



Everyone talking - A life journey with your kidneys
First series 4th episode: 16 Nov 2021

Peritoneal dialysis: Reality and misconception

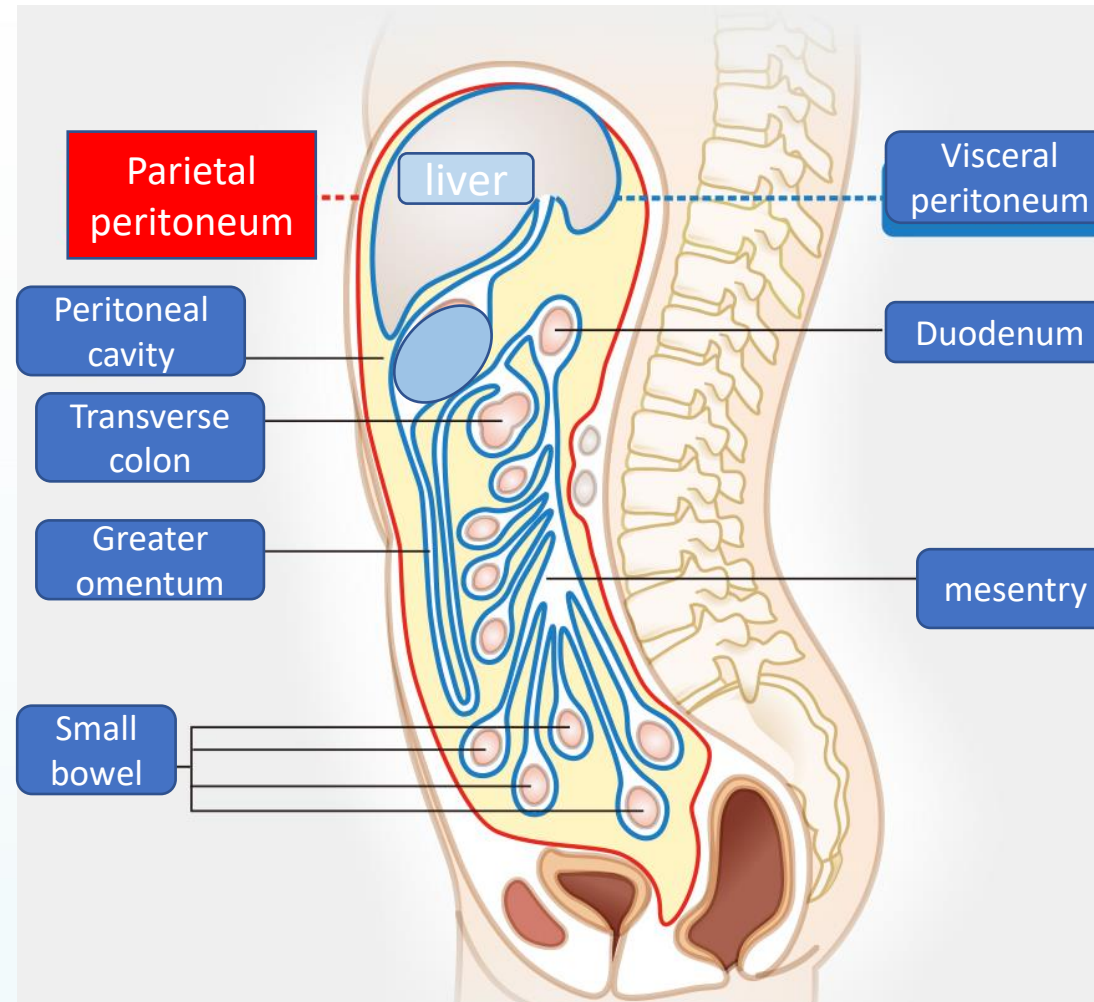
Guest speakers: Dr Chan Ching Kit. Ms Sandy Ho

Moderators: Ms Maggie Ng, Ms Windy Lee

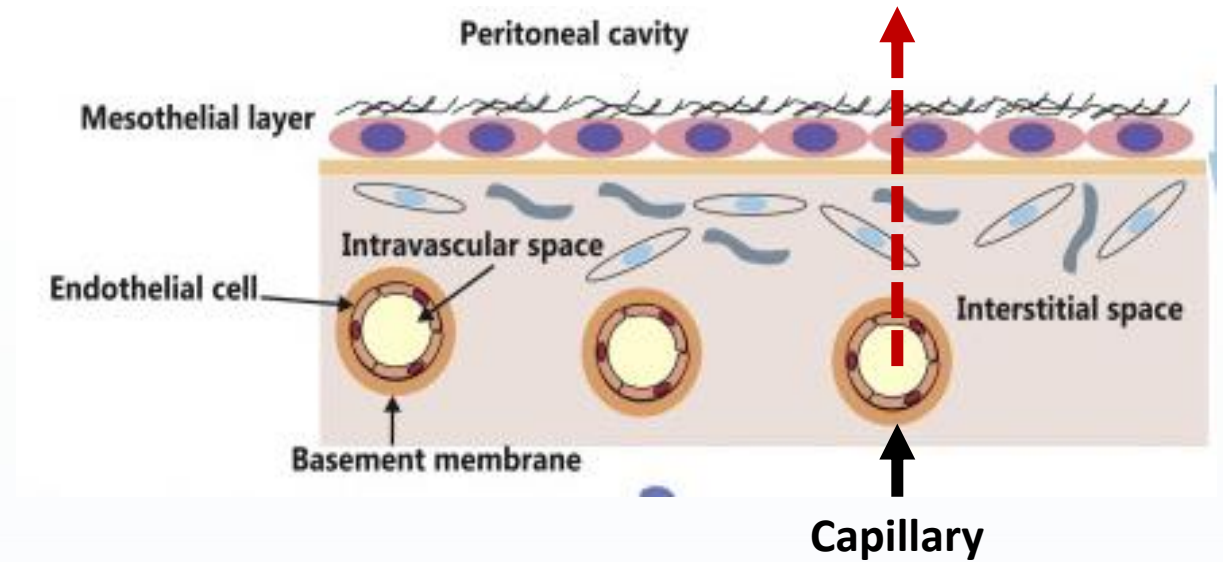


Principles for peritoneal dialysis

The peritoneal membrane is **the smooth, transparent membrane that lines the abdominal cavity** and contains the internal organs of the abdomen and pelvis



Peritoneal membrane



- Covered the peritoneal cavity and wrapped around surfaces of internal organs.
- Numerous capillaries over peritoneum
- Numerous channels of different pore sizes located over capillary walls, allowing toxins to enter peritoneal cavity, and absorbing useful substances into capillaries.

