TMU-Research Center of Urology and Kidney

Monthly Meeting

Times：**2023/11/15(Wednesday) 16:00-17:00**

Google meet link： https://meet.google.com/vsr-ucuu-zzz

Meeting Chairperson：Kuan-Yu Hung

Participant：

【TMUH】Ming-Che Liu、Yao-Chou Tsai、Shauh-Der Yeh、Chien-Chih Wu、Hsiao-Yu Lin、Jeng-Cheng Wu、Ching-Hsin Chang、Wei-Chieh Chen、Fang-Yu Ku、Shih-Hsiu Lo、Te-Chao Fang、Hsi-Hsien Chen、Yen-Chung Lin、Yueh-Lin Wu、Chih-Chin Kao、Ching-Yi Chen、Shu-Ching Yeh、TING-EN TAI

【WFH】Yu-Ching Wen、Liang-Ming Lee、Ke-Hsun Lin、Yung-Wei Lin、Chi-Hao Hsiao、Syuan-Hao Syu、Chung-Howe Lai、Chih-Chen Hsu、Tso-Hsiao Chen、Yuh-Mou Sue、Chung-Yi Cheng、Chung-Te Liu、Yun-Hong Yang、Ming-Che Lee、Cho-Hsing Chung

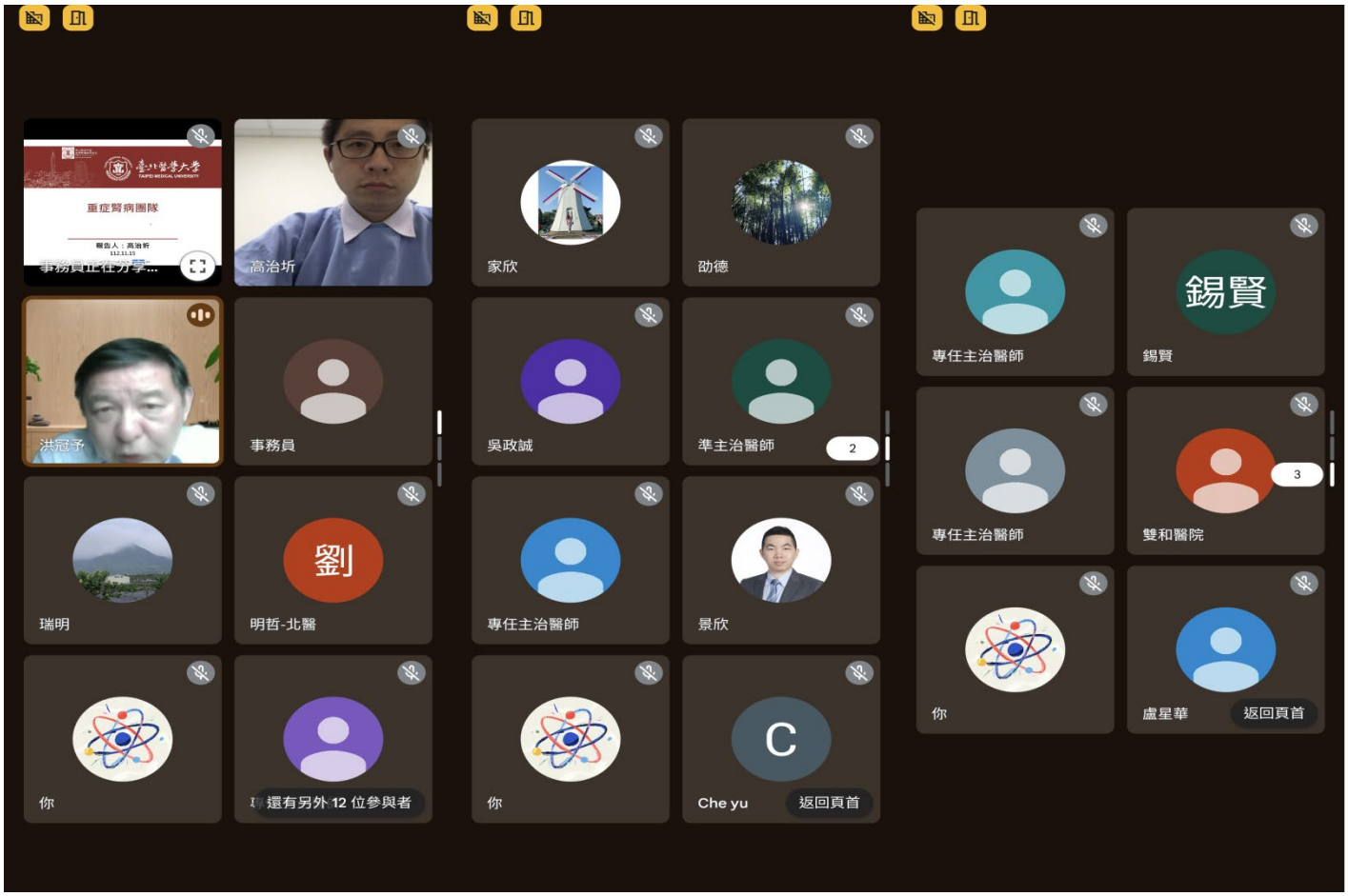
【SHH】Mai-Szu Wu、Chia-Chang Wu、Chia-Hung Liu、Yi-Te Chiang、Kai-Yi Tzou、Wei-Tang Kao、Su-Wei Hu、Wen-Ling Wu、Mei-Yi Wu、Lie-Yee Hung、Cai-Mei Zheng、I-Jen Chiu、Yu-Wei Chen、Chia-Te Liao、Cheng-Hsien Chen、Hui-Wen Chiu、Po-Han Yu、I-Wen Wu、Tze-Wah Kao、Kuan-Hung Lin

