HKU Med
LKS Faculty of Medicine
Department of Medicine
香港大學內科學系

腎病知多少 - 常見成因及預防方法

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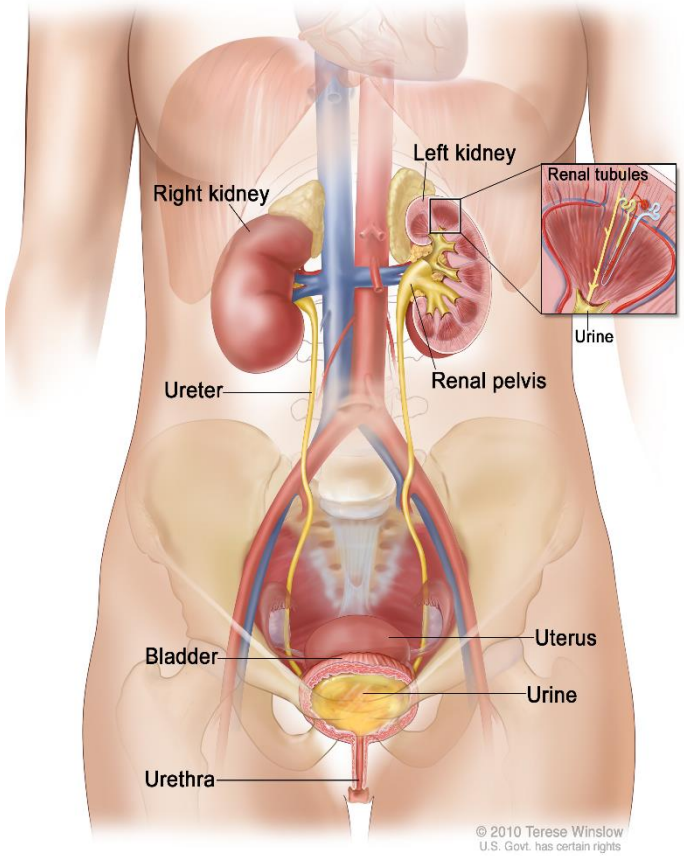
- 腎臟具有重要的代謝和排泄功能
- 腎臟由稱為腎單位 (Nephron)的小單位組成
- 腎單位包括兩個主要部分：
  - 腎小球 (glomerulus)
  - 腎小管 (tubules)
- 由不同的常駐腎細胞（腎小球，內皮細胞，足細胞，腎小管細胞）和小血管組成
- 在多系統疾病中通常是傷害的目標

