論文發表注意事項

【口頭論文發表】

- 試片室：7 樓 701C 會議室及 701G 會議室外小房間
- 口頭報告者請務必於該場次開始前 30 分鐘將隨身碟自行攜帶送至試片室進行測試，以避免中途影響會議速度進行，請先行測試檔案與隨身碟讀取正常。
- 一般論文口頭發表，每題 12 分鐘(報告 10 分鐘，討論 2 分鐘)，請各演講者務必控制報告時間，演講時間結束後即開燈結束演講。
- 學會於90年新增『年會論文優秀論文獎』，口頭發表及壁報發表分別評分。優秀論文獎得獎名單於會員大會公佈並頒獎。
- 得獎公佈—會員大會
  時間：112 年 12 月 10 日(星期日)上午 11:30 至 12:00 (請得獎者務必在現場)
  地點：701B會議室

- Our Preview Room are located outside of conference rooms 701B and 701F
- ***Oral Presentation***

Presentation Time
12 Minutes: including 10 minutes of presentation and 2 minutes of Live Q&A
Presentation Specification
***All oral presentation must Present LIVE.** File Type: **PPT or PPTX** only File Name: Oral_AbstractID_Name (e.g: OralPresentation1_25_Lin)

Oral Presentation 7 (Chinese)

December 9 (Saturday), 2023　10:30 ~ 12:00　Room 5 (702)

【Clinical-5】 *Chair(s)：李柏蒼/ Po-Tsang Lee、游棟閔/ Tung-Min Yu*

10:30—10:42

1. Artificial intelligence risk prediction systems effectively reduces the incidence of intradialytic hypotension
Chi-Ya Huang
Nephrology Department of Chi Mei Medical Center

10:42—10:54

2. Use of super high flux hemodialysis，for treatment of HD Patients with uremic pruritus and perforating dermatosis
Cheng-Ching Peng
Guan Hua Hospital hemodialysis center

11:06—11:18

4. Machine learning-based prediction of cardiac dysfunction in hemodialysis patients through blood proteomics analysis
Ping-Hsun Wu[1,2], Jen-Ping Lee[2], Yu-Lin Chao[1], Yi-Wen Chiu[1,2], Shang-Jyh Hwang[1,2], Yi-Ting Lin[2,3], Mei-Chuan Kuo[1,2]
[1]Division of Nephrology, Department of Internal Medicine, KMUH [2]Faculty of Medicine, College of Medicine, KMU [3]Department of Family Medicine, KMUH

11:18—11:30

5. To Establish the Rope Ladder Technique of AV Access: the Three Year Experience in a District Hospital
Ya-Ping Chang[1], Tzu-Yu Chen[1], Yuan-Yang Hsu[1], Mei-Chen Chou[1], Hsiao-Ting Liao[1], Hsin-Yu Liao[1], Nai-Chi Kuo[1], Chen-Sen Huang[2], Ya-Ping Chang[1]
[1]Douliou Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation Department of Nursing
[2]Dalin Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation Department of Nephrology

11:30—11:42

6. Deep radiomics revealed distinct anatomical distribution of aortic calcification in patients with chronic kidney disease
Chia-Ter Chao[1], Hsiang-Yuan Yeh[2]
[1] Division of Nephrology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan
[2] School of Big Data Management, Soochow University, Taipei, Taiwan

【Oral Presentation 7】
【Clinical-5】 Room 5 (702)

1

Artificial intelligence risk prediction systems effectively reduces the incidence of intradialytic hypotension

Chi-Ya Huang
黃琪雅[1], 黃惠暄[2], 莊秋萍[3], 劉忠峰[4], 沈郁婷[5], 陳佳蓉[6], 楊翼寧[7]
Nephrology Department of Chi Mei Medical Center
[1]奇美醫院腎臟科總醫師、[2]奇美醫院洗腎室護理長、[3]奇美醫院洗腎室護理師、[4]奇美醫院智慧醫療中心主任、[5]奇美醫院 AI 工程師、[6]奇美醫院資訊室組長、[7]奇美醫院腎臟科主治醫師

