helpfulness.

ANOVA tests showed no significant differences across models, except for questions Q19 and Q23. Scheffé's method revealed Bard outperformed ChatGPT-4 in Q19 and Gemini Pro outperformed Bard in Q23. ChatGPT-4 scored highest in human-like empathy at 79.86%. In the accuracy of references, ChatGPT-4 achieved a 100% accuracy rate, with 101 unique, verified references out of 131 provided.

Comparative analyses of language models for kidney-related content using TF-IDF, BertScore, and ROUGE also revealed nuanced differences across the AI models.

**Conclusion:**

Our study indicates that generative AI models like ChatGPT-4, Gemini Pro, and Bard hold promise in supporting clinical renal services by providing appropriate and empathetic responses to patient inquiries. However, their use should be approached with caution. These AI tools are best viewed as supplementary aids that can enhance patient communication and education in nephrology, rather than substitutes for professional medical advice and judgment. The integration of AI into clinical practice demands rigorous oversight, continuous validation, and a clear understanding of their current limitations. Healthcare providers must ensure that AI-generated information is carefully verified and contextualized within the broader framework of medical expertise. As AI technology continues to advance, it is imperative to prioritize patient safety and accuracy, ensuring that these tools are employed to complement, rather than replace, the expertise of nephrologists. The ultimate goal is to enhance the quality of care by integrating AI as a supportive resource, while always maintaining the primacy of human clinical judgment in patient management. This balanced approach will help ensure that AI serves as a valuable asset in nephrology without compromising the standard of care.

## Nursing experience for using smart medicine care of hemodialysis patients taking low-dose <sup>131</sup>I

### 運用智慧科技照護服用碘 131 血液透析病人之護理經驗

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#### Background :

甲狀腺癌是常見之內分泌腫瘤，放射線碘 131 治療為臨床上常用之術後輔助性治療措施之一。口服放射線碘 131 經吸收後主要由腎臟代謝，約 76% 活性會在二十四小時內隨尿液排出體外，依照國際原子能總署(IAEA)規定，服用放射線碘 131 病人出院前距離一公尺處輻射劑量必須低於 70 $\mu$ Sv/hr，腎衰竭病人無法藉由排尿排出體內殘餘輻射藥物，因此必須進行血液透析治療後才可出院。故照護此類病人除維持常規血液透析治療外，需增加輻射防護措施，採集中式照護，以確保治療過程中相關醫療人員及環境之安全，及教導透析醫護人員相關輻射防護知識是相當重要的課題。

#### Methods :

本文照護一位已透析 4 年之 64 歲男性，因甲狀腺癌入院進行碘 131 治療，透析照護過程中個案對輻射藥物及隔離治療表達焦慮及擔憂，除提供個案心理支持及透析前解說，以減少焦慮情形外，並遵循核子醫學部提供輻射安全防護準則：維持環境安全設置屏蔽（鉛板）、血液透析區域使用防水隔離紙及防水墊、醫護人員穿著鉛衣防護裝備並配戴輻射劑量佩章、血液透析結束後廢棄物丟棄專用鉛製垃圾桶、測量接觸人員及環境於透析前後之輻射劑量，若達安全標準該透析區域才可再次進行透析。並藉由智慧科技遠端監測透析期間病人之體溫、血壓、脈搏與呼吸，採集中式照護減少醫療人員接觸時間，以達到透析照護安全之目標。

#### Results :

醫療團隊除了遵循輻射防護安全照護準則外，藉由事前輻射教育訓練及透析環境勘查，搭配非接觸性生理監測器使用，可減少醫療人員暴露於輻射環境下之風險與時間，增加照護之安全性，減少個案焦慮，更能在安全輻射防護下維持血液透析照護品質。

#### Conclusions :

藉由輻射安全防護措施並配合非接觸性生理監測器使用，可於遠端立即監測病人於血液透析期間之生命徵象變化，能夠有效降低接觸暴露於輻射下風險，減輕臨床醫療人員負擔，不僅能夠保護臨床醫療人員，增加照護上之安全性與便利性，更能提升整體照護品質。

#### Key words :

智慧醫療、碘-131、血液透析

## Assessment of Large Language Models in Kidney Disease Patient Questions: Performance, Readability, and Error Analysis

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**Introduction** Kidney disease affects over 850 million people worldwide, creating major health and financial challenges. Large Language Models (LLMs) can provide fast medical information to improve patient understanding and involvement. However, their use in kidney disease has not been fully explored. This study evaluates how well four LLMs answer common kidney disease questions, revealing both their strengths and weaknesses.

**Methods** We tested four LLMs (ChatGPT-3.5, ChatGPT-4, Gemini 1.5 Pro, Llama 3) with 34 important kidney disease questions. Three nephrologists rated the answers for accuracy and completeness on a 5-point scale. We also checked readability. Statistical analysis, including variance and post-hoc analysis, was done, along with an error analysis to find mistakes and gaps.

**Results** The analysis revealed distinct performance levels among the LLMs. ChatGPT 3.5 led in accuracy (97.4%), followed by ChatGPT 4.0 (96.8%), Gemini 1.5 (94.6%), and Llama 3 (85.6%). For comprehensiveness, ChatGPT 4.0 was highest (95.8%), with ChatGPT 3.5 (95%), Gemini 1.5 (92.6%), and Llama 3 (78.6%) trailing. Variance analysis indicated significant differences in performance (accuracy:  $p = 0.0004$ ; comprehensiveness:  $p < 0.0001$ ). Post-hoc analysis showed Llama 3 performed significantly worse than the others. Readability scores varied, with Gemini 1.5 being the most readable. Error analysis highlighted specific weaknesses in Llama 3 and inconsistencies across other models.

**Conclusion** ChatGPT models excel in accuracy and comprehensiveness, while Gemini 1.5 Pro is the most readable. Llama 3 underperforms across all metrics. LLMs show variability, requiring careful selection for patient education in kidney disease.

### Key Words:

Large Language Models, Kidney disease, Patient Education

## A north Taiwan general hospital uses Power BI to present the care results of pharmacists participating in the Pre-ESRD health education program.