泌尿系統


Left kidney
Renal tubules
Right kidney
Urine
Renal pelvis
Ureter
Uterus
Bladder
Urine
Urethra
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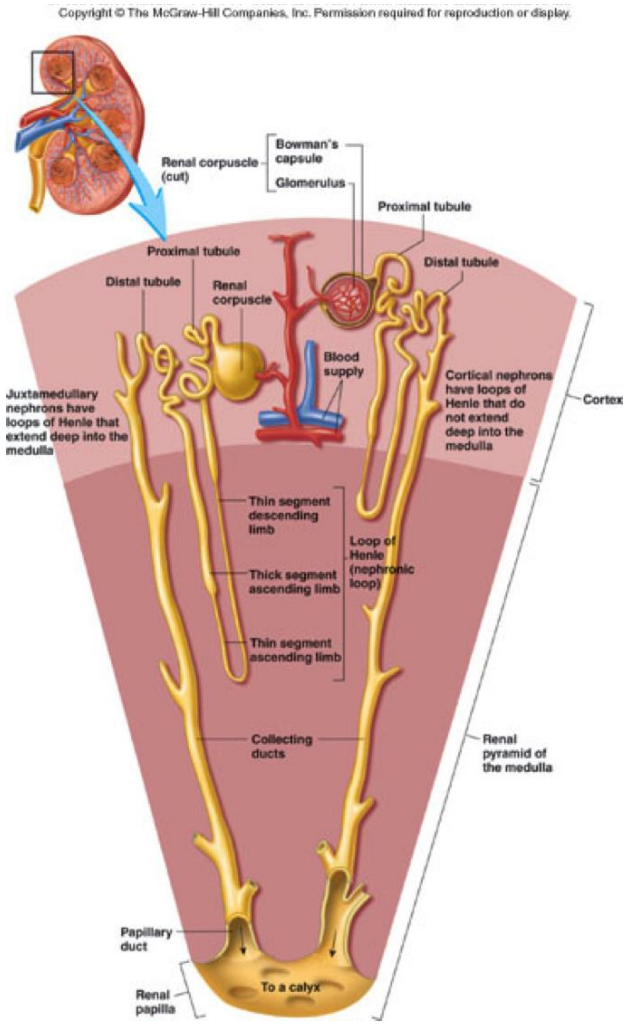
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Renal corpuscle (cut)
Bowman's capsule
Glomerulus
Proximal tubule
Proximal tubule
Distal tubule
Renal corpuscle
Distal tubule
Blood supply
Juxtamedullary nephrons have loops of Henle that extend deep into the medulla
Cortical nephrons have loops of Henle that do not extend deep into the medulla
Cortex
Thin segment descending limb
Loop of Henle (nephronic loop)
Thick segment ascending limb
Thin segment ascending limb
Collecting ducts
Renal pyramid of the medulla
Papillary duct
Renal papilla
To a calyx

Kidney Function

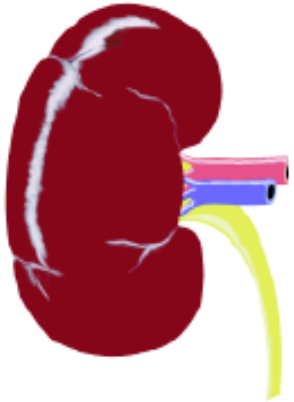
Excretory Functions

Remove metabolic waste products

Remove excess fluid

Regulate acid-base balance

Regulate electrocyte balance



Secretory Functions

Regulate blood pressure (Renin)

Regulate red blood cell production (EPO)

Regulate calcium uptake (active Vit. D)

Remember: Renal function is to remove and to regulate

腎病的早期及晚期症狀

腎功能的評估

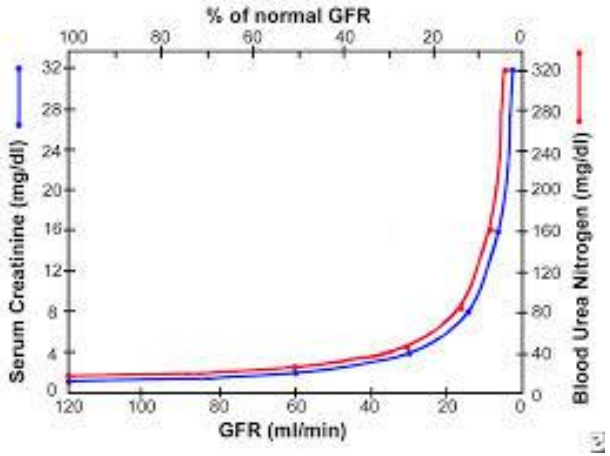
抽血檢查是評估腎功能的常用方法

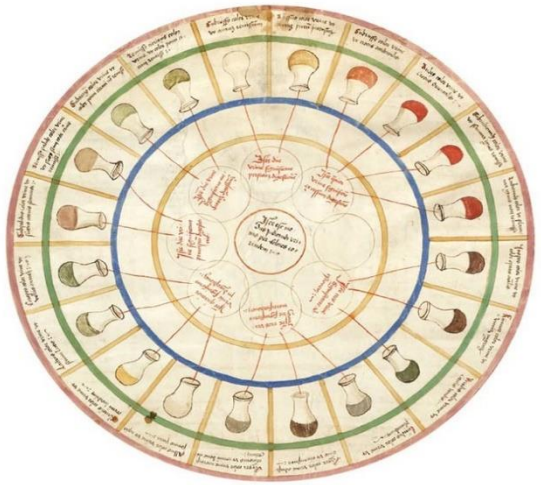
常用的參考指標包括:
肌肝酸 (creatinine)和尿素 (urea)