【SKMH】Yung-Ho Hsu、Chu-Lin Chou

Chief：Mai-Szu Wu (President, TMU)、Yen-Hua Huang (Dean, Research and Development, TMU)、Chih-Cheng Hsu (Professor, NHRI)、Ke-Hung Tsui (Vice President, SHH) 、Shing-Hwa Lu

Agenda： 1. Integrated Kidney Intervention Team

2. Severe Kidney Disease Team


重症腎病團隊
高治圻
家欣
劭德
洪冠予
事務員
吳政誠
準主治醫師
2
瑞明
劉
明哲-北醫
專任主治醫師
景欣
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盧星華
返回頁首

臺北醫學大學
TAIPEI MEDICAL UNIVERSITY

重症腎病團隊

報告人：高治圻

112.11.15

組織架構

醫院	姓名	個人經歷	專長
北醫	高治圻 	腎臟內科主治醫師 急重症透析	Clinical nephrology、Critical care
	陳靜怡 	加護病房專責主治醫師 腎臟內科主治醫師	Clinical nephrology、Critical care
	林哲宇 	腎臟內科主治醫師 整合照護醫學科主治醫師	Clinical nephrology、PD catheter implantation
萬芳	劉崇德 	腎臟內科主治醫師	Clinical nephrology、Hemodialysis、Vascular access
	楊韻紅 	腎臟內科主治醫師 急重症透析	Critical-care nephrology
雙和	洪麗玉 	腎臟內科主治醫師 急重症透析	Clinical nephrology、Critical care
	邱怡仁 	腎臟內科主治醫師 加護病房專責主治醫師 美國BWH研修醫師	Critical-care dialysis, Multiple organ support dialysis

重症小組會議

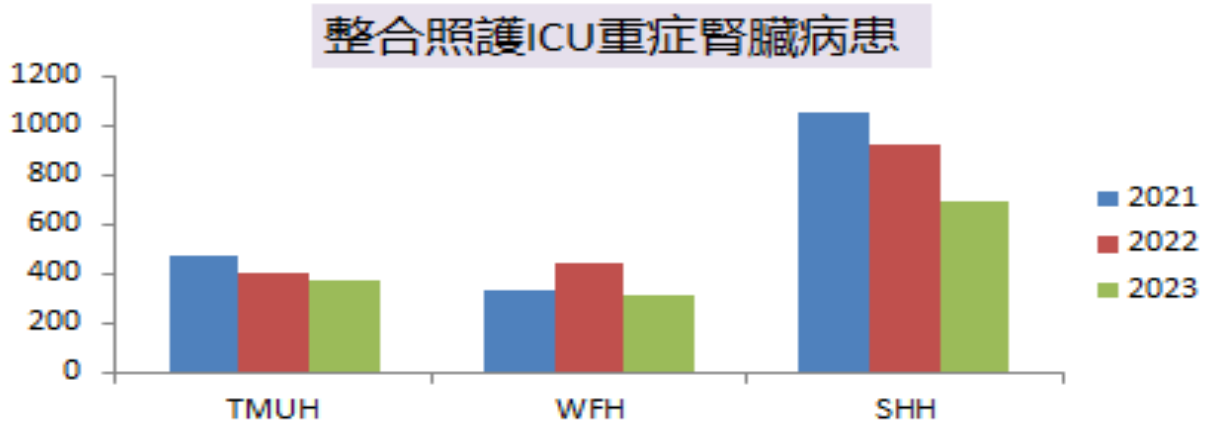
10/27 小組會議：床邊植管經驗分享，討論可能研究主題

臨床與研究

- Q1. Bedside PD catheter implant in ICU critical-ill patients (urgent-start PD)
- Q2. Fluid monitoring method for ICU patients, when modality shifting (modality shift)
- Q3. Nutritional intervention in critical-ill AKI patients (Nutrition in AKI)