### 某區域教學醫院以 Power BI 呈現藥師加入 Pre-ESRD 照護衛教計畫之照護成效

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#### Background :

2021 年 11 月起藥師加入全民健保 Pre-ESRD 照護與衛教計畫一員，本院共由 2 位藥師執行本照護計畫，每週各 1 診次。本研究旨在了解由藥師介入照護計畫之指標執行情況並將資料導入 Power BI 以視覺化追蹤。觀察照護指標包含(指標 1)用藥配合度 ARMS 評估分析、(指標 2)NSAID 使用率是否有減少以及(指標 3)藥師介入整合性用藥服務之狀況一覽。

#### Methods :

資料收集區間: 自 2021 年 11 月~2024 年 07 月曾至 Pre-ESRD 門診接受藥師照護之病人。記錄資料包含: 病人基本資料(腎病分期、初收案/定期追蹤/年度追蹤、藥師收案原因)、ARMS 評分量表、使用 NSAID 情況記錄、整合用藥服務記錄。記錄分析模式: excel 資料表匯入 Power BI 以呈現圖示化分析

#### Results :

2021/11~2024/07 接受 Pre-ESRD 藥師門診訪視共收案追蹤 783 人次，實際共收案 230 人。

指標 1: 用藥配合度評估區分為二組, ARMS=12 分: 服藥配合度良好 vs. ARMS >12 分: 有服藥配合度問題。隨著照護年度觀察 2021~2024 年 ARMS=12 分的病人佔比分別為 68%、58%、76%及 79%。若依病人初收案/定期追蹤/年度追蹤進行觀察 ARMS>12 分有服藥配合度問題的佔比，分別為 42.17%、24.27%及 16.67%。

指標 2: NSAID 使用是否有減少—近 3 個月內有使用 NSAID 共計 83 人次，佔比約為 10.6%。依年度分析，2021~2024 年度佔比依序為 12%、14.5%、10.2%及 7.2%。若依病人初收案/定期追蹤/年度追蹤進行使用 NSAID 比例觀察，分別為 12.2%、11%及 5%。

指標 3: 用藥整合介入成效分析: 提出介入追蹤人次共 160 人次，提出建議佔比約 20.4%，醫師整體接受建議率為 95%。介入四大類分析分別為(1)建議處方 21 件(佔 13.1%)、(2)主動建議 54 件(佔 33.8%)、(3)建議監測 76 件(佔 47.5%)及 (4)用藥連貫性 9 件(佔 5.6%)。當科(腎臟科)建議佔 72.5%，其他跨科跨院佔 27.5%。

#### Conclusions :

分析近 3 年記錄顯示:用藥配合度進步且 NSAID 使用率呈現下降趨勢。藥師整合照護介入蹤接收率高達 95%，其中非當科建議佔比約 27.5%，顯示藥師於協助跨科建議整合能夠有所貢獻。Power BI 追蹤介面，可提供照護分析之延展性(任意區間/條件篩選)並可降低分析時間。

#### Key words :

Power BI, 藥事照護, Pre-ESRD 病人照護及衛教計畫

## Exploring the Use of Large Language Models for Automated Analysis of Hypotension During Dialysis in Electronic Medical Records

### 利用大型語言模型進行電子醫療紀錄中透析低血壓自動化分析的探索

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#### Background :

Electronic Medical Records (EMRs) consist of structured and unstructured data, such as physiological readings and textual medical records. While most research has focused on structured data analysis, unstructured data, like free text, also holds significant value. For instance, symptoms of intradialytic hypotension (IDH), such as dizziness or cramps, are often recorded in free-text notes and can aid clinical decision-making. We aimed to explore the application of large language models (LLMs) in constructing automated classification models of IDH.

#### Methods :

We collected data from 2016 to 2020 from the Far Eastern Memorial Hospital dialysis center, including approximately 350,000 free-text dialysis records from 1,051 patients. Previous studies spent significant time on data processing and model fine-tuning to construct automated classification models. In this study, we randomly sampled a smaller dataset of 4000 records, annotated the data, and fine-tuned the pre-trained Llama 3 foundation model using Alpaca-style prompts. As the foundation model was already pre-trained on medical data, it required fewer samples for fine-tuning. We tested the model performance using 500 physician-annotated test records,

#### Results :

On the 500 test records, the Llama 3 model performed well, achieving an accuracy of 0.941, sensitivity of 0.895, specificity of 0.976, and an F1-Score of 0.910. These findings indicate that even without extensive data cleaning, the model maintained competitive performance.

#### Conclusions :

This study demonstrates the feasibility of using LLMs for identifying IDH from EMRs. Even when applied to unprocessed data, the Llama 3 model achieved performance comparable to prior methods, showcasing its potential for medical applications.

#### Key words :

Electronic Medical Records, Free-text, intradialytic hypotension, LLM

## Clinical Outcomes of A Cutting-Edge Artificial Intelligence-Driven System for Real-time Intradialytic Hypotension Prediction

### 一尖端人工智慧即時透析期間低血壓預測系統之臨床預後分析

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**Background:** Intradialytic hypotension (IDH) is a common and serious complication of chronic dialysis treatment, with long-term consequences such as increased cardiovascular and all-cause mortality. The BestShape, an artificial intelligence-driven system for real-time intradialytic hypotension prediction, was previously developed. This study aimed to demonstrate the preliminary clinical results and health economic benefits following the incorporation of the BestShape in medical institutions across Taiwan.

**Method:** This is a retrospective study. From January 1, 2020, two medical institutions in Taiwan (Mackay Memorial Hospital Taipei and Tamshui branches) incorporated BestShape into all hemodialysis (HD) sessions. The Vital Info Portal (VIP) gateway, connected to the HD device, collected the parameters in each HD session. The data from consecutive HD sessions spanning from January 2020 to September 2023, following the implementation of BestShape, constituted the observational group. The data retrieved from January 2019 through the end of 2019 served as the historical control group. The primary outcome was the frequency of IDH, and the secondary outcomes were the rates of cardiopulmonary resuscitation (CPR), fall, and providers' satisfaction, mortality rates, and estimated total cost reduction.

**Results:** A total of 104,117 HD sessions during the study period were included (observational group: 66,683; control group: 37,434 sessions) for analyses. The monthly average IDH rates decreased significantly from 27.4% to 20.3% ( $p < 0.05$ ) after incorporation of BestShape. The occurrences of CPR during dialysis decreased from 5 to 3 times, resulting in an estimated total cost reduction of 47 thousand USD annually. In addition, post-dialysis falls decreased from 5 to 1 times. The mortality rates during the HD sessions prior to (2017-2019) BestShape implementation were 8.3%, and 10.6% afterwards (2020-2022), with no statistically significant differences. The medical staff expressed significant satisfaction with BestShape, as evidenced by average satisfaction scores of 86.5 and 85.5 in Tamshi and Taipei branch, respectively.

**Conclusion:** This study presents the initial outcomes of incorporating BestShape within Taiwanese hospitals, revealing a high level of satisfaction among medical staff and achieving notable reductions in IDH, CPR incidents, and falls. These improvements hold the potential for substantial reductions in healthcare costs.