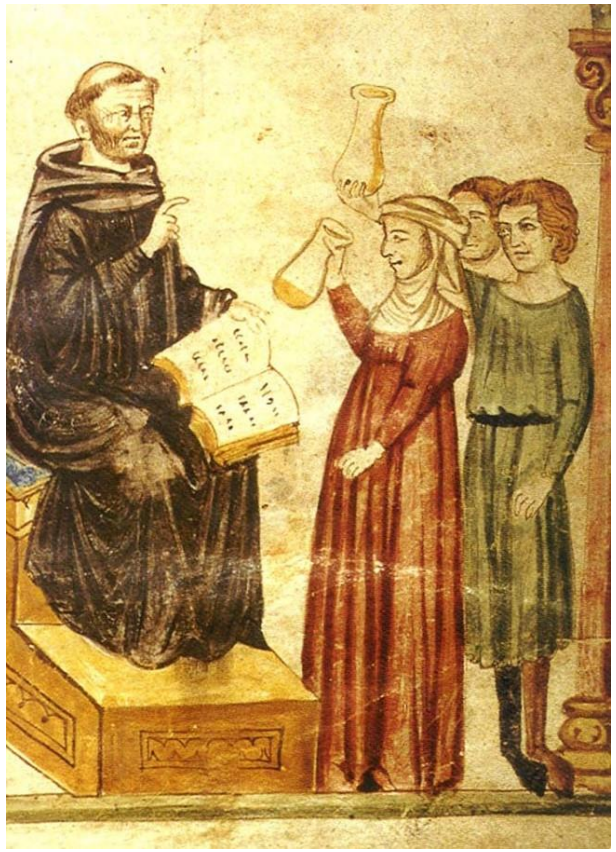
小便檢查 (MSU, 24-hr urine or spot urine)

腎臟超聲波 (Ultrasound)

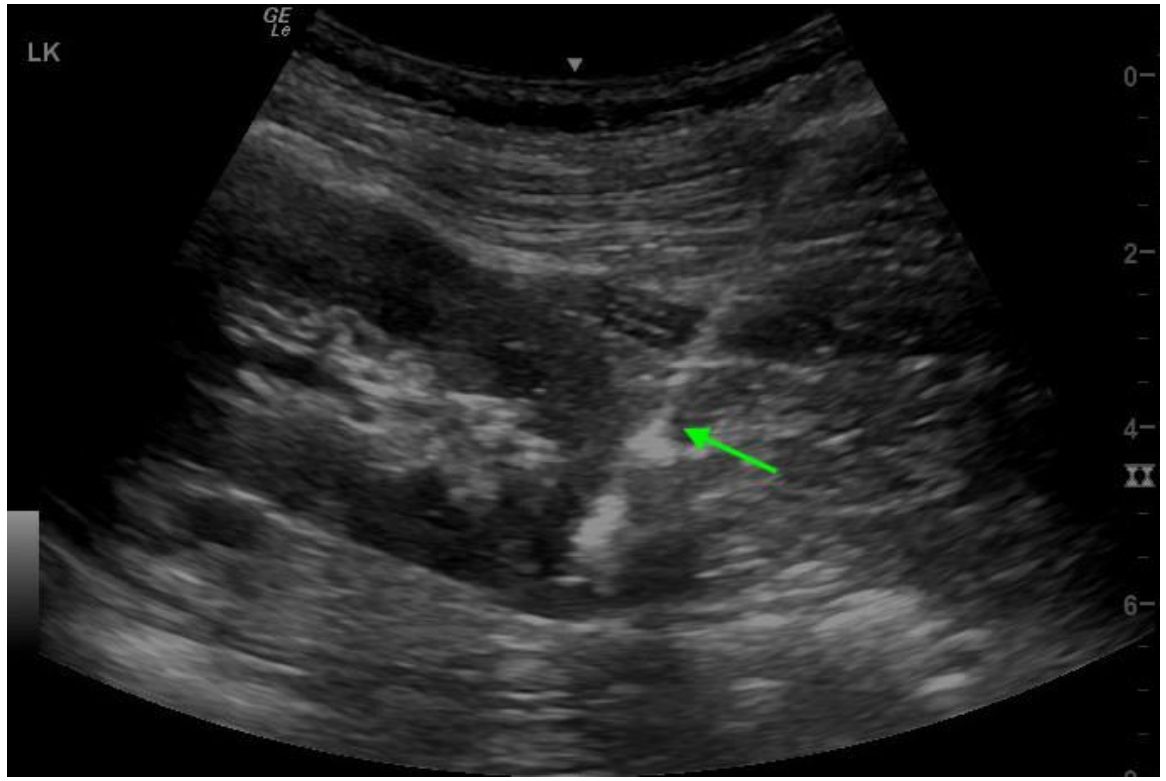
腎臟穿刺(活檢) (Kidney Biopsy)