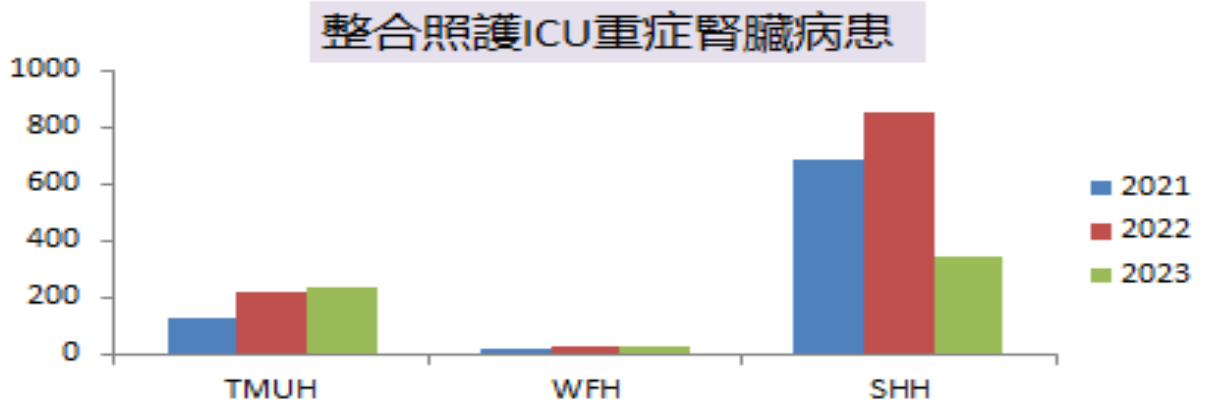
重症透析介入-1

- Critical-ill patients receiving **CVVH**
  (3 affiliated hospitals, **2021-2023/8**)



重症透析介入-2

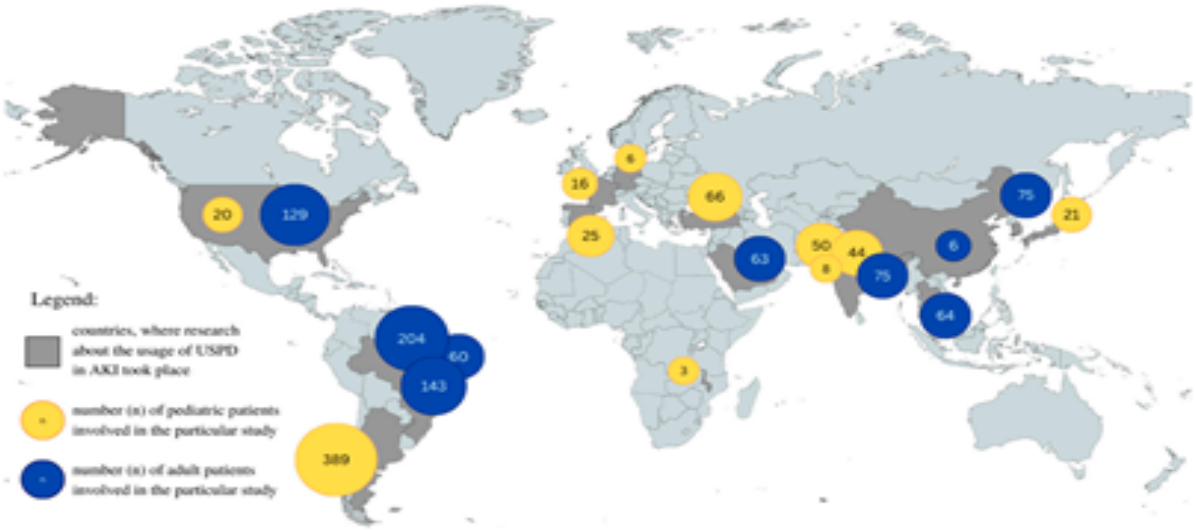
- Critical-ill patients receiving **SLEDD**
  (3 affiliated hospitals, **2021-2023/8**)



Is there PD role in critical-ill ?

- P: critical-ill AKI-requiring dialysis patients
- I: urgent start peritoneal dialysis (ISPD)
- C: hemodialysis
- O: mortality, renal recovery, complications

Urgent-start peritoneal dialysis (USPD)



USPD: refers to treatment that is commenced **within 2 weeks of catheter placement**

J. Clin. Med. 2023; 12: 5079

USPD vs HD in CKD patients

Cochrane Library
Trusted evidence.
Informed decisions.
Better health.

Cochrane Database of Systematic Reviews

[Intervention Review]

Urgent-start peritoneal dialysis versus haemodialysis for people with chronic kidney disease

Htay Htay[1], David W Johnson[2,3,4], Jonathan C Craig[5,6], Armando Teixeira-Pinto[5,7], Carmel M Hawley[2,3], Yeoungjee Cho[2,3]

[1]Department of Renal Medicine, Singapore General Hospital, Singapore, Singapore. [2]Department of Nephrology, Princess Alexandra Hospital, Woolloongabba, Australia. [3]Australasian Kidney Trials Network, The University of Queensland, Brisbane, Australia. [4]Centre for Kidney Disease Research, Translational Research Institute, Brisbane, Australia. [5]Cochrane Kidney and Transplant, Centre for Kidney Research, The Children's Hospital at Westmead, Westmead, Australia. [6]College of Medicine and Public Health, Flinders University, Adelaide, Australia. [7]Sydney School of Public Health, The University of Sydney, Sydney, Australia

