

## Oral Presentation (Chinese)

December 14, 2024 (Saturday) 10:30 ~ 11:30

Venue : Room 6 (鳳杯講堂)

【Oral-6】 Chair(s) : 李柏蒼/ Po-Tsang Lee、游棟閔/ Tung-Min Yu

- 10:30—10:42 1. Real-World Comparison in Orthopedic Outcomes between of Parathyroidectomy and Calcimimetics in Secondary Hyperparathyroidism for End-Stage Renal Disease  
Yi-Chou Hou<sup>1</sup>, Cai-Mei Zheng<sup>2</sup>, Ko-Lin Kuo<sup>3</sup>, Cheng-Yi Wang<sup>4</sup>, Kuo-Cheng Lu<sup>3</sup>  
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<sup>4</sup>Department of Pulmonary Medicine, Cardinal Tien Hospital, New Taipei City, Taiwan
- 10:42—10:54 2. Clinical Applications of Super High-Flux Hemodialysis  
Cheng-Ching Peng  
Kwan Hua Hospital, Changhua City, Taiwan
- 10:54—11:06 3. Efficacy and Safety of Lipid-lowering Therapy in Patients Receiving Maintenance Dialysis: A Systematic Review and Meta-analysis  
Yi-Chih Lin<sup>1,2</sup>, Tai-Shuan Lai<sup>1</sup>, Yu-Hsiang Chou<sup>1</sup>, Shuei-Liong Lin<sup>1</sup>, Yu-Kang Tu<sup>3</sup>  
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<sup>3</sup>Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan
- 11:06—11:18 4. Hyperkalemia in Real-World Patients Under Continuous Medical Care in Taiwan  
Mei-Yi Wu<sup>1,2,3</sup>, Kuan-Hung Lin<sup>1,2,3</sup>, Min-Kuang Tsai<sup>1,3</sup>, Phung-Anh Nguyen<sup>4,5,6,7</sup>, Shiue-Ming Lin<sup>7</sup>, Yang Chieh<sup>7</sup>, Jason C. Hsu<sup>5,6,7,8</sup>, Mai-Szu Wu<sup>1,2,3</sup>  
<sup>1</sup>Division of Nephrology, Department of Internal Medicine, Shuang Ho Hospital, Taipei Medical University, Taiwan  
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<sup>8</sup>International PhD Program in Biotech and Healthcare Management, College of Management, Taipei Medical University, Taipei, Taiwan
- 11:18—11:30 5. Impact of Different ACEI/ARB Resumption Timing on Post-AKI Outcomes  
Jia-Jin Chen<sup>1,2,3</sup>, Cheng-Chia Lee<sup>1,2</sup>, Chieh-Li Yen<sup>1,2</sup>, Ming-Jen Chan<sup>1,2</sup>, Yung-Chang Chen<sup>1,2</sup>, Chih-Hsiang Chang<sup>1,2,3</sup>  
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**Real-world comparison in orthopedic outcomes between of parathyroidectomy and calcimimetics in secondary hyperparathyroidism for end-stage renal disease**  
**副甲狀腺切除術與擬鈣劑對續發性副甲狀腺亢進產生骨相關併發症的現實世界比較**Yi-Chou Hou<sup>1</sup>, Cai-Mei Zheng<sup>2</sup>, Ko-Lin Kuo<sup>3</sup>, Cheng-Yi Wang<sup>4</sup>, Kuo-Cheng Lu<sup>3</sup>  
侯羿州<sup>1</sup> 鄭彩梅<sup>2</sup> 郭克林<sup>3</sup> 王誠一<sup>4</sup> 盧國城<sup>3</sup><sup>1</sup>Department of Internal Medicine, Cardinal Tien Hospital, New Taipei City, Taiwan<sup>2</sup>Division of Nephrology, Department of Internal Medicine, Taipei Medical University - Shuang Ho Hospital, New Taipei City, Taiwan<sup>3</sup>Department of Nephrology, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, New Taipei City, Taiwan<sup>4</sup>Department of Pulmonary Medicine, Cardinal Tien Hospital, New Taipei City, Taiwan<sup>1</sup>耕莘醫院腎臟科 <sup>2</sup>雙和醫院腎臟科 <sup>3</sup>台北慈濟腎臟科 <sup>4</sup>耕莘醫院胸腔科**Background :**

Background and hypothesis.

Secondary hyperparathyroidism (SHPT) was associated with bone loss and excessive extrasosseous calcium deposition in patients with end-stage renal disease (ESRD). Parathyroidectomy (PTx) and calcimimetics (CAMs) are therapeutics targeting the parathyroid gland, but the comparison between the two managements is lacking. This study aims to compare the clinical outcomes between these two treatments.

**Methods :**

The TriNetx database was analyzed, focusing on patients with ESRD who were divided into two groups based on their treatment one year after starting maintenance dialysis: those who had PTx and those who received CAMs (CAMs). Patients receiving both treatments were excluded. After matching for age, gender, race, and comorbidities, 12,547 individuals per group were compared for mortality, major adverse cardiovascular events (MACE), and fractures over five years. Statistical significance was set at a familywise error-corrected p-value of less than 0.05.