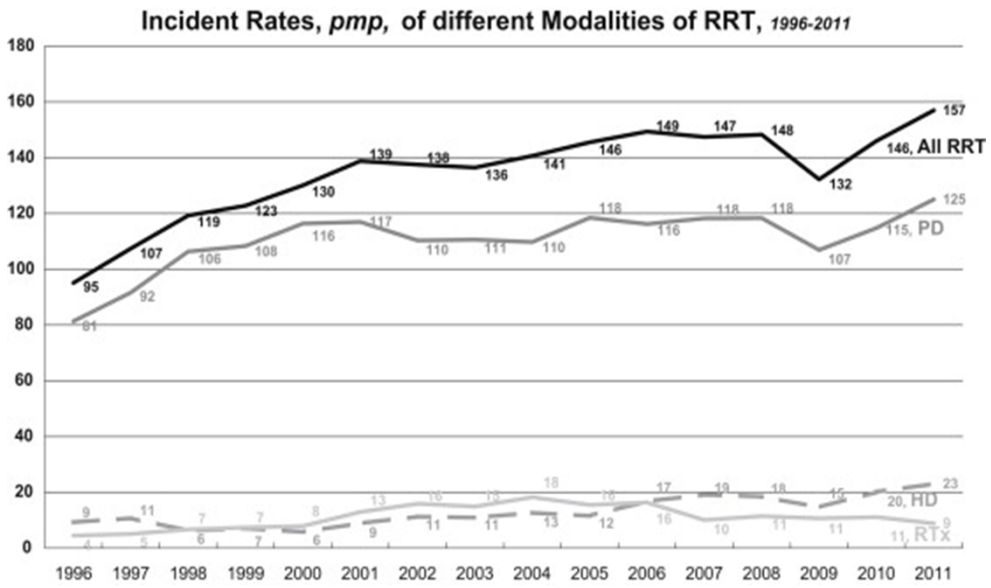


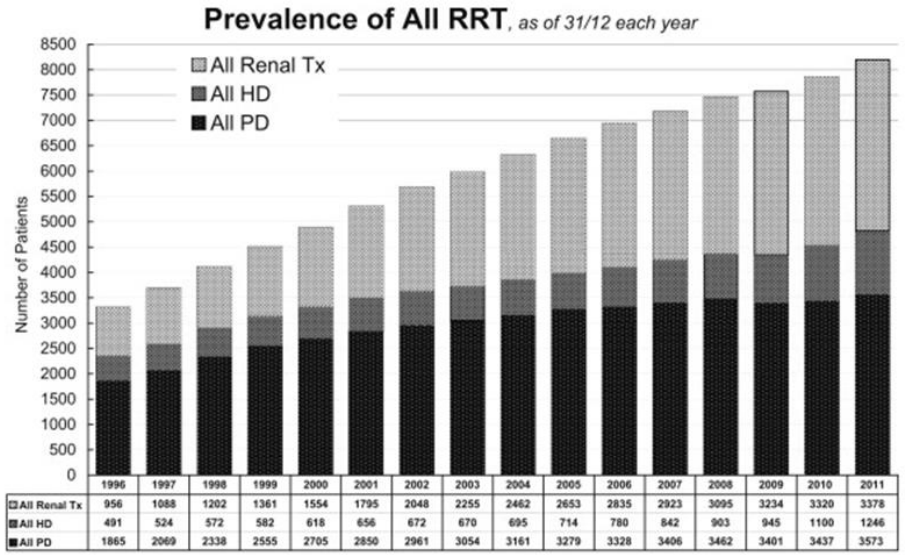


腎臟穿刺(活檢) (Kidney Biopsy)



終末期腎病發病率和患病率





	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
All Renal Tx	956	1088	1202	1361	1554	1795	2048	2255	2462	2653	2835	2923	3095	3234	3320	3378
All HD	491	524	572	582	618	656	672	670	695	714	780	842	903	945	1100	1246
All PD	1865	2069	2338	2555	2705	2850	2961	3054	3161	3279	3328	3406	3462	3401	3437	3573