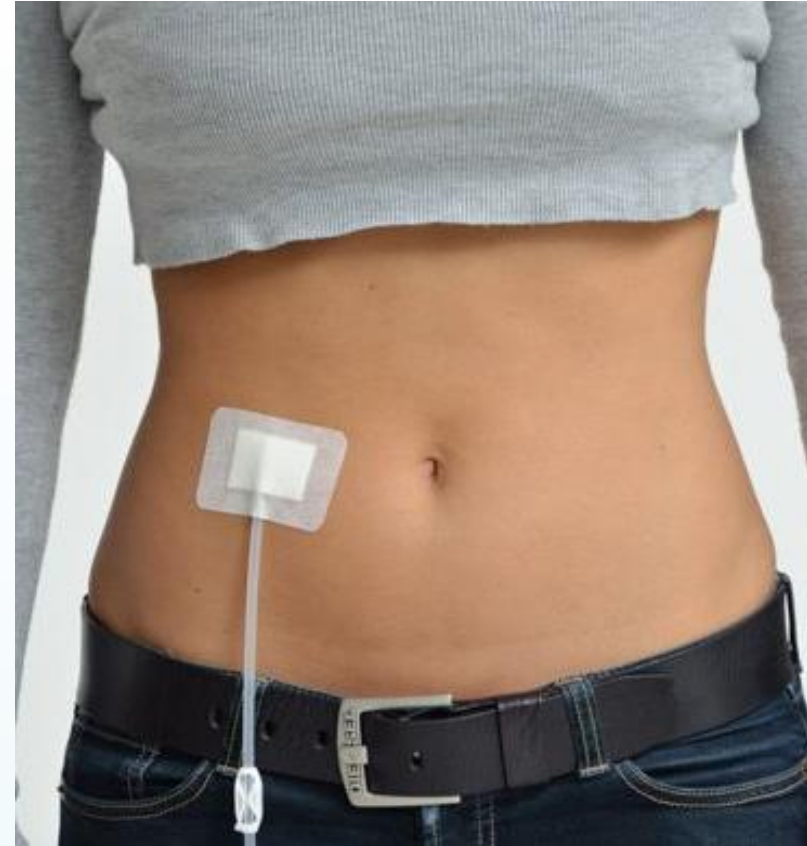
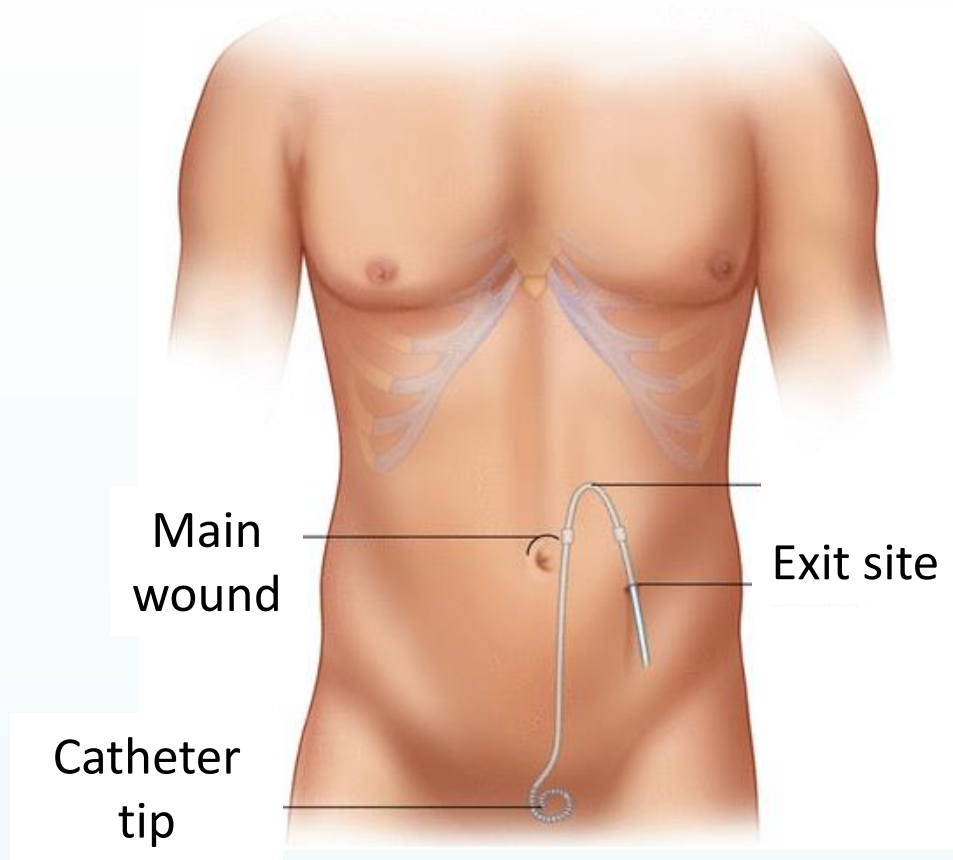
Peritoneal Dialysis

- Surgical procedure to insert a silicon catheter (Tenckhoff catheter) permanently into peritoneal cavity.
- Instill dialysate into peritoneal cavity via the catheter
- Excrete uraemic toxins and free water, from capillaries over peritoneum to dialysates into peritoneal cavity, and drain out through the Tenckhoff catheter.
- Slowly and continuously excreting uraemic toxins and free water via several exchanges of dialysates every day.