Background:
About 20-30% of hemodialysis patients suffer from symptomatic intradialytic hypotension (IDH), which can result in organ damage and higher mortality rates. This study aims to harness artificial intelligence (AI) to manage big data and challenges during dialysis. It monitors dialysis parameters and patient data, providing timely alerts to enable early nursing interventions, ultimately enhancing the safety and quality of dialysis by preventing low blood pressure episodes in hemodialysis patients.
Methods:
Spanning September 1, 2020, to December 31, 2020, we collected around 68,552 medical records from Chi Mei Medical Center's Hemodialysis Unit. This dataset encompassed diverse patient information, including dialysis parameters, vital signs, baseline characteristics, laboratory test values, and medical histories. Analyzing this data, an AI risk prediction system was developed for predicting IDH. The changes in incidence of IDH after the implementation of AI system were assessed using two-sample t-test and Chi-square test.
Results:
After gender and age matching (n: 16692), the mean age was 64.7 years, with 43.8% female. From January to April 2021, before the implementation of AI system, 3051 patients experienced IDH (18.3%). By January to April 2022, after AI system prediction, only 2684 patients experienced IDH and the total incidence decreased to 16.1% with statistical significance (P-value <0.001). Furthermore, regarding the severity of IDH, in the period from January to April 2022, the proportion of patients experiencing IDH three or more times during a single dialysis was 1.2%. Comparing to the proportion from January to April 2021 (1.6%), this reduction is statistically significant (P-value <0.001).
Conclusions:
The results of this study demonstrate that the "AI Risk Prediction System" accurately captures the dialysis status of patients. Meanwhile, the AI system significantly reduces the incidence and severity of IDH.
Key words: Hemodialysis, Intradialytic hypotension, artificial intelligence, AI

2

Use of super high flux hemodialysis，for treatment of HD Patients with uremic pruritus and perforating dermatosis

以超高效率血液透析法，治療透析患者的尿毒性皮膚搔癢症和穿透性皮膚病

Cheng-Ching Peng
彭正清
Guan Hua Hospital hemodialysis center
彰化市冠華醫院血液透析中心

背景: 透析患者的尿毒性皮膚搔癢症和穿透性皮膚病，一直是腎臟科及皮膚科非常困擾的問題，因為其致病機轉尚未完全明瞭，某類尿毒素的累積是其中可能性之一，且目前治療效果並不理想。雖然我們中心是全部使用高效率血液透析，還是有患者出現了上述症狀，今年由於有超高通量膜(Super high flux membrane)上市，所以我們嘗試以超高通量膜血液透析的方式來治療這些患者。

方法: 從 2023 年 3 月至 7 月，共有 5 位患者，男性 4 位女性 1 位，年齡從 45 至 92 歲，透析期間為 3 至 15 年，出現經藥物治療無效的皮膚搔癢症，其中 3 位合併穿透性皮膚病，接受了超高效率血液透析法的治療。我們使用的超高通量膜的透析器是 Elisio 21HX Nipro，所有的患者皆每周透析 3 次，每次 4 小時，透析處方及設定與之前的高效率血液透析方式相同。

結果: 這些患者們都成功的轉換成超高效率血液透析，所有患者們的症狀都得到改善，其中皮膚搔癢的症狀在 2 周後即改善，穿透性皮膚病 2 個月後明顯改善。在經過 3 至 6 個月的治療後，其中 4 位患者因症狀消失改回高效率血液透析，1 位患者雖然已無皮膚搔癢症，但因為尚有少量的穿透性皮膚病，未完全消失，所以仍維持在超高效率血液透析中。5 位患者血清白蛋白的平均濃度，跟高效率血液透析時相當，所以 Elisio 21HX Nipro 透析器，沒有造成患者們白蛋白的流失。

結論: 使用 Elisio 21HX Nipro 透析器的超高效率血液透析，可以有效的治療患者們的尿毒性皮膚搔癢症和穿透性皮膚病變。 尿毒性皮膚搔癢症比穿透性皮膚病容易治療，且造成此症狀的尿毒素，可能分布在中大分子的行列中。 其他廠牌的超高通量膜透析器血液透析或血液透析過濾術，是否對此病變具有類似的療效，值得大家共同評估。