7 studies (N = 991), USPD vs HD using a catheter

Cochrane Database Syst Rev. 2021; 1(1): CD012899

USPD vs HD in CKD patients

Compared with HD initiated using a CVC, USPD may reduce the risk of bacteremia

Summary of findings 1. Summary of findings

Urgent-start peritoneal dialysis versus haemodialysis initiated with a catheter for patients with chronic kidney disease

Patient or population: people with CKD

Settings: community

Intervention: USPD

Comparison: HD initiated with a central venous catheter

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Quality of the evidence (GRADE)
	Risk with USHD	Risk with USPD			
Bacteraemia up to 6 months	**151 per 1,000**	**20 per 1,000** (6 to 62)	**RR 0.13** (0.04 to 0.41)	301 (2)	⊕⊕○○ LOW[1]
Death (any cause) up to 24 months	**204 per 1000**	**139 per 1,000** (90 to 218)	**RR 0.68** (0.44 to 1.07)	820 (5)	⊕○○○ VERY LOW[2]
Hospitalisation up to 6 months	**579 per 1,000**	**683 per 1,000** (515 to 897)	**RR 1.18** (0.89 to 1.55)	123 (1)	⊕○○○ VERY LOW[2]

***The risk in the USPD group** (and its 95% CI) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

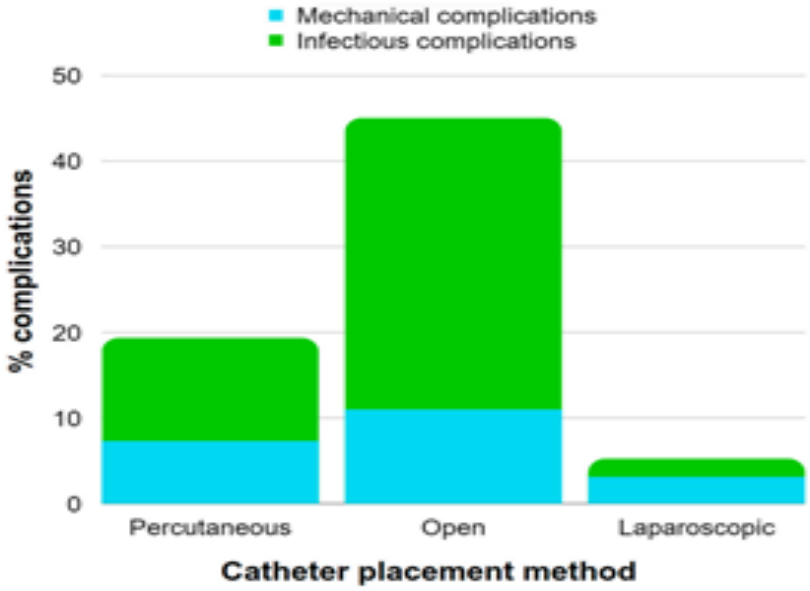
CI: Confidence interval; **RR:** Risk Ratio; **HD:** haemodialysis; **USHD:** urgent-start HD; **USPD:** urgent-start peritoneal dialysis

Pros and Cons of USPD in AKI

Advantages of USPD in AKI	Disadvantages of USPD in AKI
- Cost-Effectiveness: USPD offers a more economical option compared with other kidney replacement therapies. - Safety and Effective for Children and Neonates with Low Birth Weight. - Hemodynamic Stability: USPD is considered safe for hemodynamically unstable patients. - Well-Tolerated: Patients generally tolerate USPD well, making it a comfortable and feasible treatment approach, particularly in pediatric populations. - Effective Response to Infectious Complications: USPD-related infectious complications, such as peritonitis, show positive responses to antibiotics, contributing to successful outcomes. - Reduced Hospital/ICU Stay: USPD has been associated with shorter length of stay in hospital and intensive care units, optimizing patient recovery and overall healthcare resource utilization. - Improved Outcomes: USPD demonstrates better outcomes in terms of renal recovery and mortality rates compared with other kidney replacement modalities.	- Technical Difficulties of Catheter Insertion: The procedure for catheter insertion in USPD may pose potential technical challenges, requiring skilled medical professionals. - Staff Training and Equipment Management: Prior to catheter insertion, specialized staff training is necessary to ensure proper procedural execution. - Limited Supply Availability: USPD may face limitations in the availability of supplies, especially in certain healthcare settings or regions, which could affect its feasibility as a treatment option. - Increased Complications and Potentially Inferior Results: Urgent-start peritoneal dialysis has been associated with a higher incidence of complications and may yield less favorable outcomes when compared with conventional start methods.