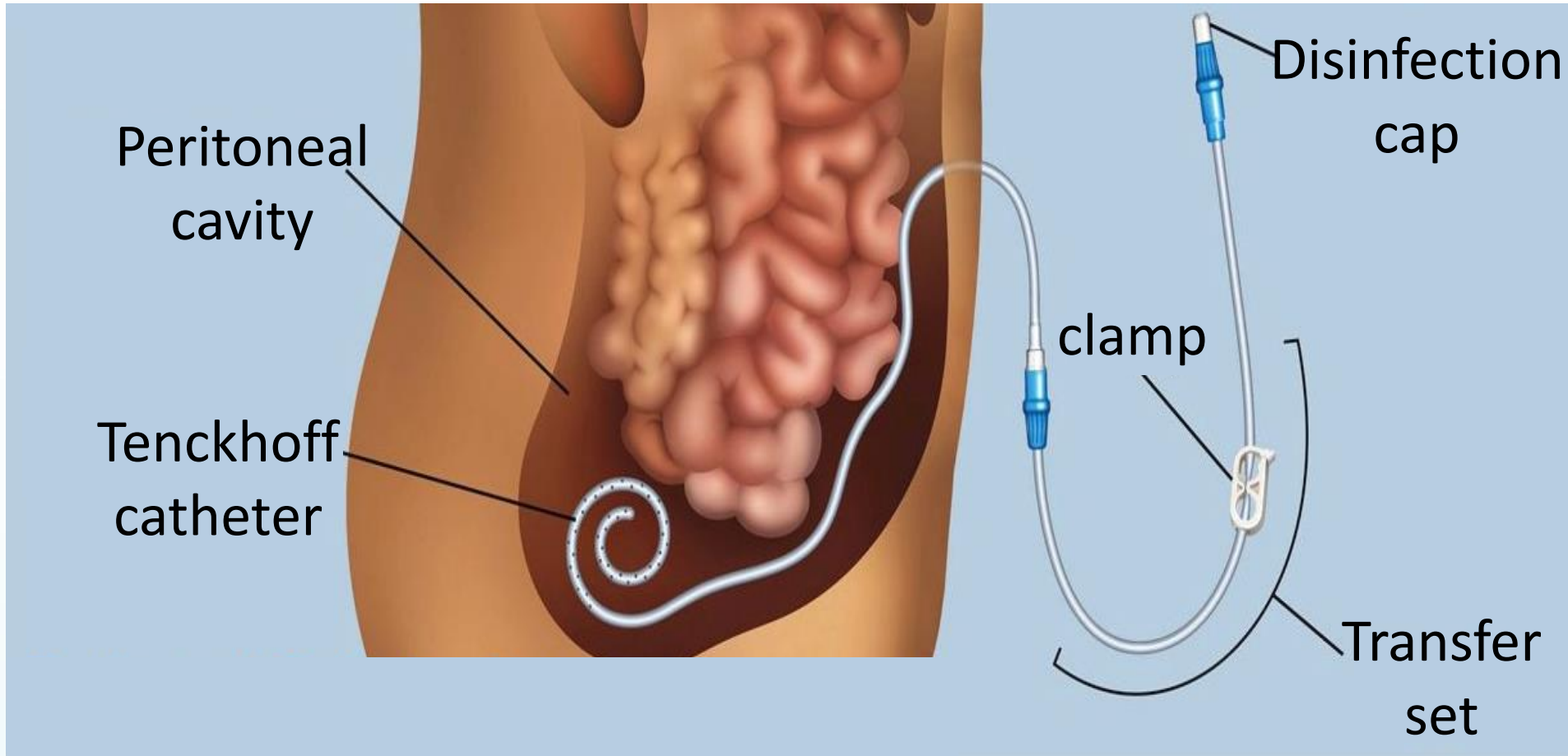
Tenckhoff Catheters



Position of Tenckhoff catheter

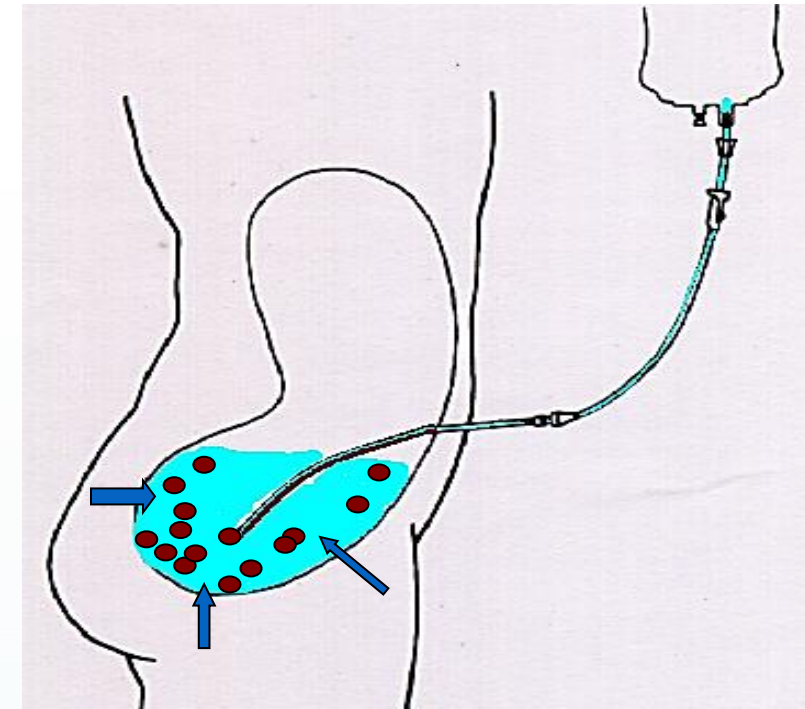


Tenckhoff catheter in peritoneal cavity

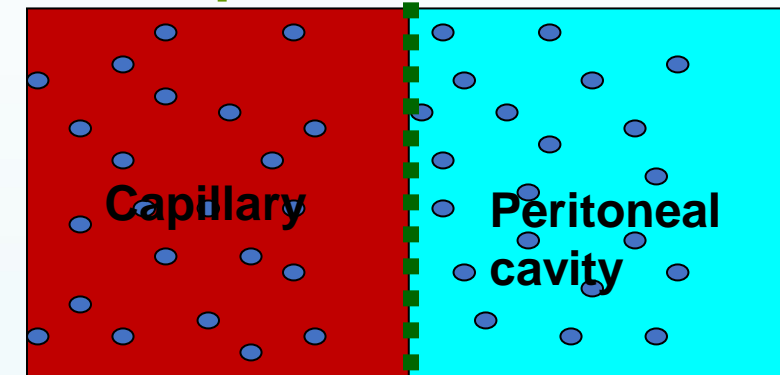


Principles of Peritoneal dialysis

- Uraemic toxins and free water excreted into dialysate in peritoneal cavity through **diffusion** and **osmosis**.
- Regular exchange of dialysate to remove the toxin and free water from the body.