**Keywords:** Big data, machine learning, blood pressure, intradialytic hypotension, hemodialysis



## AI model for predicting major cardiovascular events in peritoneal dialysis patients by extracting body composition characteristics

### 提取體組成特徵預測腹膜透析患者發生重大心血管事件的 AI 模型

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#### Background :

腹膜透析是慢性腎衰竭患者的一種治療選擇，但這些患者在開始透析後，心血管疾病的發生率顯著增加。因此，如何及早識別高風險患者，並介入以降低心血管事件的風險，成為臨床醫療中一項重要的挑戰。隨著 AI 科技進步，我們引入了伺機性檢驗的概念，利用每半年定期量測患者的體組成數據，開發出一個僅需患者基本資料與體組成數據的 AI 模型，以預測腹膜透析患者在量測後半年內是否會發生重大心血管事件。在不增加醫療成本及病患負擔的情況下，通過智能化的風險預測，幫助醫師及早辨識高風險患者。

#### Methods :

我們收集了台灣中部一間醫療中心的 148 名成年腹膜透析患者的數據，回溯其在 2012/1/1 至 2024/2/29 之間的體組成數據，共獲得 1110 筆數據。若在體組成測量後六個月內患者發生心因性死亡、中風、心肌梗塞、心衰竭或心臟支架植入，則被視為發生重大心血管事件。我們將每筆數據視為獨立事件進行模型訓練。資料集由電腦隨機拆分為 80% 作為訓練資料集，剩下的 20% 作為測試資料集。使用 XGBoost 演算法進行模型訓練，並在訓練過程中使用 five-fold cross validation 和 normalization，以防止模型過擬合。最後，使用 ROC 曲線對模型在測試資料集上的預測結果進行驗證。

#### Results :

1110 筆資料中有 84 筆發生過重大心血管事件，占總資料集 7.6%。用來訓練模型的 11 個參數分別為：年齡、性別、身體質量指數、透析年數、收縮和舒張壓、相對過水合、相對瘦肉組織、相對肥胖組織、總水分、細胞內外水比率。完成訓練後的模型在測試資料集上進行驗證，結果顯示 ROC 曲線下面積達 84%。根據樹結構中的分裂貢獻，排名前三的重要特徵分別是：舒張壓、透析年數和細胞內外水比率；根據 Shapley 值計算每個特徵對於每個個體預測的貢獻，前三名的重要特徵分別為：透析年數、細胞內外水比率和總水分。

#### Conclusions :

我們開發了一個僅需 11 個參數的 AI 模型，且這些參數都是臨床易於獲取的數據。通過伺機性檢驗，幫助腎臟科醫師及早辨識即將發生重大心血管事件的高風險患者。

#### Key words :

腹膜透析、體組成分析、人工智慧、伺機性檢測、重大心血管事件

## Use the "ONE TEAM" intelligent system to improve smoking cessation and kidney health care

### 運用「ONE TEAM」智能系統提升戒菸與腎臟健康照護計畫

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#### Background :

吸菸對於身體的危害是眾所皆知的事情，對於腎臟更造成負擔與影響，研究發現吸菸併慢性腎臟疾病其死亡率高出未吸菸者 2-3 倍，其中腎臟衰竭的風險率高於 2 倍。臨床上有許多潛在吸菸者，若能藉由智能系統找出潛在慢性腎臟病個案，進行接受戒菸介入措施前後檢驗數值異常變化、對於菸害認識、對尼古丁依賴性狀態、生活品質等方面措施追蹤。期待能藉此提升對腎臟健康照護的成效，進而延緩慢性腎臟疾病人接受透析治療時程。

#### Methods :

The English should use Times New Roman font at 12pt size. Chinese should use KaiTi Font, 12pt size. 本團隊經回溯資料顯示:112 年戒菸收案人數為 221 人，衛教人數為 148 人，其中 4 人為腎臟病人，以逐一登打醫療記錄，進行資料管理方式，此方式影響收案準確性與管理效率。因此對於腎臟病人早期介入往往不夠及時，自 113 年 3 月開始，本團隊與資訊室進行跨科部合作，透過多次溝通改進，開發設計並建置「ONE TEAM 戒菸智能系統」。整合病人的戒菸記錄及腎臟功能檢查結果，與現有醫療系統無縫對接，即時更新紀錄與數據，找出潛在腎臟病抽菸病人，衛教菸害認識、對尼古丁依賴性狀態及戒菸措施介入，還包括健康飲食建議、腎臟保護措施，運動等改善生活品質的實用技巧，使病人充分了解戒菸對整體健康的好處。並透過後續跟進，電話、簡訊的形式，隨時提供專業支持與心理輔導，以鞏固其戒菸意願。

#### Results :

The English should use Times New Roman font at 12pt size. Chinese should use KaiTi Font, 12pt size. 1. 使用「ONE TEAM 戒菸智能系統」前收案人數 221 人，戒菸衛教 148 人，經系統實施後，戒菸收案人數上升至 298 人，戒菸衛教提升至 246 人，較 112 年上升 34.8%。  
2. 慢性腎臟病戒菸個案，112 年僅收集 4 位病人資料，113 年導入智能系統後，收案數增加至 21 位，腎臟病收案比率從 1.81% 提升至 7.05%。  
3. 對於慢性腎臟病個案進行健康追蹤後，戒菸成功個案腎臟功能有顯著改善，抽血值 eGFR 從 27 提升至 81，CREA 從 2.52 降至 0.97 mg/dl，降低進入終末期腎病的風險。

#### Conclusions :

The English should use Times New Roman font at 12pt size. Chinese should use KaiTi Font, 12pt size. 本研究證實，「ONE TEAM」智能系統與跨部門合作，系統即時更新吸菸病人腎臟功能數據，醫護人員能及時介入管理。不僅提升了戒菸輔導的即時性，有助於預防腎臟疾病發生。

#### Key words :

智能系統、戒菸、慢性腎臟病、跨部門合作

## A Machine Learning Model for the Early Prediction of Acute Kidney Injury During Intensive Care Unit Stay

### 早期預測重症加護病房期間急性腎損傷的機器學習模型

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#### Background :

Acute kidney injury (AKI) negatively affects patient prognosis. The current AKI risk equations derived from logistic regression models lack the precision and timeliness required for guiding therapeutic decisions in intensive care units (ICUs). Herein, we introduce a machine learning model for predicting AKI events in the early stages of ICU admission..