J. Clin. Med. 2023; 12: 5079

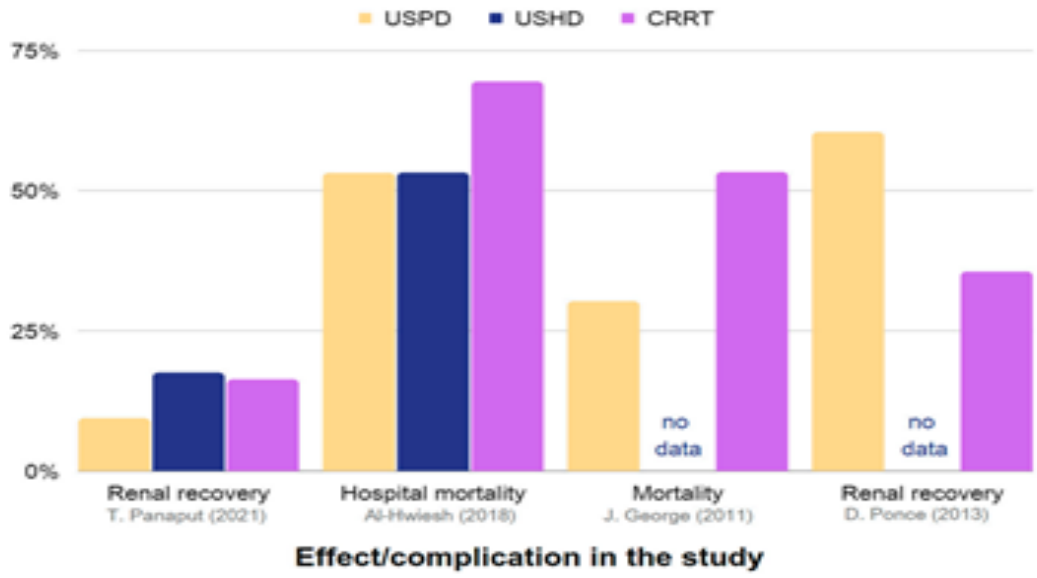
Urgent-start peritoneal dialysis (USPD)



Complications following catheter placement in patients with CKD and AKI

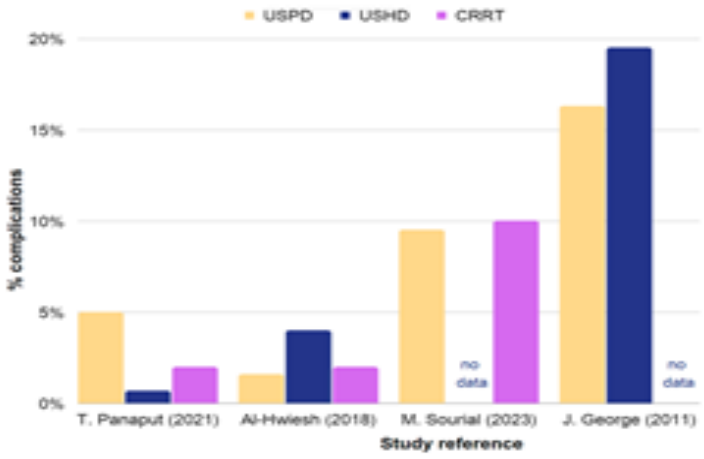
J. Clin. Med. 2023; 12: 5079

Urgent-start peritoneal dialysis (USPD)



J. Clin. Med. 2023; 12: 5079

Urgent-start peritoneal dialysis (USPD)



PD-related complications：leakage (7.3–23%), poor flow (4–5%), bleeding following catheter placement (15%), catheter-site infections, pain at inflow (2.7%), peritonitis (0–18%), hypotension (15.9%), hypomagnesemia (11.1%), and hypophosphatemia (11.1%).

J. Clin. Med. 2023; 12: 5079

USPD contraindications

Table 1 – Contraindications for urgent-start peritoneal dialysis.

Absolute contraindications	
Patient not consenting	
Recent surgery involving large anterior abdominal incisions	There is a general consensus that operations using large abdominal wall incisions should probably invoke a minimum 2-week hiatus from PD due to the risk of fluid leak and hernia.[1]
Relative contraindications	
Severe hyperkalaemia	Emergency haemodialysis is often more appropriate in such indications, as urgent-start peritoneal dialysis may be unable to safely achieve the requisite accuracy and speed of treatment. If peritoneal dialysis is chosen, regular patient reassessment is prudent.
Severe pulmonary oedema	
Severe uraemic pericarditis or encephalopathy	
Critical illness	Concerns about inadequacy, cachexia and protein losses.
Respiratory failure	Upward diaphragmatic pressure affecting lung mechanics.
Active intra-abdominal infection	Theoretical but unproven risk of exacerbation of infection.
Overlying soft tissue infection	Tenckhoff catheter should be cited in another location.
Uncorrected bleeding diathesis	Risk of haemorrhage after catheter implantation.
Significant past history of abdominal surgery or disease	Diverse anecdotal experience has seen PD to be safe and effective in the post-operative setting and in many patients with structural lesions such as hernias. PD is also feasible in patients with a distant history of major abdominal surgery, though peritoneal membrane function is difficult to predict.[1] Recent cardiothoracic surgery, neurosurgery and laparoscopic or minor open abdominal surgery do not preclude USPD.[1] In patients with previous abdominopelvic surgery, surgical PD catheter placement allowing direct vision is advisable as opposed to percutaneous insertion.
Large abdominal wall hernia	
Recent abdominal surgery	
Perioperative management	