關鍵字: 超高效率血液透析(Super high flux hemodialysis)、尿毒性皮膚搔癢症(Uremic pruritus)、穿透性皮膚病(perforating dermatosis)

4

Machine learning-based prediction of cardiac dysfunction in hemodialysis patients through blood proteomics analysis

利用機器學習模型來分析血中蛋白質體學去預測血液透析患者的心臟功能障礙

Ping-Hsun Wu[1,2], Jen-Ping Lee[2], Yu-Lin Chao[1], Yi-Wen Chiu[1,2], Shang-Jyh Hwang[1,2], Yi-Ting Lin[2,3], Mei-Chuan Kuo[1,2]

吳秉勳[1,2], 李任評[2], 趙祐麟[1], 邱怡文[1,2], 黃尚志[1,2], 林憶婷[2,3], 郭美娟[1,2]

[1]Division of Nephrology, Department of Internal Medicine, KMUH [2]Faculty of Medicine, College of Medicine, KMU [3]Department of Family Medicine, KMUH

[1]高醫附設醫院腎臟內科, [2]高醫醫學院醫學系, [3]高醫附設醫院家庭醫學科

Background：

Cardiac function predicts mortality among individuals undergoing hemodialysis (HD). Assessing cardiac function should ideally be both convenient and efficient. Blood sampling tentatively emerges as an accessible approach, potentially offering insights for evaluating cardiac function. We cautiously harnessed cardiovascular proteomics with machine learning (ML) techniques to explore the feasibility of forecasting cardiac dysfunction in HD patients.

Methods：

A cohort of 347 HD participants was enrolled, and determined cardiac function by echocardiography. Proximity extension assays performed a comprehensive measurement of 184 proteins. Subsequently, machine learning techniques were performed to develop an optimized model for predicting cardiac dysfunction. The prediction model's performance was evaluated using the AUC. The SHAP method was employed to identify crucial variables for predicting cardiac dysfunction.

Results：

Encompassing 184 proteins and 34 standard clinical variables within our analytical framework, a better prediction of the "proteomics" than the "routine clinical and laboratory variables" was found among various machine learning techniques, including CART, LASSO, random forest, Ranger, and XgBoost models. Applying LASSO and XgBoost for feature selection, the NT-proBNP emerged as the foremost contributor, followed by the CHIT1, ACE2, and MMP-2 in determining cardiac dysfunction. This alignment was reaffirmed by the SHAP-based elucidation of the XgBoost model.

Conclusions：

Cardiovascular proteomics demonstrated a superior prediction for cardiac dysfunction compared to clinical variables based on machine learning techniques. The NT-proBNP and CHIT1 are vital proteins to predict heart dysfunction in HD patients.

Key words：hemodialysis, machine learning, proteomics, cardiac dysfunction

5

To Establish the Rope Ladder Technique of AV Access : the Three Year Experience in a District Hospital

建置血液透析病人血管通路繩梯式穿刺技術三年之經驗

Ya-Ping Chang[1], Tzu-Yu Chen[1], Yuan-Yang Hsu[1], Mei-Chen Chou[1], Hsiao-Ting Liao[1], Hsin-Yu Liao[1], Nai-Chi Kuo[1], Chen-Sen Huang[2], Ya-Ping Chang[1]

張雅萍[1]黃振森[2]許鴛鴦[1]周美珍[1]廖曉婷[1]廖欣瑜[1]郭乃綺[1]陳姿佑[1]張雅萍[1]

[1]Douliou Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation Department of Nursing

[2]Dalin Tzu Chi Hospital,Buddhist Tzu Chi Medical Foundation Department of Nephrology

[1]佛教斗六慈濟醫院 [2]佛教大林慈濟醫院

Background：

血管通路是長期血液透析病人之第二生命，動靜脈瘻管穿刺技術的適當性，是一項極具挑戰性之技術，因其關係血液透析品質與瘻管使用年限。護理師必須具備正確的瘻管評估知識及正確的瘻管穿刺技能，才能提供病人安全且適當的穿刺技術，以降低動靜脈瘻管穿刺失敗事件之發生，並提供優質的透析服務。