Semipermeable membrane



Hours later

Peritoneal dialysis principles - Diffusion



Hours later



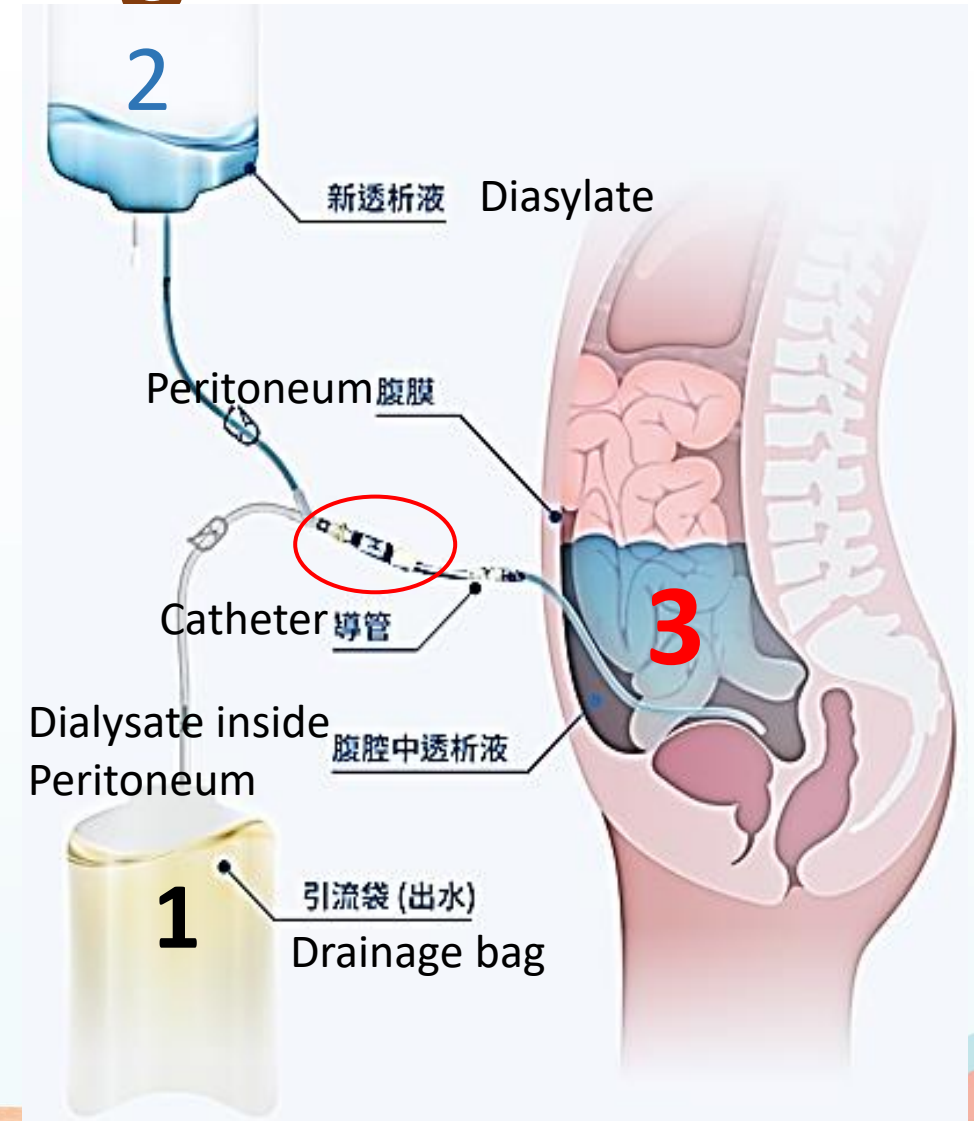
“Manual” Peritoneal dialysis

–

Continuous Ambulatory Peritoneal Dialysis (CAPD)

Steps for bag exchanges

1. Draining out effluent
2. Infusing dialysate
3. Dwell
Diffusion and Osmosis



Continuous Ambulatory Peritoneal Dialysis (CAPD)

Pros:

- Home based therapy, exchanges by patient or carer at flexible hours
- No frequent hospital attendance
- Flexible hours for bag exchanges, less disturbance to work
- Higher self control and patient satisfaction
- Short and simple training time required
- **Continuous therapy with stable control**
- Remove free water at steady rate, better blood pressure and anaemia.
- Better preserve residual renal function
- less diet restriction
- No risk for blood borne infection



Continuous Ambulatory Peritoneal Dialysis (CAPD)

Cons:

- High glucose content in dialysate, may worsen lipid and diabetic control
- Some protein loss through CAPD
- May have fluid retention or dehydration
(if reduced ultrafiltration or excessive ultrafiltration)
- Need adequate time for bag exchanges
- Complications
 - Peritonitis (on average once every 3.2 years)
 - Hernia (7-27.5%)
 - Exit site infection
- More space for consumables storage.