Nefrologia. 2023; 43(3): 293-301

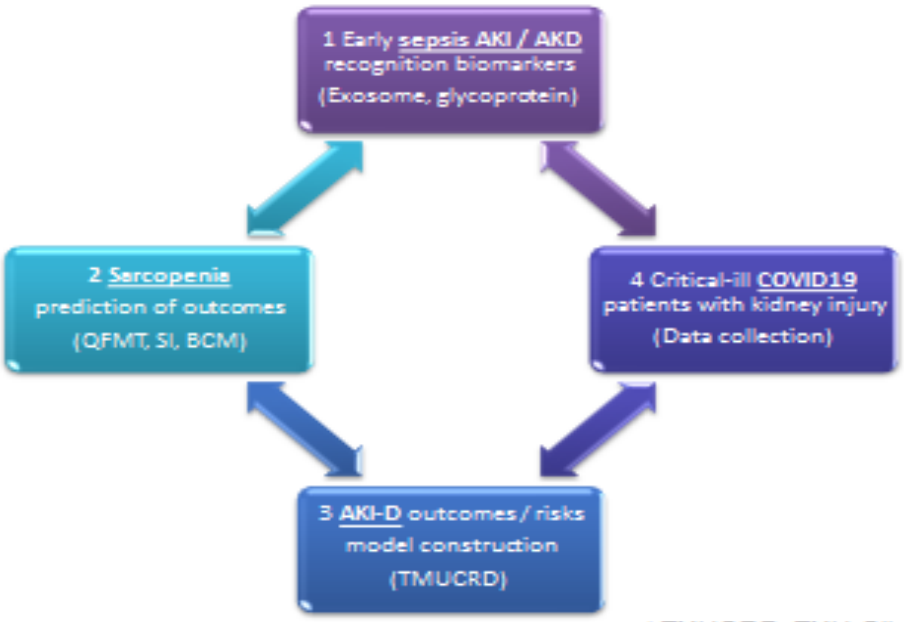
USPD prescriptions

Table 2 – Suggested initial urgent-start peritoneal dialysis prescriptions.

Patients with CKD	
CAPD	Fill volumes – 500 mL (TBW < 70 kg), 1000 mL (TBW > 70 kg). Dwell time – 4 h. Number of daily exchanges – 3–4. Dialysate – 1.5% glucose standard solution.
APD	Fill volumes – 500 mL (TBW < 70 kg), 1000 mL (TBW > 70 kg). Dwell time – 1 h. Number of daily exchanges – 10. Dialysate – 1.5% glucose standard solution.
Patients with AKI	
APD	Fill volumes – 1000 mL (TBW < 70 kg), 1500 mL (TBW > 70 kg). Dwell time – 1–2 h. Total daily dialysis time – 16–24 h. Total daily dialysis volume – 20–30 L. Dialysate – half 1.5% glucose solution, half 2.5%.

Nefrologia. 2023; 43(3): 293-301

Critical-ill patients



* TMUCRD: TMU-Clinical Research Database

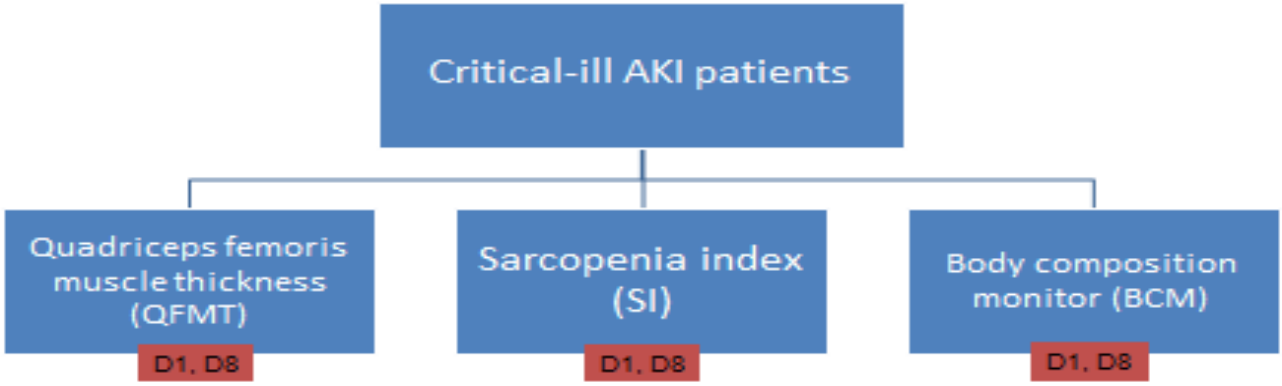
Early AKI / AKD recognition biomarker

Patient enrollment IRB 110/8/20已通過→到112/11/14為止、已收案83個病人

We enroll critical-ill patients aged 20-80 years with the diagnosis of sepsis, without a history of malignancy, ESRD and organ transplantation. Sepsis is defined by 1. microbiological proof (cultures) or 2. suspicion of sepsis + >2 SOFA score. Patients will be divided into 2 groups, 1: septic AKI (n=100), 2: septic non-AKI (n=100)

Plasma and **Urine** samples are collected on Day 1, Day 4, and Day 8.