#### Methods :

We retrospectively analyzed the following data of all patients who had been admitted to the ICU of a tertiary medical center in Taiwan between 2009 and 2018: comorbidities, vital signs, and laboratory results upon ICU admission. The random forests and extreme gradient boosting (XGBoost) algorithms were used to construct models for predicting AKI events within 48 h of ICU admission. The SHapley Additive exPlanation (SHAP) values were used to evaluate the importance of each input feature contributing to model performance. Predictive performance was compared between the constructed models and the conventional risk indices.

#### Results :

Of the 10,762 patients included, 6101 (56.7%) developed AKI following ICU admission; 3155 (29.3%) events occurred within 48 h of ICU admission. The highest area under the curve value was noted for XGBoost (0.793), followed by random forests (0.771), persistent AKI risk index (0.703), and modified renal angina index (0.663). The XGBoost model revealed the highest AKI predictivity for serum creatinine levels of  $>2.0$  mg/dL or  $<0.5$  mg/dL before the index admission, followed by elevated Sequential Organ Failure Assessment scores and reduced systolic blood pressure. We found that extremely high or low serum phosphate levels, along with low serum creatinine levels, enhanced the model's positive predictability.

#### Conclusions :

Our early AKI prediction model, which was constructed using extensive data and various clinical features, exhibits superior accuracy and promptness than do other risk prediction models in assessing AKI risk in ICU settings. However, external validation is necessary to evaluate the model's generalizability.

#### Key words :

machine learning; acute kidney injury; prediction model; critical care

## Leveraging Large Language Models for Automated Extraction of Symptoms from Unstructured Hemodialysis Nursing Records

應用大型語言模型自動提取血液透析病患護理紀錄中非結構化症狀

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### Background :

Nursing records contain valuable information about patients' symptoms and complaints, often in unstructured text, which big data studies tend to overlook. Extracting this information is challenging, but large language models (LLMs) can transform unstructured records into structured data, improving comprehensive research.

### Methods :

We analyzed 600 anonymized hemodialysis nursing records from National Cheng Kung University Hospital (Jan 2023 to Aug 2024). Data preprocessing ensured consistency and privacy. LLM was used to detect symptoms like dizziness, nausea/vomiting, muscle cramps, and chest tightness. Prompt engineering enhanced the model's accuracy. Physicians validated the AI's results, and standard statistical methods calculated sensitivity, specificity, precision, recall, and F1-scores.

### Results :

Dizziness was reported 8 times, and all cases were accurately identified by the AI with a sensitivity, specificity, precision, recall, and F1-score of 100%. Nausea/vomiting was reported 3 times, also achieving perfect detection across all metrics. Muscle cramps were reported 19 times, with the AI identifying 18 cases (sensitivity: 94.7%, specificity: 100%, precision: 100%, recall: 94.7%, F1-score: 97.3%); the missed case was due to ambiguous wording. Chest tightness was reported 3 times and correctly identified in all instances. Overall, LLM demonstrated high accuracy and consistency in detecting symptoms.

### Conclusions :

LLMs effectively convert unstructured nursing records into structured data, enabling large-scale research on subjective complaints. Future efforts will enhance symptom detection and model performance for better patient care.

### Key words :

Hemodialysis, large language models, nursing records, structured data, symptoms detection

## Digital Thermostatic Dialysate Fluid Monitoring Device

### 數位恆溫腹膜透析液監控裝置

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#### Background :

腹膜透析為一常見的末期腎臟病替代療法，然而病人在進行腹膜透析技術操作時，經常遭遇以下問題，1. 透析液加溫耗時、溫度不穩定 2. 病人灌液量不準確；3. 透析液混濁判讀不易，可能造成腹膜炎太晚發現而導致嚴重敗血症或其它併發症。因著上述臨床需求，本團隊研發「數位恆溫腹膜透析液監控裝置」(以下簡稱「本裝置」)來進行改善，以期讓病人居家換液時可以有舒適且安全換液過程。

#### Methods :

本裝置主要由電子吊秤模組、恆溫模組、揚聲器模組、鏡頭模組以及 AI 嵌入式系統等模組所構成，在進行透析液引流時本裝置將同時進行透析液加溫，並於腹膜透析藥水注入時，保持裝置腔體內溫度及監控腹膜透析藥水袋袋重變化，當藥水袋袋重低於預定之閾值時，則發出警示訊息，提醒相關人員進行管夾關閉；整體完成換液後將引流透析液，透過拍攝引流袋之影像進行 AI 影像分析袋內色澤及混濁程度，作為輔助判讀相關併發症(如：腹膜炎)之依據。

#### Results :

本裝置在預熱腹膜透析藥水時，可在 20 分鐘內將新的透析藥袋加溫並維持在 37°C，而在藥水注入達到指定注入量時，透過揚聲器模組發出警示訊息提醒病人關閉注入夾管。在將腹腔透析廢液引流到廢液袋後，鏡頭模組用於拍攝廢液袋影像，並藉此影像分析廢液混濁程度，以輔助病人判讀自身是否有任何併發症(例如:腹膜炎)的風險，整體準確率達 97%。

#### Conclusions :

本裝置是目前唯一能夠同時解決上述問題的智慧型裝置並同時兼顧病人舒適及安全的居家裝置，目前臨床上並無此類三合一產品，而此項產品已通過中華民國新型專利(專利字號：M64633)以及申請中華民國發明專利(專利案號：113105959)，本團隊預期本裝置具有龐大潛在優勢，希望透過此產品，協助腹膜透析病人在進行每日常規療程中有舒適且精確的灌液體驗，並利用 AI 演算法辨識引流液，早期發現潛在併發症，以利儘早就醫治療，造福廣大的腹膜透析病人。

#### KeyWords :

腹膜透析、腹膜炎、深度學習

## The association between dioxins with obesity-related indices in a large Taiwanese population study

### 戴奧辛與肥胖相關指數在大型台灣族群研究中的關聯性

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#### Background:

Dioxins, known for accumulating in the fat tissue, may influence obesity. This study aims to explore the association between dioxin exposure and obesity-related indices in a large Taiwanese population.

#### Methods:

A total of 121,364 participants in the Taiwan Biobank (TWB) recruited between 2008 and 2020 were linked to dioxins in the ambient air data estimated by geospatial-artificial intelligence based ensemble mixed spatial model. This study excluded 940 participants who live offshore without dioxins data in the, and the remaining 120,424 participants were enrolled. The dioxins data were compiled as 1-year, 3-year and 5-year averages, recorded prior to the survey year of the TWB of each participant.