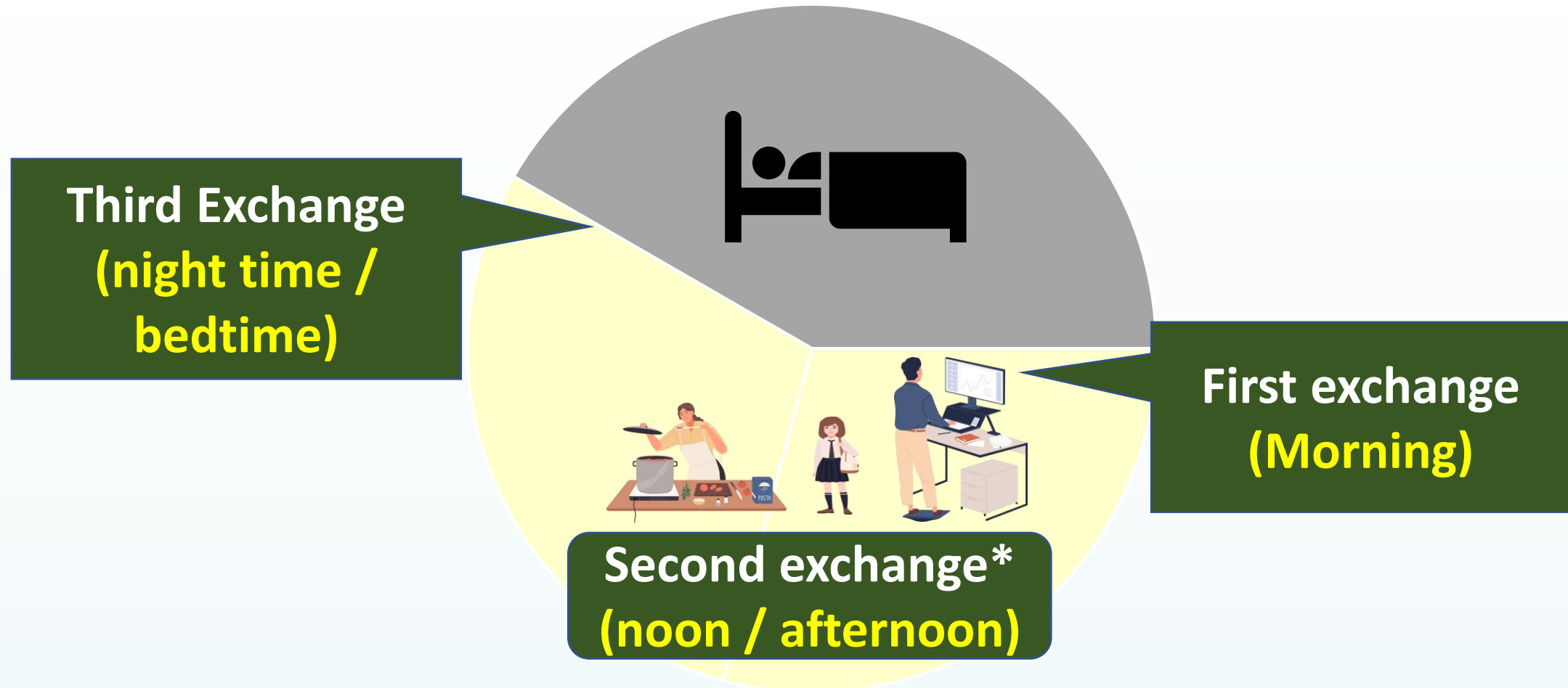
Who is not suitable for Peritoneal dialysis ?

➤ In general, most patients are suitable for peritoneal dialysis.

Prior assessment required for the following conditions:

- previous lower abdominal surgery
- Recurrent abdominal hernia
- Inherited disease e.g., polycystic kidney / liver with limited space for peritoneal dialysis

Continuous Ambulatory Peritoneal Dialysis (CAPD)



*Perform two exchanges in daytime are required if four exchanges daily

**“Machine assisted”
peritoneal dialysis**

—

**Automated Peritoneal dialysis
(APD)**

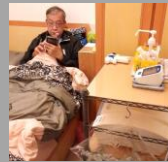
Automated Peritoneal Dialysis (APD)

- Once daily
- Performed during sleep (8-10 hours)
- Connected to machine before sleep
- Disconnected from machine in the morning
- Higher expenses
- Suitable for those unable to perform exchanges in the daytime



Automated Peritoneal Dialysis (APD)

At nighttime / bedtime
start treatment after
connected to machine

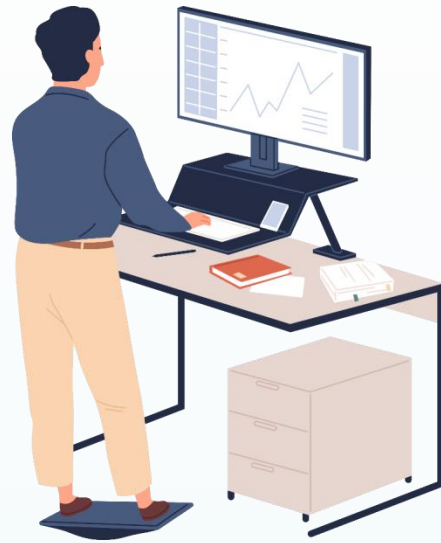


Free from bag exchange in daytime



**Completed treatment
in the morning,
disconnected from
machine**

CAPD or APD ?



**Daytime working or studying
vs. housewife**



Cognitive ability



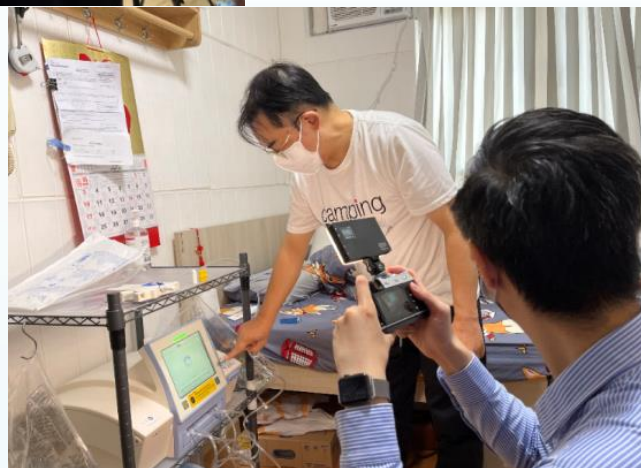
Bag exchange demonstration



APD



CAPD



Please refer to the following hyperlink: <https://hkkf.org.hk/zh/patients-video-c/>