**Results :**

In the cohort of ESRD patients, those who underwent PTx had a comparable overall mortality risk to those treated with CAMs over five years. However, the PTx group had a lower risk of MACE but a higher risk of fractures. Hyperphosphatemia was associated with reduced mortality in the PTx group. Furthermore, parathyroid hormone (PTH) levels between 300-599 pg/mL correlated with a decreased risk of MACE in the PTx group and a lower risk of fractures in the CAMs group.

**Conclusions :**

Overall mortality risk was similar for patients undergoing PTx and those treated with CAMs.

However, PTx reduced the risk of major adverse cardiovascular events (MACE), whereas CAMs protected against fractures.

**Key words :**

Calcimimetics (CAMs), End Stage Renal Disease (ESRD), Fracture, Parathyroidectomy (PTx), Secondary Hyperparathyroidism (SHPT), Morality.

## Clinical Applications of Super High-Flux Hemodialysis

### 超高效率血液透析法的臨床應用

Cheng-Ching Peng

彭正清

彰化市冠華醫院血液透析中心

**背景:** 本中心自 2012 年起就全面使用高效率(High-Flux)血液透析，雖然發現慢性腎病相關性搔癢症(CKD-aP)的患者比低效率(Low-Flux)血液透析時發生率較低，但仍然困惱著 15 至 30% 的病人，另有 5 至 10% 的患者則患有後天穿透性皮膚病(Acquired perforating dermatosis)。最近由於有超高效率透析器(Super High -flux dialyzer)在台灣上市，所以我們嘗試以超高效率血液透析(Super high-flux HD)的方式來治療這類患者。相同的做法在歐洲和美國被稱為中截除量透析器(Medium Cut-Off Dialyzer)與延展性血液透析術(Expanded HD)。超高效率透析器與中截除量透析器跟高效率透析器最大的差別是尿毒素裏大中分子(25-58kDa)的清除率，前者比後者多約一倍。

**方法:** 從 2023 年 3 月到 2024 年 9 月共有 12 位患者因為皮膚搔癢症或合併穿透性皮膚病接受了超高效率血液透析，其中 5 位是重度皮膚搔癢症，另外 7 位還合併不同程度的穿透性皮膚病。他們的平均年齡為  $64.1 \pm 17$  歲(分布 39 至 93)其中男性 9 位女性 3 位。我們使用的超高效率透析器是 Elisio 21HX Nipro，患者的透析處方及設定與之前的高效率血液透析方式相同，透析時間為 4 小時每周 3 次。療程為當患者們症狀消失後隔月即恢復到高效率血液透析，並且觀察病情是否復發或多久後復發。

**結果:** 這 12 位患者都成功的從高效率血液透析轉換成超高效率血液透析，皮膚搔癢的症狀在滿 2 周後即改善，穿透性皮膚病在 1 至 2 個月後明顯改善。皮膚搔癢症的患者約 2 至 3 個月改回高效率血液透析，穿透性皮膚病的患者約在 4 至 6 個月即可改回高效率血液透析，經過 6 個月以上的觀察只有一位患者穿透性皮膚病復發但是嚴重度降低。治療期間有 4 位患者(33%)在第 4 及第 6 個月治療時出現數次手腳抖動及躁動不安的症狀，胸悶低血壓，心悸等不舒適的現象，經隔次改回高效率血液透析，數日後症狀即消失。

**結論:** 超高效率血液透析，可以有效的治療透析患者的慢性腎病相關性搔癢症(CKD-aP)和後天穿透性皮膚病(Acquired perforating dermatosis)，經過適當治療後，沒有症狀的患者不需要持續使用本透析法，可改回高效率血液透析。

## Efficacy and safety of lipid-lowering therapy in patients receiving maintenance dialysis: A systematic review and meta-analysis

### 降脂治療對於透析患者的效應和安全性:系統性回顧和統合分析

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#### Background and objectives:

Lowering-lipid therapy (LLT) has been shown to help prevent poor cardiovascular outcomes in non-dialysis chronic kidney disease patients. The efficacy and safety of LLT in patients receiving dialysis remain unclear.

#### Design, setting, participants, and measurements:

A systematic review and meta-analysis of randomized controlled trials (RCTs) and observational studies was conducted to evaluate the protective effect and safety of the LLT in patients with dialysis. The PubMed, Embase, and Cochrane Library databases were systematically searched for relevant studies published before May 31, 2024. The primary outcome was all-cause mortality. The secondary outcomes comprised the incidence of major adverse cardiovascular events (MACEs), changes in lipid profiles, and safety.

#### Results:

Eleven eligible RCTs and nine observational studies with 137,307 participants with dialysis were included. Nineteen of the included studies had a treatment group with a statin, and one RCT had a treatment group with statin plus ezetimibe. Compared with the control group, statin therapy significantly reduced all-cause mortality (risk ratio [RR] 0.79, 95% confidence interval [CI], 0.69 to 0.90) and MACEs (RR 0.88, 95% CI, 0.80 to 0.97). Statin had beneficial effects on serum total cholesterol (weighted mean difference (WMD)  $-35.31$  mg/dL, 95% CI,  $-68.33$  to  $-2.29$  mg/dL), and low-density lipoprotein cholesterol (WMD  $-19.27$  mg/dL, 95% CI,  $-35.34$  to  $-3.20$  mg/dL) compared to the control groups. The incidence of adverse events was low, with no significant difference between the treatment and the control groups.