腎病的常見成因

代謝性疾病

糖尿病

高血壓

藥物與醫療程序

止痛藥

化療藥物

顯影劑

腎小球炎

IgA 腎小球炎

狼瘡腎小球炎

急性/慢性間質性腎炎

遺傳性腎病

多囊腎腎病

泌尿系統梗阻

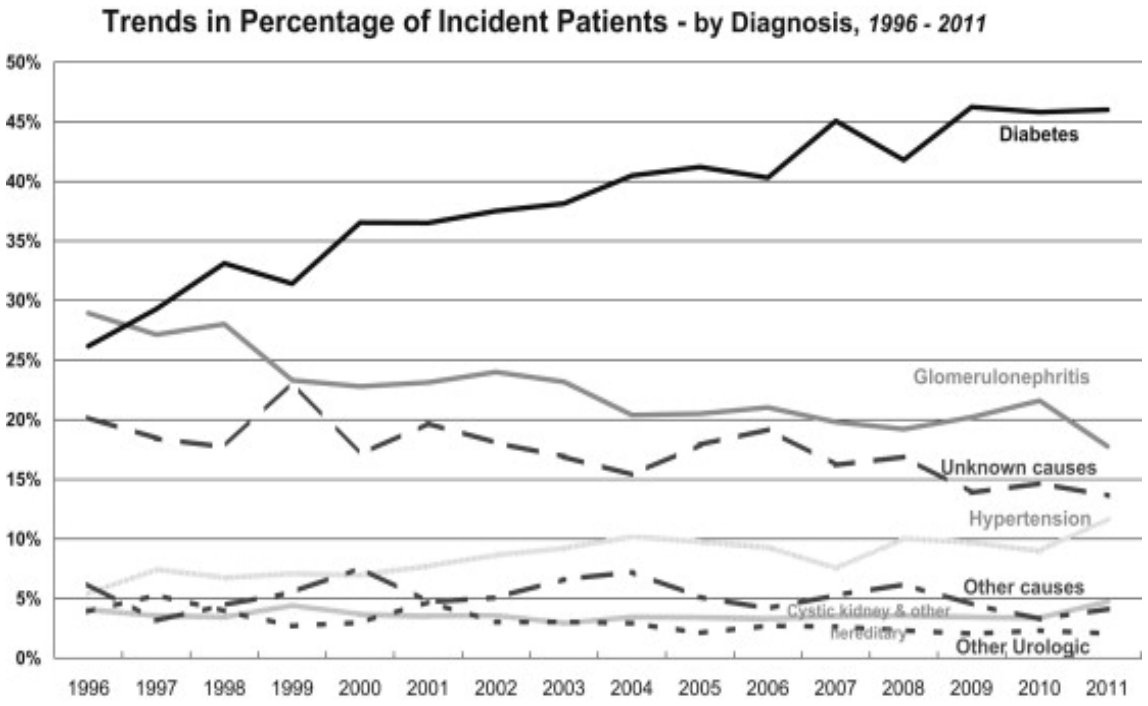
前列腺

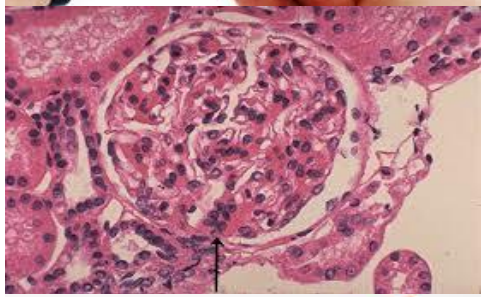
輸尿管

膀胱

尿道

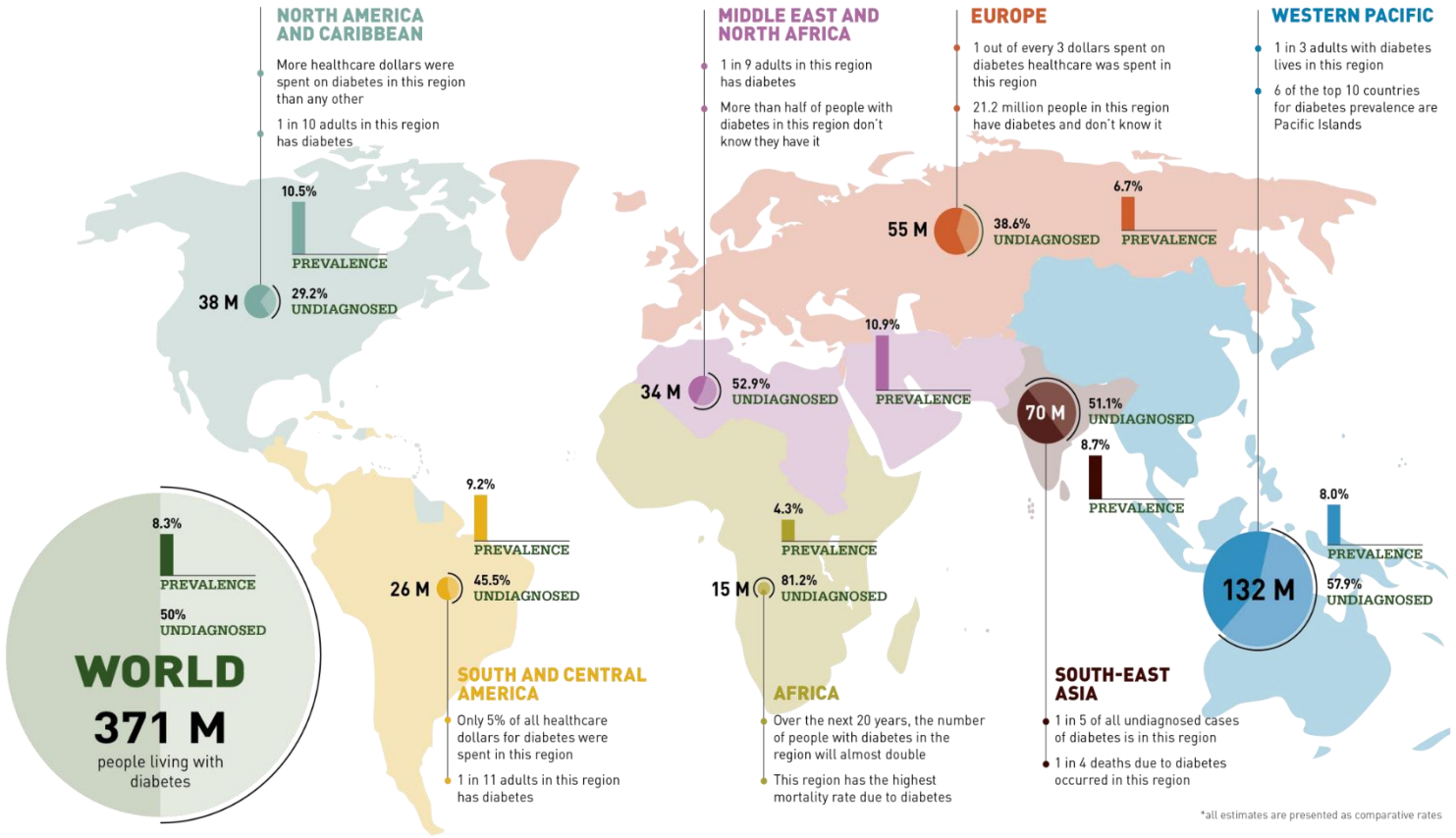
終末期腎病的成因


Trends in Percentage of Incident Patients - by Diagnosis, 1996 - 2011
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Diabetes