Preparation before starting peritoneal dialysis

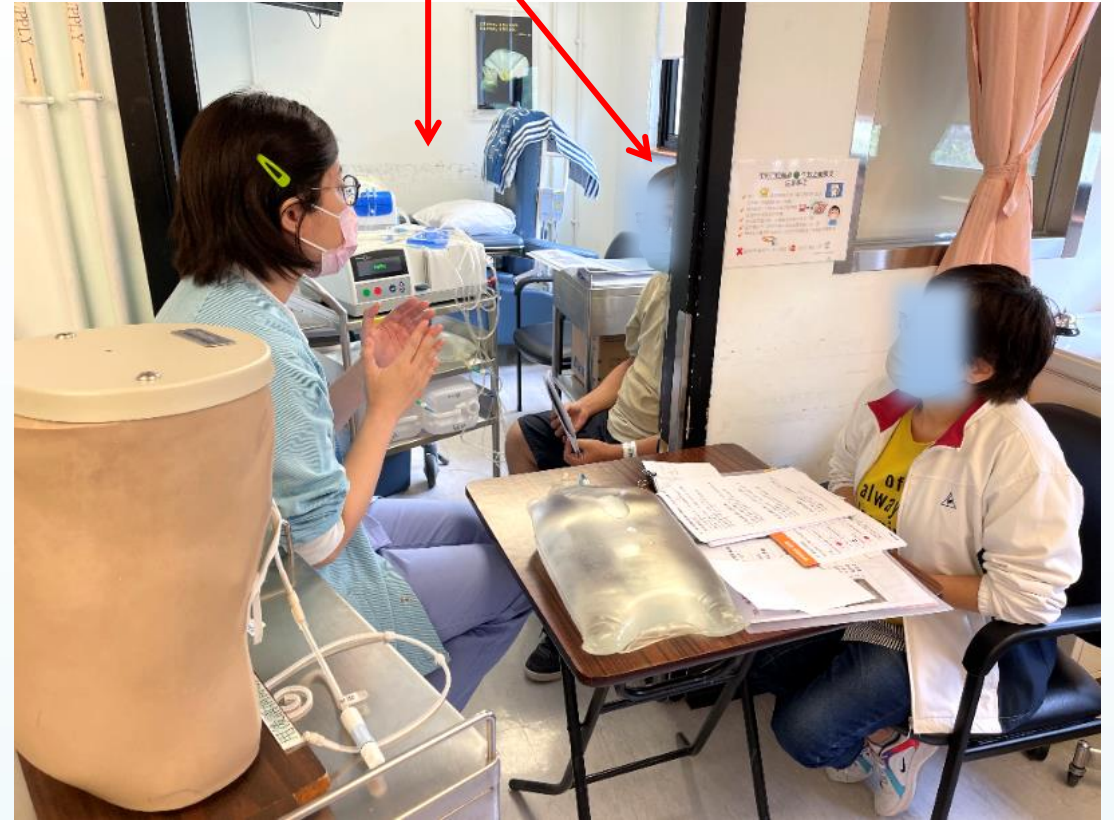
Preparation

1. Home environment
2. Work arrangement
3. Formulate the optimal mode of PD
4. Arrange access creation



Peritoneal Dialysis - Training

PD training



PD training

- Principles of PD
- Tenckhoff catheter care
- Bag exchange preparation
- **Proper hand hygiene**
- Bag exchange procedure-
non-touch technique
- Vital signs evaluation
- Documentation

日期 **15/11/21** 體重 **56** Kg 體溫 **37**

濃度	容量	血壓/脈搏	出水時間 入水時間	出水量	結餘	檢查	血糖
1.5%	2250	135/82 74	0745 0820	2400	- 150	清 / 濁 / 蛋白	4.8
1.5%	2250	---	1545 1615	2560	- 310	清 / 濁 / 蛋白	
2.5%	2230	---	2230 2310	2400	- 170	清 / 濁 / 蛋白	
				總出水量	- 630	清 / 濁 / 蛋白	

日期 **16/11/21** 體重 **56.2** Kg 體溫 **36.8**

濃度	容量	血壓/脈搏	出水時間 入水時間	出水量	結餘	檢查	血糖
1.5%	2260	130/80 68	0640 0720	2160	+ 100	清 / 濁 / 蛋白	6.1
1.5%	2250		1500 1535			清 / 濁 / 蛋白	
						清 / 濁 / 蛋白	

PD training

- Exit site assessment and care
- Recognize complications
- Nutrition and diet restriction
- Medication
- Psychological / emotional support
- Daily activities e.g., shower
- Handling emergencies



Preventing peritonitis



Proper hand hygiene and wearing of surgical mask



Home environmental hygiene



Personal hygiene



Pets

Peritoneal dialysis at home: points to note

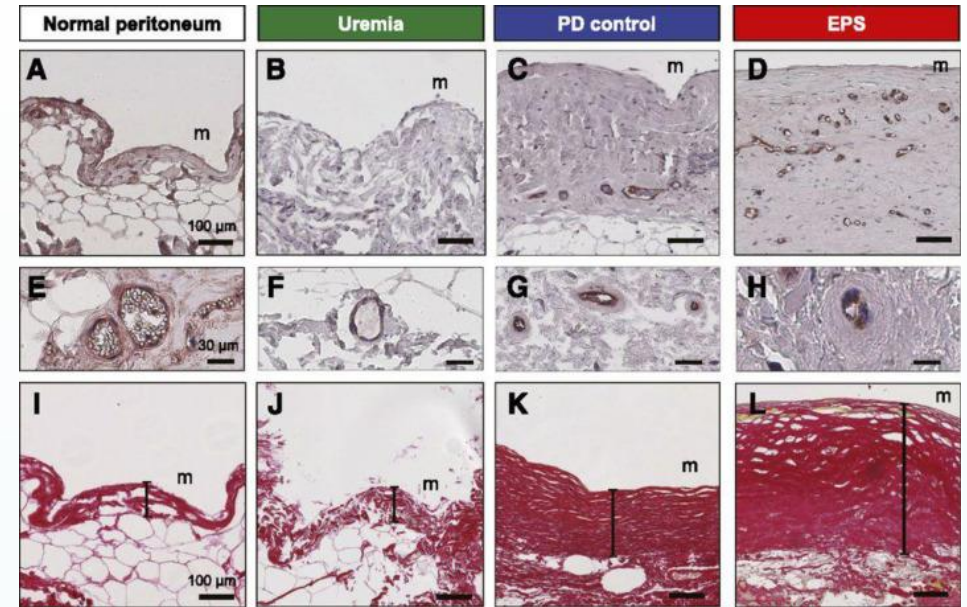
Peritoneal Dialysis and Sugar

- Glucose as osmotic agent to drag water movement across peritoneal membrane in peritoneal dialysis e.g 1.5%, 2.5% and 4.25%
- expected to absorb extra **50-150gm** sugar daily through bag exchanges (~ extra 500-800kcal/day)
- May worsen diabetic and lipid control
- May stimulate insulin secretion and cause weight gain
- Daily caloric requirement for 60kg adult ~1500 – 1800kcal



Peritoneal Dialysis and Sugar

- Prolonged exposure to dialysate with high glucose content, may **promote membrane capillary growth**, membrane thickening, worsening membrane function, ending up into **membrane failure**.
- Avoid using dialysate with high glucose content, to achieve membrane longevity.