Sarcopenia change in Critical-ill AKI patients



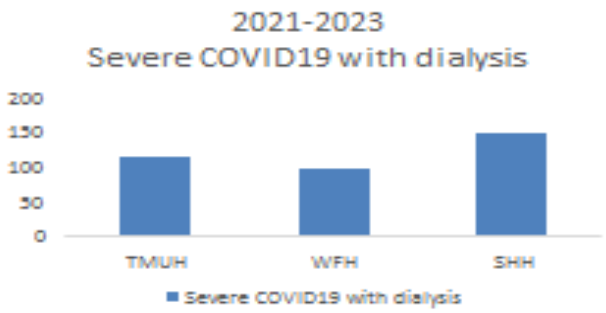
* Gold standard for muscle mass: paraspinal muscle surface area at L4 (CTMSA)

Construct sarcopenia model to predict patients' outcomes

Outcomes of severe COVID19 infection with AKI-D

Collect data in 3 hospitals

- P: severe COVID19 infection with AKI-D
- I: CVVH
- C: HD
- O: All-cause mortality, renal outcomes



進度報告

整合透析團隊
腎臟內科 邱怡仁 醫師

2023/11/15

Current Project

- Using PD in AKI patient requiring dialysis
- Novel approach to peritoneum membrane function

Using PD in AKI patient requiring dialysis

- Liver cirrhosis (Hepatorenal syndrome) and acute decompensated heart failure patients
- Percutaneous PD tube insertion followed by acute PD treatment protocol. (CAPD/APD, small volume but frequent exchanges)
- Low/Zero Na solution in ADHF patients
  (D10W resulted in more Na removal and enhanced water balance)

Circulation. Volume 141, Issue 13, 31 March 2020; Pages 1043-1053

Novel approach to peritoneum membrane function

- The BIS analysis reveals that the majority (56.4%, 582/1031) of PD patients is overhydrated ,with a mean absolute FO of 1.9 ± 2.4 L.
- Fluid overload in ESRD patients is correlated to increased all-cause mortality and CV mortality
- ISPD guideline emphasizes the importance of recognizing low UF capacity

Nephrol Dial Transplant. 2015 May; 30(5): 849–858.
Peritoneal Dialysis International Vol 41, Issue 4, July 2021, 352-372

Mini-PET

- Peritoneal equilibration test (PET)
- 每6 個月一次，或在發生腹膜炎之後，執行PET 檢測評估腹膜廓清效果、腎殘餘功能及調水能力，提供醫師開立適當處方

- 傳統PET 無法及時用來判斷病人腹膜功能是否喪失脫水能力。腹膜透析患者脫水能力喪失的可能原因很多，包括小分子通透增加，導致滲透壓差異減少，水分子通道功能改變，或是腹膜纖維化導致通透性改變。目前利用比PET 更為省時方便的mini-PET，可以提供更多腹膜脫水功能的即時資訊

Monitor Peritoneal Membrane Function

Mini-PET
1 hour 4.25% dextrose exchange

The sodium dip is expressed as the absolute fall in the dialysate sodium concentration from baseline,

$[Na^{+}]_{t=0} - [Na^{+}]_{t=60}$ min. 9 mmol/L (6-11)

It can also be expressed as the sodium sieving ratio:

$1 - ([Na^{+}]_{t=60\ min}/[Na^{+}]_{t=0}$. 0.07 (0.055-0.085)

Sodium dip <5 mmol/L
Sodium sieving ratio< 0.03

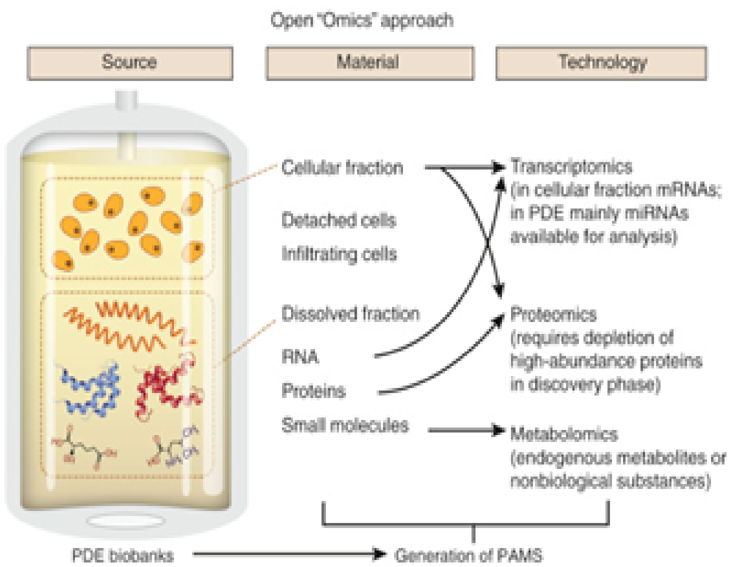
*Better discriminator for UF failure than longitudinal change in PET