#### Results:

Multivariable analysis showed that the 1-year, 3-year and 5-year averages of exposure to dioxins were significantly positively correlated with obesity-related indices including waist-to-height ratio (WHtR), waist-hip ratio (WHR), waist circumference (WC), a body shape index (ABSI), abdominal volume index (AVI), body adiposity index (BAI), body roundness index (BRI), conicity index (CI), and visceral adiposity index (VAI), and central obesity which was defined by WC > 90 cm in men and WC > 80 cm in women, after adjusting for potential confounders.

#### Conclusions:

The dioxins in the air were significantly associated with obesity-related indices including WHtR, WHR, WC, ABSI, AVI, BAI, BRI, CI and VAI, and central obesity in a large Taiwanese population study.

**Keywords:** dioxins, obesity, air pollution, Taiwan biobank

## Exploring the Role of Ketoanalogues in Mortality and Renal Outcomes of Diabetic Kidney Disease Patients: Insights from a Machine Learning Analysis

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### Background :

Diabetic kidney disease (DKD) is a leading cause of chronic kidney disease (CKD) and progression to end-stage renal disease (ESRD), significantly increasing both patient morbidity and mortality. The use of ketoanalogues, which support protein balance while minimizing nitrogenous waste, has emerged as a promising therapeutic strategy in DKD management. Despite their potential, the impact of ketoanalogues on survival rates and kidney function remains unclear. This study utilizes machine learning approaches to investigate the efficacy of ketoanalogue supplementation in enhancing mortality and renal outcomes in DKD patients.

### Methods :

This study applied a machine learning approach to evaluate the impact of ketoanalogues supplementation in diabetic kidney disease (DKD) patients. Clinical data, including renal function indicators, glycemic control metrics, and demographic information, were extracted from electronic health records. Machine learning models, such as random forest, support vector machines, and logistic regression, were implemented to predict the effects of ketoanalogues administration on mortality and renal function outcomes.

### Results :

The machine learning analysis of 1,200 diabetic kidney disease (DKD) patients revealed significant associations between ketoanalogue supplementation and improved renal outcomes. The random forest model demonstrated the best predictive performance, with an accuracy of 87%, sensitivity of 85%, and an AUC of 0.89. Patients receiving ketoanalogues exhibited a 25% reduction in mortality risk compared to those who did not receive supplementation ( $p < 0.001$ ). Renal function outcomes, measured by the rate of eGFR decline, showed a slower progression in the ketoanalogue group (mean annual decline of 2.8 mL/min/1.73m<sup>2</sup> vs. 4.5 mL/min/1.73m<sup>2</sup> in controls,  $p < 0.01$ ). Logistic regression analysis further confirmed that ketoanalogue supplementation was an independent predictor of reduced mortality (OR: 0.75, 95% CI: 0.68-0.83,  $p < 0.001$ ) and slower renal function decline (OR: 0.70, 95% CI: 0.62-0.79,  $p < 0.01$ ). Support vector machines showed similar trends, validating the robustness of the findings. The results suggest that ketoanalogues may play a crucial role in enhancing survival and preserving renal function in DKD patients, particularly when integrated into a low-protein diet.

### Conclusions :

Ketoanalogues supplementation shows a beneficial impact on mortality and renal outcomes in DKD patients, as confirmed by machine learning analysis. The findings underline the potential of ketoanalogues as part of personalized treatment strategies to enhance prognosis in diabetic kidney disease.

**Key words :** Ketoanalogues, diabetic kidney disease, renal outcomes, machine learning

## An under-recognized factor associated with lower risk of frailty progression in patients with diabetic kidney disease: ketoanalogue use

一個被低估的潛在降低腎性衰弱症惡化因素：酮酸氨基酸的使用在糖尿病腎疾病病人

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### Background :

Patients with diabetes kidney disease (DKD) are at risk of developing frailty, leading to functional impairment and poor outcomes. Medications are potential modifiers of such risk. Keto-analogues have been shown to delay dialysis initiation in DKD patients. We investigated whether ketoanalogues use influenced the risk of worsening frailty in this population.

### Methods :

From 840,000 patients with diabetes between 2004 and 2011, we identified those with DKD but without frailty, and divided them into those with and without receiving ketoanalogue, followed by propensity score matching in 1:4 ratio. Worsening frailty was defined as  $\geq 1$  positive FRAIL item increase compared to baseline status during follow-up. We used Cox proportional hazard regression to estimate the probability of worsening frailty, adjusting for demographics, comorbidities, glycemic control, renal function, treatments and medications.

### Results :

The mean age of included patients (n=920) was 57.4 years, with 91.3% having non-dialysis stage 5 chronic kidney disease. Approximately two-thirds had prefrailty. After 3.72 years, 16.6% patients had worsening frailty, but the prevalence of stage 5 CKD did not differ between those without and with worsening frailty. Multivariate analyses, adjusting for confounders disclosed that ketoanalogue users ( $\geq 14$  days) had a significantly lower risk of worsening frailty than non-users (hazard ratio (HR) 0.52, 95% confidence interval (CI) 0.32-0.87). Sensitivity analysis including those received ketoanalogue  $\geq 28$  days showed even greater benefits (HR 0.45, 95% CI 0.26-0.78).

### Conclusions :

Patients with DKD receiving ketoanalogues were less likely to have worsening frailty over time. Our findings uncover a new strategy of ameliorating frailty progression in this population, who already carries a high frailty prevalence.

### Key words :

chronic kidney disease; diabetes mellitus; frailty; ketoanalogue



## Balancing Risks and Benefits: The Impact of Spironolactone on Renal Outcomes in Type 2 Diabetes

### 螺內酯對第 2 型糖尿病患者腎臟結局的影響

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**Background :** In patients with chronic kidney disease (CKD), overactivation of the mineralocorticoid receptor (MR) leads to hypertension and tissue fibrosis. Mineralocorticoid receptor antagonists (MRAs) include steroidal MRAs (e.g., spironolactone and eplerenone) and non-steroidal MRAs (e.g., finerenone). Recently, finerenone has demonstrated renal and cardiovascular benefits in patients with type 2 diabetes mellitus (T2DM) and CKD. Steroidal MRAs have been shown to benefit patients with heart failure. However, research on the use of steroidal MRAs for treating CKD in T2DM remains inconclusive.

**Methods :** We retrospectively collected data from patients with T2DM who were stably using renin-angiotensin system inhibitors (RASi) between 2014 and 2021 at National Cheng-Kung University Hospital in Tainan, Taiwan. From this cohort, we selected patients who were also concurrently using spironolactone. The outcomes of interest included renal events (such as the development of ESRD or the need for renal transplantation and decline in renal function), major adverse cardiovascular events (MACE), occurrence of hyperkalemia and hyponatremia, and changes in proteinuria. We also conducted subgroup analyses to identify which groups exhibited the greatest benefit-to-risk ratios in using spironolactone.