Morelle J et al. J Am Soc Nephrol.
<http://dx.doi.org/10.1681/ASN.2014090939>.

Fluid retention

Symptoms



Swelling over
dependent area



Breathlessness

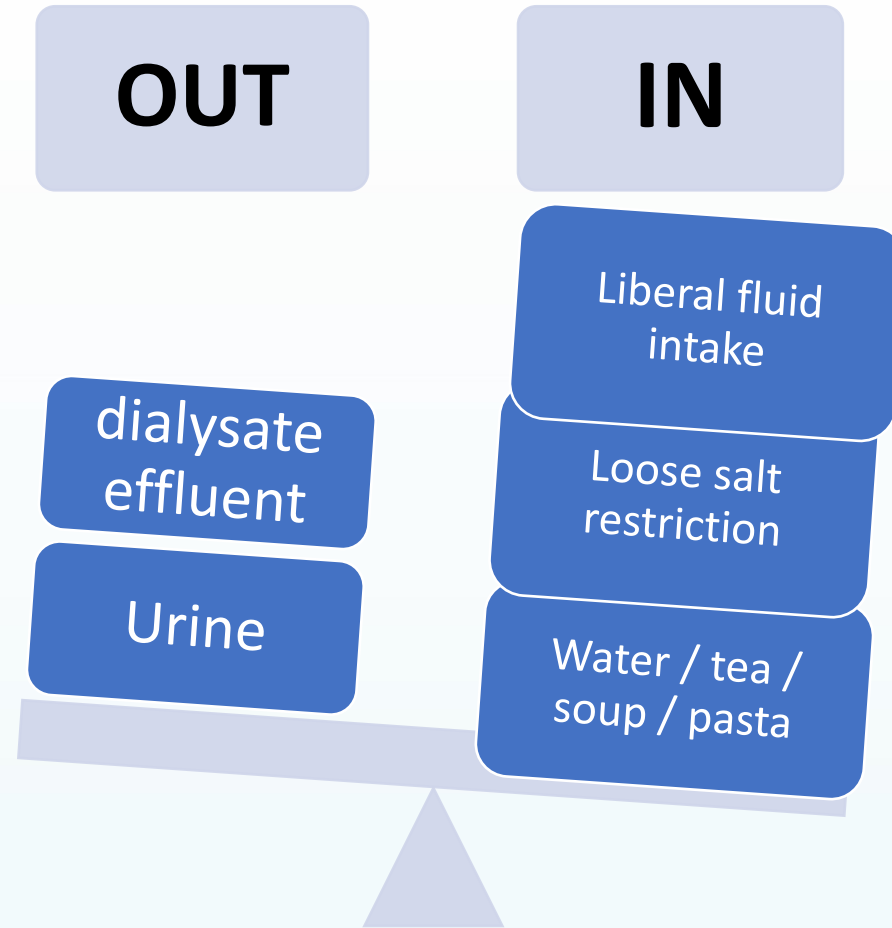


Hypertension



reduced urine output /
effluent

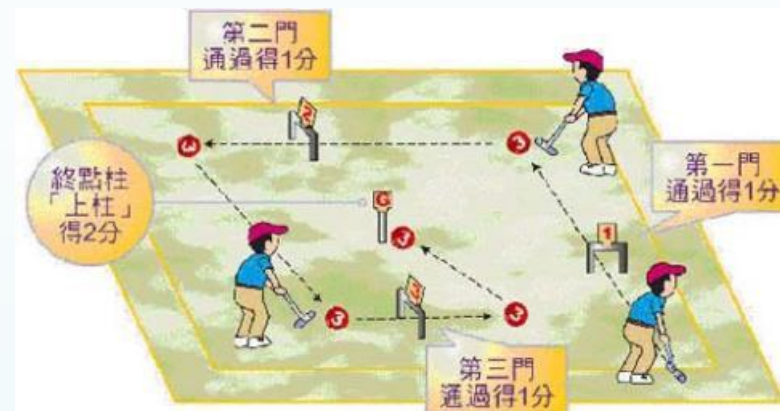
Preventing fluid retention: out = in



Life with peritoneal dialysis

Some changes in daily life

- Arrange bag exchanges according to own schedule
- Minimal disturbance to usual daily work and social events if arranged properly
- Bring back home record upon clinic review



Please refer to episode 7 for details

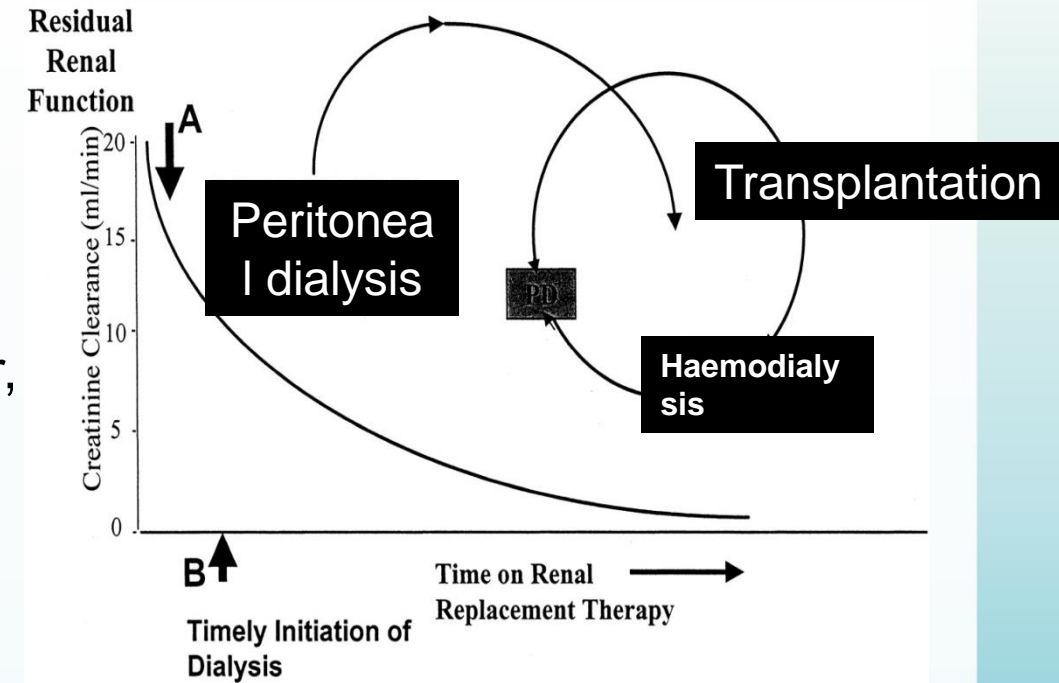
Any activities not suitable after catheter insertion?