*High risk of encapsulating peritoneal sclerosis (EPS)

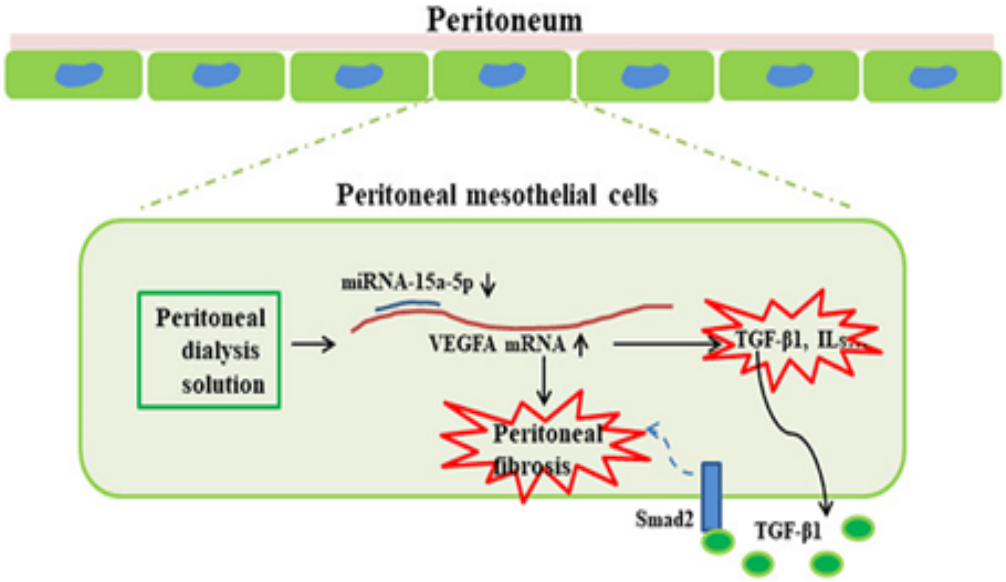
表三、本研究規範 mini-PET 檢測時機

每一季定期檢測一次
近期腹膜透析脫水異常
近期發生腹膜炎
近期腹膜透析處方改變
PET 檢測顯示腹膜通透性改變

Nonhypothesis-driven biomarker research following an open omics approach

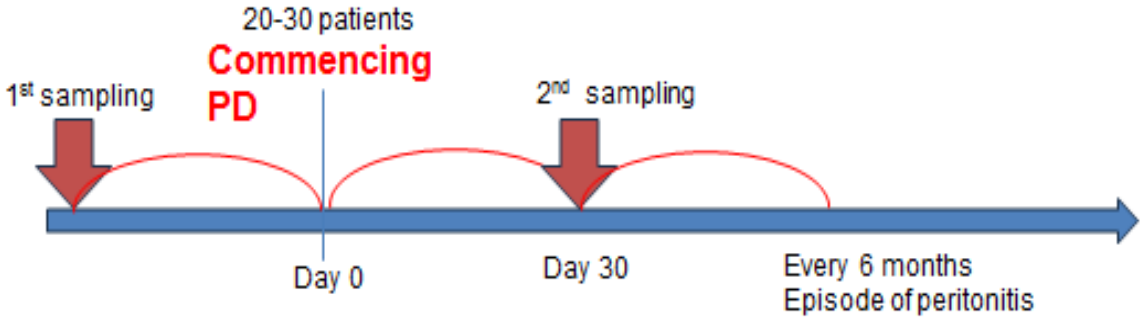


Role of miRNA in peritoneum phenotype changes



J Cell Physiol. 2019 Jun;234(6):9746

Longitudinal miRNA profile in CAPD patients



Diagnostic Markers	1. Compare different solute transport group 2. Compare different glucose concentration/non-glucose-based solution 3. Compare Peritonitis/Non-peritonitis
Mechanism	1.Downstream Pathway (VEGF/TGF-b) 2.Therapeutics

林哲宇 醫師

現職：

- 臺北醫學大學附設醫院整合醫學科專任主治醫師

學歷：

- 慈濟大學醫學系

經歷：

- 臺北醫學大學附設醫院腎臟內科總醫師
- 臺北醫學大學附設醫院內科部總醫師
- 衛生福利部雙和醫院(委託臺北醫學大學興建經營)內科住院醫師
- 北醫附醫一般醫學科醫師

專科證書：

- 醫師證書
- 內科專科醫師證書