**Results :** After 1:1 propensity score matching, we analyzed 404 spironolactone users and 404 non-users. During the follow-up period, spironolactone users had a higher incidence of composite renal events compared to non-users (63.86% vs. 58.91%; hazard ratio [HR]: 1.27; 95% CI: 1.06–1.51;  $p = 0.0081$ ), higher rate of persisted estimated glomerular filtration rate (eGFR) decline (57.67% vs. 51.73%; HR: 1.31; 95% CI: 1.09–1.58;  $p = 0.0049$ ), and a higher incidence of hyperkalemia (44.1% vs. 34.53%; HR: 1.57; 95% CI: 1.21–2.04;  $p = 0.0007$ ). We also observed a significant decrease in proteinuria among spironolactone users (62.87% vs. 55.69%; HR: 1.34; 95% CI: 1.12–1.60;  $p = 0.0016$ ). There were no significant differences in MACE, occurrence of ESRD or renal transplantation, or hypokalemia between spironolactone users and non-users. In subgroup analysis, we found that spironolactone users with a history of heart failure had a lower trend toward the occurrence of ESRD or renal transplantation.

**Conclusions :** Patients with T2DM who were stably using RASi and spironolactone had higher rates of composite renal events and hyperkalemia, despite a reduction in proteinuria. Patients with a history of heart failure tended to benefit from spironolactone.

**Key words :** type 2 diabetes mellitus (T2DM); chronic kidney disease (CKD); renal composite events; major adverse cardiovascular events (MACE); hyperkalemia; spironolactone

## **Influence of heat stress on Metabolic Syndrome and Cardiometabolic Risk Factors in a Large Taiwan Population Cohort**

### **探討熱傷害對代謝症候群與心血管代謝風險因子的影響**

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#### **Background :**

Metabolic syndrome (MetS) and cardiometabolic risk factors are rising public health concerns in Taiwan, with prevalence rates steadily increasing. As climate change intensifies, extreme heat events and heat stress may exacerbate these risks. This study explores the relationship between heat stress and MetS in a large Taiwanese cohort using geospatial artificial intelligence (Geo-AI), providing insights into how environmental factors contribute to metabolic health.

#### **Methods :**

This study employed a retrospective cross-sectional analysis using data from the Taiwan Biobank (TWB). Wet Bulb Globe Temperature (WBGT) data during midday (11 AM - 2 PM) and work hours (7 AM - 5 PM) were integrated based on participants' residential addresses. We calculated average WBGT levels for 1-year, 3-year, and 5-year periods preceding the survey year. WBGT levels were analyzed using a Geo-AI Ensemble Mixed Spatial Model from 2010 to 2020.

#### **Results :**

A total of 120,424 participants from the Taiwan Biobank (TWB) were included in this study, of which 27,132 (22.5%) were identified as having MetS. The cohort consisted of 35.9% males. Our analysis revealed that higher WBGT averages over 1-year, 3-year, and 5-year periods prior to the survey, during noon hours, were significantly associated with increased risks of MetS and cardiometabolic risk factors. For every 1°C increase in WBGT over the 1-year, 3-year, and 5-year periods, the risk of MetS increased significantly (OR=1.045, 1.047, and 1.049, respectively;  $P<0.05$ ). Similarly, the risk of high blood pressure increased (OR=1.068, 1.066, and 1.059;  $P<0.05$ ), as did the risk of high triglycerides (OR=1.025, 1.046, and 1.047;  $P<0.05$ ). Additionally, WBGT was positively associated with MetS score ( $\beta=0.02974, 0.03079, \text{ and } 0.03206$ ;  $P<0.05$ ) and triglyceride-glucose index ( $\beta=0.00405, 0.00892, \text{ and } 0.01073$ ;  $P<0.05$ ). However, WBGT was not significantly associated with glucose impairment.

#### **Conclusions :**

Higher WBGT levels over 1-year, 3-year, and 5-year periods were significantly associated with increased risks of MetS and cardiometabolic factors, except glucose impairment. These findings underscore the impact of environmental heat on metabolic health, emphasizing the need for further research amid climate change.

#### **Key words :**

Wet Bulb Globe Temperature; Heat stress; Metabolic Syndrome; Cardiometabolic Risk Factors

## Learn new knowledge about sugar control -Using Board Games to Increase Knowledge about Type 2 Diabetes nephropathy

### 玩出控糖新知識-運用桌遊提升第二型糖尿病人腎病變知識

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#### 研究目的：

運用桌遊方式讓病友透過「周遊糖腎心照護地圖」與「錦囊妙計全攻略」，在闖關遊戲中了解自己控糖務必謹「腎」小「心」的相關知識。

#### 研究方法：

排除未完成檢查與問卷者後，共計 36 份。採問卷調查進行分析，問卷內容包含性別、年齡、教育程度、職業、健康行為等；活動內容包含「周遊糖腎心照護地圖」、「錦囊妙計全攻略」等，帶入許多生動有趣教具和遊戲，利用遊戲的方式寓教於樂，讓糖友們經由遊戲過程中，思考並解決各項生活中與血糖相關的問題。

#### 研究結果：

研究結果顯示，參與活動平均年齡為 69.5 歲，以 65~70 歲居多，經由疾病認知講解與遊戲互動介入後，其中以「教育保健相關知識提升」，滿意度達 98% 為最多，意謂民眾認為經由遊戲互動的方式較易提升對於自我照護與疾病的認知。

#### 研究結論：

這項研究顯示，團體遊戲的衛教方式可以在初級衛生教育預防中實施，可以改善糖尿病友對於疾病的控制以及生活方式的改變。許多研究指出有效控糖可以帶來許多益處，希望嶄新和實用的資訊，了解控糖的重要，且可依循藥物、飲食、運動原則和注意事項，有信心的採取具體行動；更期盼病患能採取多元策略，真正有效的預防和控制糖尿病，降低對藥品之依賴。

關鍵字: 桌遊、糖尿病腎病變、團體衛教

## Cost-effectiveness analysis of SGLT2 inhibitors in patients with diabetic nephropathy

### SGLT2 抑制劑用於糖尿病腎病變患者之成本效益分析

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#### 背景：

糖尿病的發病率、死亡率及醫療支出持續上升，造成社會成本增加；糖尿病主要併發症為糖尿病腎病變，對個人及社會經濟帶來嚴重影響，是台灣重要的醫療和公衛議題，評估SGLT2i應用在糖尿病腎病變患者之成本效益對於醫療保健系統資源的優化分配非常重要。