Methods：

透過實證文獻搜尋，建置血管通路繩梯式穿刺技術，並計畫兩階段實施由穿刺 6 點延伸至穿刺 12 點。首先成立讀書會研讀 BRS_英國腎臟學會 Standard 及 KDOQI Guideline 學習繩梯式穿刺技術，成立穿刺小組，設定穿刺輪替規範及血管穿刺計畫、製作交班工具:不走針看板、訂定瘻管施打順序、建置瘻管異常評估：瘻管異常評估量表及啟動轉診機制；人員在職教育包含血管超音波解析、個案討論等。

Results：

經由專案實施改善後，110 年度瘻管穿刺方式:區域式穿刺占 20%、繩梯式穿刺占 76%、依病人意願占 4%；第一階段血管通路繩梯式穿刺 6 點建置完成率達 58%，111 第二階段血管通路繩梯式穿刺 12 點建置完成率達 72%；瘻管穿刺失敗率年平均 0.23%，瘻管總感染密度 0.01‰。

Conclusions：

血管通路是腎友第二生命，而護理人員角色為照護者也是瘻管功能評估的重要執行者，透過培養多種不同動靜脈廔管穿刺技能，提高血管通路的使用年限，降低合併症產生，也提升護病信任感。

Key words：

血管通路穿刺技術、繩梯式穿刺技術

6

Deep radiomics revealed distinct anatomical distribution of aortic calcification in patients with chronic kidney disease

深度影像組學分析可協助慢性腎臟病病人偵測主動脈鈣化偏好位置

Chia-Ter Chao[1], Hsiang-Yuan Yeh[2]

趙家德[1], 葉向原[2]

[1] Division of Nephrology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan

[2] School of Big Data Management, Soochow University, Taipei, Taiwan

[1] 臺灣大學醫學院附設醫院內科部腎臟科 [2] 東吳大學巨量資料管理學院

Background：

Patients with chronic kidney disease (CKD) have an increased risk of mineral bone disorder (MBD), among which vascular calcification (VC), constitutes an important component. Recent understandings emerged that VC systemically involves almost all vessels, albeit to different degrees. VC involves the entire layers of vascular tissues, in which endothelial and medial involvement exhibit the most pathophysiological influences. These findings likely suggest that VC is a heterogeneous pathological entity. We previously established a chest radiography-based radiomic approach for capturing aortic calcification among different at-risk population. In this pilot attempt, we aimed to examine whether our approach could identify differentially affected aortic segments among those presented with VC.

Methods：

Our deep radiomic approach consisted of a classification method using the attention mechanism built on a deep learning neural network. We first trained the network architecture in a large chest radiography dataset, followed by an ensemble strategy. We initialized the focus on the target domain(s), which included potentially calcified areas, with fine-tuning based on other smaller datasets. Subsequently, we divided substrate images into subparts with grid-based specifications accompanied by numeric values. These data summarized radiomics features generated from deep learning-assisted attention mechanisms. We used boxes to indicate regions more significantly attentioned in patients with at least stage 3b CKD comparing to those without CKD. Finally, we visualized the attention of the network by extracting the targeted areas.

Results：

More than 11,000 individual chest radiographic films from general population were analyzed as the training set, among which 3.3% had calcification, whereas another 59 patients with at least stage 3b or higher CKD were also harnessed for comparison (61% with calcification). Differentially attentioned areas between general population and those with advanced CKD were obtained after deep learning. Activated areas, or differentially calcified areas in CKD patients potentially included ascending aorta, carotid, and inter-diaphragmatic areas of thoracoabdominal aortas. Statistical analysis revealed inter-diaphragmatic areas exhibited the highest radiomic feature values, followed by carotid vessels and ascending aortic region.

Conclusions：

Assisted by deep radiomics, we were able to show that certain large vessel segments as well as branch vessels were more likely to be influenced by calcification among those with CKD than those without. These findings may pave the way toward elucidating how we should screen for VC in patients with CKD.

Key words： Chronic kidney disease; deep radiomics; deep learning; mineral bone disorder; vascular calcification