- Swimming
- Bathing (shower is fine)
- Baptism
- Strenuous exercise
(especially with dialysate dwell)

**Peritoneal dialysis
is less effective
compared to
haemodialysis?**

Misconception 1

- **Peritoneal dialysis is less effective when compared to haemodialysis ?**
- Correct answer :
 - Peritoneal dialysis is non-inferior to haemodialysis in efficacy
 - Steadily excreted uraemic toxin and free water, suitable for children and elderly patients
 - Better preserve residual kidney function
 - Peritoneal dialysis and haemodialysis are two different blood purification treatment, with their own advantages and disadvantages.



Ram Gokal. ASN January 2002, 13
(suppl 1) S104-S115

Automated PD better than CAPD?

Misconception 2

- **APD better than CAPD ?**

- Correct answer :

- CAPD and APD with own advantages
- CAPD with 3-4 bag exchanges per day, at flexible hours, achieving stable control
- APD with exchanges at night, by patient or carer, therefore shorter treatment time but less disturbance to daytime activities
- CAPD and APD patients can enjoy normal life if arranged appropriately
- APD with higher cost compared to CAPD
- Elderly patient may have difficulties in mastering APD

Financial implication for peritoneal dialysis

CAPD

Hospital Authority

Essential
(One off):
~\$4500-\$5000

Consumables
(monthly):
~\$1000-\$1500

First month
expenditure ~\$5,700

(Monthly) ~\$1,000-\$1,500

APD

Patient preference

Hospital
Authority

Hong Kong Kidney Foundation

Self paid

Free loaning program

Co-Fund Co-Use program
\$2333 x36 months

(Monthly rent)
~\$2500-\$3210

Essential
(one off):
~\$3000-\$4000

Essential (one off) : ~\$3000-\$4000

Consumables and tubings: ~\$2300-\$2500 (monthly)

Consumables
(monthly):
~\$800-\$1000

Insurance contract: ~\$720 (annual)
warranty : ~\$4200-\$4500 (annual)
Purchase after 18 months

(company 1)
Deposit \$5000 + 12
monthly rent
(company 2)
Deposit \$3210

+first 2 months contribution
(\$4666)

~\$4,400

~\$6,600

~\$11,300

\$12,300-15,900

~\$800-\$1,000

~\$2,400

~\$4,700

\$4,900-\$5,610

Refer social worker for financial assistance if required

For reference only

Hong Kong Kidney Foundation

- **Free loaning APD machine Program**
 - Prior social worker review for financial assessment and social situation
 - Loan APD machine to patient free of charge, consumables paid by patient
- **Home Automated Peritoneal Dialysis machine Co-Fund Co-Use (CFCU) program**
 - Patient with monthly contribution of **\$2,333** to CFCU, maximal up to **36 months**
 - The cumulative fund enables HKKF to buy another new APD machine for another patient

Host organiser: Hong Kong Kidney Foundation

<https://hk kf.org.hk/>



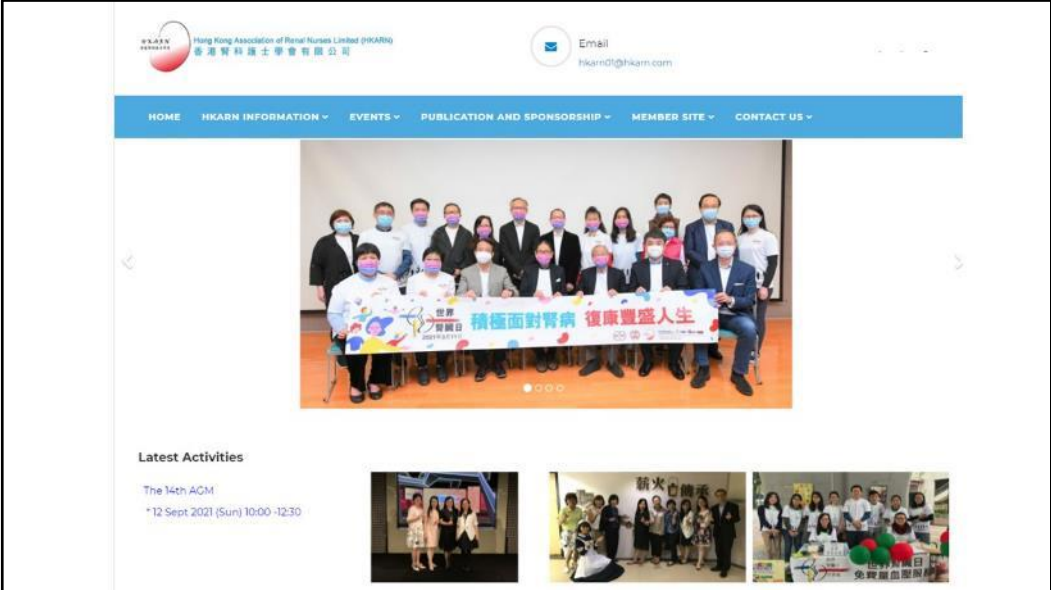
Co-organisers: Hong Kong Society of Nephrology

<https://www.hksn.org/>



Co-organisers: Hong Kong Association of Renal Nurses

<https://www.hkarn.com>



Partner: Alliance for Renal Patients Mutual Help Association

<http://www.arpmha.org.hk/>



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