#### 方法：

本研究為回溯性世代研究，研究設計分為兩組，一組為使用SGLT2抑制劑治療糖尿病腎病變的患者，另一組為使用標準治療糖尿病腎病變的患者，進行兩組的臨床成果和成本效益分析，醫療費用以健保給付標準推估，研究對象為2017年1月1日至2022年12月31日於南部某醫學中心體系醫院接受SGLT2i治療糖尿病腎病變的患者，結合臨床特性研究樣本排除懷孕患者、資料不足、樣本中ICD-10編碼錯誤或無法取得相關醫療費用者，使用治療權重倒數機率(Inverse Probability of Treatment Weighting, IPTW)進行樣本的配對以降低研究偏差避免干擾效應的產生；使用馬可夫模型模擬疾病進展過程(循環狀態設定為非重度/重度腎臟衰竭、透析治療及死亡三種，再依據馬可夫循環建立決策樹模型，模型參數中的轉換機率及醫療成本，使用本研究資料庫之真實數據，效用使用文獻數據。

#### 結果：

SGLT2平均醫療成本為NT\$1,140,504，Non-SGLT2平均醫療成本為NT\$796,679，SGLT2相對於Non-SGLT2多0.69QALYs，亦即每增加一個QALY多花費NT\$494,885.76(小於WTP的NT\$982,680)。

#### 結論與建議：

蒙地卡羅模擬法落點皆落在第1象限且在WTP線的右下方，顯示SGLT2i每增加一QALY所增加的成本是小於WTP。SGLT2抑制劑是一種具有成本效益的治療方法，惟目前用於慢性腎臟病的腎臟保護仍未符合健保給付標準，使用上仍需注意健保規範，且SGLT2抑制劑治療會增加生殖泌尿道感染機率，臨床使用時應加強追蹤感染相關症狀。

#### 關鍵字：

SGLT2 抑制劑、糖尿病腎病變、成本效益

## Diabetes and Chronic Kidney Disease Integrated Care: Experience Sharing 糖尿病及初期慢性腎臟病照護整合方案經驗分享

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### Background :

糖尿病對個體健康和公共衛生有深遠影響，病人往往還伴隨多重慢性病，如：心血管疾病、高血壓、慢性腎病等，這些慢性病使得糖尿病病人的管理變得更具複雜及挑戰性，糖尿病及初期慢性腎臟病照護整合方案能使病人提早了解糖尿病與腎臟病的關聯，促進早期診斷和治療，長期持續的管理能夠減少相關併發症，透過衛教師與營養師早期介入提供個別化衛教：包括血糖、高血壓、減少蛋白尿等，減少疾病對病人日常生活的影響，改善其生活品質。本文旨在探討糖尿病及初期慢性腎臟病照護整合方案的管理策略及其管理的重要性。

### Methods :

自 2023 年 7 月起，本院採用多重策略透過以下措施啟動整合方案：1.定期團隊會議和討論，訂定相關改善計畫內容 2.全院性宣導，請各醫療科室配合：由新陳代謝科 8 位醫師率先開始收案，再依計畫推行至腎臟科及家醫科醫師進行配合收案。3.醫療系統：改善醫療資訊系統並適時修改對應 4.創造支持性的環境：加強院內門診區糖尿病腎臟病照護相關環境佈置，門診區撥放衛教影片，張貼海報於公告欄 5.完善的示教具：布置衛教櫥窗及環境 6.強化行動力：定期辦理團體衛教講座及社區篩檢，將觀念推廣至來院及社區民眾。

### Results :

本院自 2023 年 7 月開始收案，至 2024 年 6 月底收案量 1225 人次，新陳代謝科收案 494 人，腎臟科收案 196 人，共計 690 人，男性 317 人，女性 373 人，平均年齡  $68.6 \pm 10.2$  歲，平均罹病年  $13.8 \pm 8.8$  年，其中使用心血管藥物人數占 26.8%，使用降血脂藥物人數占 37.9%，平均 BMI  $26.5 \pm 4.97$  kg/m<sup>2</sup>，接受糖尿病及初期慢性腎臟病照護整合方案介入前收縮壓  $133 \pm 14.8$  舒張壓  $77 \pm 13.5$  mmHg、AC Sugar  $133.6 \pm 37.3$  mg/dl、Creatinine  $0.98 \pm 0.4$  mg/dl、eGFR  $71.8 \pm 21.8$  ml/min/1.73m<sup>2</sup>；接受糖尿病及初期慢性腎臟病照護整合方案介入 6 個月後收縮壓  $135 \pm 17.0$  舒張壓  $76 \pm 12.4$  mmHg、AC Sugar  $134.3 \pm 37.1$  mg/dl、Creatinine  $0.97 \pm 0.27$  mg/dl、eGFR  $71.2 \pm 21.3$  ml/min/1.73m<sup>2</sup>、其中 A1C 7.37 % 下降至 7.25 %、Urine albumin creatinine ratio(UACR) 153.2 mg/g 下降至 142.0 mg/g、LDL 84.2 mg/dl 下降至 82.9 mg/dl，有改善趨勢，雖統計並未達到顯著差異 (P>.05)，仍需長期追蹤其效益。團隊每月舉行檢討會議，由新陳代謝科與腎臟科共同參與，訂定新目標與資訊改善，優化收案流程。

### Conclusions :

糖尿病及初期慢性腎臟病照護整合方案管理介入後發現 A1C、Urine Albumin creatinine ratio(ACR)、LDL 有改善趨勢，未來仍須持續追蹤結果；糖尿病及初期慢性腎臟病照護整合方案是目前健保新的方案亦是本院新的挑戰，門診病人可能同時具有糖尿病或慢性腎臟病醫療給付方案資格，為縮短病人等候時間及重複衛教，同時接受營養師、糖尿病與腎臟病的衛教服務，在短時間內獲得完整資訊，幫助病人了解糖尿病與慢性腎病的重要性，並達成個別化之控制目標，也減少病人就醫次數與醫療費用。未來將持續推動並增加家庭醫學科、心臟內科、神經內科，進行糖尿病與初期慢性腎臟病整合管理。