#### Conclusions:

In patients receiving maintenance dialysis, statin therapy significantly reduced risks of all-cause deaths and MACEs and improved serum lipid profiles without significant differences in adverse effects compared with the control group.

#### Keywords:

Lipid-lowering therapy, statin, dialysis, all-cause mortality, major adverse cardiovascular events

## Hyperkalemia in Real-World Patients Under Continuous Medical Care in Taiwan 臺灣連續性醫療照護下之高血鉀病人實際情況與風險

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### Background

Hyperkalemia is a common and potentially fatal electrolyte imbalance, especially in patients with chronic kidney disease (CKD), heart failure (HF), and patients taking renin-angiotensin-aldosterone system inhibitors (RAASI). However, the epidemiology of hyperkalemia and its association between serum potassium (S-K) concentration and mortality have not been fully explored in the Taiwanese adult patient population.

### Objectives

The purpose of this study was to use real-world clinical data from hospitals in Taiwan to analyze the epidemiological characteristics of hyperkalemia among Taiwanese adult patients and explore the risk of death in different S-K concentration ranges.

### Methods

This study is a retrospective observational study. This study used Taipei Medical University Clinical Research Database (TMUCRD) data to capture 561,276 patients aged  $\geq 18$  years who had at least one S-K measurement between January 1, 2010 and December 31, 2021. We used a Cox proportional hazards regression model to evaluate the association between S-K concentration and mortality, adjusting for age, gender, chronic diseases and other potential confounding factors.

### Results

The study results showed that the risk of death in patients with hyperkalemia increased significantly with increasing S-K concentration. In the S-K range of 5.2 to 5.4 mEq/l, the hazard ratio for the risk of death was 1.8 (95% CI: 1.7–1.9); in the S-K range of 5.5 to 5.9 mEq/l, the hazard ratio was 2.3 (95% CI: 2.2–2.5); when the S-K concentration is  $\geq 6.0$  mEq/l, the hazard ratio reaches 3.0 (95% CI: 2.7–3.2). In addition, among patients with hyperkalemia, the average age was  $70.05 \pm 14.29$  years old, and 53.5% were male. In terms of high-risk comorbidities, 63.0% of patients had hypertension, 64.2% had CKD, 45.4% had diabetes, and 37.2% had HF.

### Conclusion

This study shows that hyperkalemia is associated with a significantly increased risk of death in Taiwanese adults. The higher the S-K concentration, the greater the risk of death, especially in patients with high-risk comorbidities. These findings emphasize the importance of timely monitoring and management of hyperkalemia in clinical practice to improve patient outcomes.

### Key words

Hyperkalemia, chronic kidney disease, heart failure, Taipei Medical University Clinical Research Database, mortality

## Impact of Different ACEI/ARB Resumption Timing on Post-AKI Outcomes

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**Background:** Evidence suggests a survival benefit from resuming ACEI/ARB post-AKI compared to non-use, yet the optimal timing and its impact on outcomes are unclear.

**Methods:** Using multi-institutional electronic health records, we analyzed the relationship between three ACEI/ARB resumption timelines post-AKI (prior to discharge, 0-3 months, and 4-6 months post-discharge) and outcomes including all-cause mortality, major adverse cardiac and cerebrovascular events (MACCE), dialysis initiation or end-stage renal disease (ESRD), severe hyperkalemia, and recurrent AKI with hospitalization. Cox proportional models estimated hazard ratios for outcomes across different resumption timings, following a target trial design.

**Results:** Among 5,392 AKI survivors resuming ACEI/ARB within 6 months post-AKI, earlier resumption was associated with lower mortality, MACCE, MACCE-related mortality, new dialysis initiation or ESRD ( $P < 0.001$  in trend tests), without increased risks of severe hyperkalemia and re-AKI admissions. Early resumption have a lower mortality compared to 4-6 months post-discharge (before discharge, HR 0.88, 95% CI: 0.83-0.93; 0-3 months, HR 0.89, 95% CI: 0.85 - 0.94).

Subgroup analysis showed a lower mortality hazard ratio from earlier resumption among AKI survivors with prior ACEI/ARB comorbidities indications ( $P < 0.001$  in trend tests; before discharge, HR 0.85, 95% CI: 0.80-0.90; 0-3 months, HR 0.88, 95% CI: 0.83 -0.93).

**Conclusions:** Our cohort demonstrates lower risks for mortality, cardiovascular events, and ESRD with early ACEI/ARB resumption, without heightened risks of severe hyperkalemia or rehospitalization for AKI. Early resumption should be considered for patients with indications for ACEI/ARB.

**Key words:** Acute kidney injury, Acute kidney disease, RAAs inhibitor, resumption