### Key words :

糖尿病、慢性腎臟疾病、醫療團隊

糖尿病對個體健康和公共衛生有深遠影響，病人往往還伴隨多重慢性病，這些慢性病使得糖

尿病病人的管理變得更具複雜及挑戰，本旨探討糖尿病及初期慢性腎臟病照護整合方案的管理策略及其管理的重要性。本院自2023年7月起，透過1.定期團隊會議和討論2.全院性宣導3.醫療資訊系統4.創造支持性的環境5.完善的示教具6.定期辦理團體衛教講座，至2024年6月底收案量已達1225人次，共計690人，新陳代謝科收案494人，腎臟內科收案196人，男性為317人，女性為373人，平均年齡  $68.6 \pm 10.2$ 歲，平均罹病年  $13.8 \pm 8.8$ 年，其中A1C 7.37%下降至7.25%、Urine albumin creatinine ratio(UACR) 153.2 mg/g下降至142.0 mg/g，LDL84.2 mg/dl下降至 82.9 mg/dl，有改善趨勢，但統計並未達到顯著差異 ( $P>.05$ )，顯示仍需長期追蹤其效益，糖尿病及初期慢性腎臟病照護整合方案是目前健保新的方案亦是本院新的挑戰，未來也將持續推動並增加家庭醫學科、心臟內科、神經內科，進行糖尿病與初期慢性腎臟病整合管理。

## Lower Estimated Glomerular Filtration Rates Enhance Occurrence of Metabolic Syndrome and Insulin Resistance in Aged People with Early Chronic Kidney Disease

較低的估計腎小管過濾率可預估老年早期慢性腎病患者代謝症候群的加劇和胰島素抵抗的發生

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### Background :

Chronic kidney disease (CKD) is a common disease over the world. Advanced CKD (estimated glomerular filtration rate, eGFR, less than 45 ml/min) is associated with various metabolic problems. Patients with early CKD stages (eGFR  $\geq$  45 ml/min), however, usually showed mild comorbidities. The relationship between the change of metabolic parameters and eGFR in early CKD stages is still not clear.

### Methods :

From one-single health check-up clinic 39,865 people aged more than 65 years old were divided into 4 quartiles by eGFR levels. Blood hemoglobin, creatinine, glucose, lipid profiles, body mass index, waist circumference, blood pressure, and insulin resistance were checked, calculated, and analyzed

### Results :

The blood hemoglobin levels were significantly positively correlated with eGFR. Blood glucose, lipid profiles, body mass index, waist circumference, blood pressure, and insulin resistance were significantly negatively correlated with eGFR values.

### Conclusions :

Lower eGFR may enhances the occurrence of anemia, metabolic syndrome, and insulin resistance in aged people with early CKD.

### Key words :

Anemia, Chronic kidney disease, Insulin resistance, Metabolic syndrome

## Circulating short chain fatty acids and kidney outcomes in type 2 diabetes mellitus

### 第二型糖尿病病患其血清短鏈脂肪酸與腎臟預後之相關性

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#### Background :

Type 2 diabetes (T2D) is the major cause of chronic kidney disease and end-stage kidney disease (ESKD). The influence of short chain fatty acids (SCFA) on kidney outcomes in T2D remains unclear. The aim of this study is to examine the association between fasting serum SCFA levels and adverse kidney outcomes in T2D patients.

#### Methods :

Between October 2016 and June 2020, patients with T2D were recruited and followed until December 2021. Nine kinds of serum SCFA levels were assessed using liquid chromatography-mass spectrometry. The primary kidney outcomes were doubling of serum creatinine levels or progression to ESKD; the secondary kidney outcome was estimated glomerular filtration rate (eGFR) decline  $> 5$  ml/min/1.73m<sup>2</sup> per year or a rapid 25% decline in eGFR within follow-up period.

#### Results :

Among 480 T2D patients, the mean age was  $62.0 \pm 11.1$  years and 54.6% were male. Over a mean follow-up period of 3.9 years, 20 patients (4.2%) reached doubling of serum creatinine levels or progression to ESKD. T2D patients with the tertile 3 of serum propionate, butyrate and formate levels had reduced 86%, 79%, and 75% adjusted risk of reaching doubling of serum creatinine or progression to ESKD compared to those with tertile 1 and 2 of serum propionate, butyrate and formate levels. Adjusted logistical analysis revealed that T2D patients with the tertile 3 of serum propionate, butyrate, formate and valerate levels had decreased 62%, 59%, 54%, and 58% risk for eGFR decline  $> 5$  ml/min/1.73m<sup>2</sup>/year or a rapid 25% decline in eGFR within follow-up period.

#### Conclusions :

T2D patients with high circulating SCFA levels are at lower risk of reaching adverse kidney outcomes, especially propionate, butyrate and formate. SCFAs are potential biomarkers for kidney progression in T2D patients.

#### Key words :

Short chain fatty acid, kidney outcomes, type 2 diabetes



## Explore analysis complete cell count and cerebral white matter hyperintensity in patients with chronic kidney disease

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### Background :

Chronic kidney disease (CKD) is a multifaceted condition with documented effects on renal and cardiovascular health, now increasingly recognized for its intricate association with cognitive dysfunction and cerebrovascular complications. This study aimed to investigate the correlation between CKD and cognitive dysfunction by utilizing brain magnetic resonance imaging (MRI) scans.

### Methods :

In this research, CKD patients were divided into early (stages 1-2) and advanced (stages 3-5) groups based on estimated glomerular filtration rate (eGFR). The analysis of brain MRI scans revealed that the advanced CKD group exhibited significantly higher Fazekas scale scores for both periventricular and deep white matter lesions compared to the early CKD group. Furthermore, associations were identified between elevated white blood cell count, decreased hemoglobin levels, and higher Fazekas scale scores in the advanced CKD group.

### Results :

This study enrolled 1,738 patients with chronic kidney disease (CKD) to assess the association between complete blood counts and white matter lesions. Patients were categorized into early (CKD 1-2; n=181) and advanced (CKD 3-5; n=1,557) CKD groups based on disease stage. Higher white blood cell counts and lower hemoglobin levels were associated with more severe periventricular white matter lesions in the total CKD (OR 1.067, p=0.001; OR 0.924, p=0.002) and advanced CKD groups (OR 1.070, p=0.001; OR 0.942, p=0.033). Association between Fazekas scale of periventricular lesions and deep white matter lesions with acute ischemic stroke were much more correlated with advanced CKD group than with early CKD group. These findings suggest a robust connection between CKD, cognitive dysfunction, and cerebrovascular complications, potentially attributed to inflammatory processes and anemia commonly observed in CKD patients.

### Conclusions :

In conclusion, this research underscores the importance of understanding the intricate relationship between CKD and cerebrovascular complications for enhanced management and improved patient outcomes. Elevated white blood cell count and anemia emerged as significant factors associated with cognitive dysfunction in CKD patients, highlighting the need for further research to develop targeted interventions and preventive strategies

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**Key words** : Chronic kidney disease, cognitive dysfunction, complete cell count