Glomerulonephritis
Unknown causes
Hypertension
Other causes
Cystic kidney & other hereditary
Other Urologic



糖尿病腎病

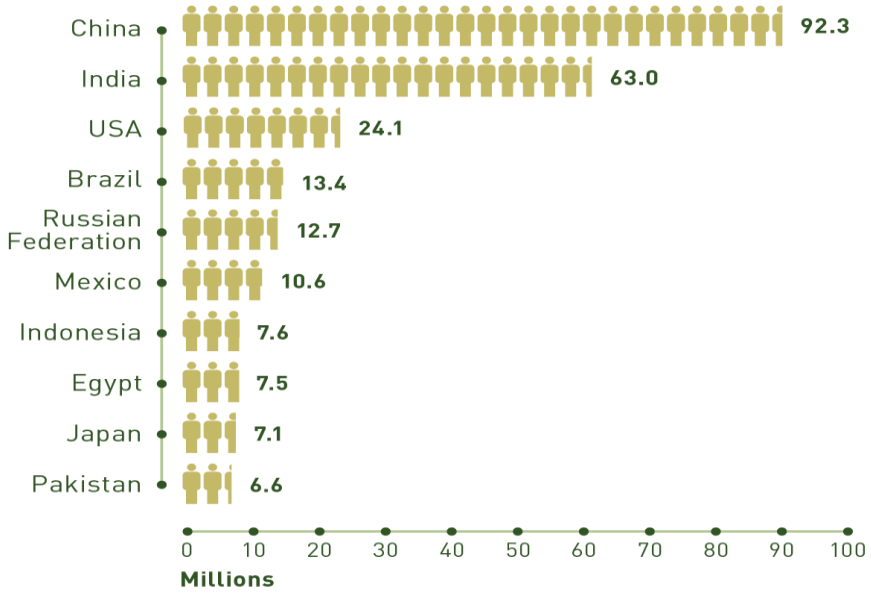
糖尿病患病率


NORTH AMERICA AND CARIBBEAN
More healthcare dollars were spent on diabetes in this region than any other
1 in 10 adults in this region has diabetes
10.5%
PREVALENCE
38 M
29.2% UNDIAGNOSED
MIDDLE EAST AND NORTH AFRICA
1 in 9 adults in this region has diabetes
More than half of people with diabetes in this region don't know they have it
34 M
52.9% UNDIAGNOSED
10.9%
PREVALENCE
EUROPE
1 out of every 3 dollars spent on diabetes healthcare was spent in this region
21.2 million people in this region have diabetes and don't know it
55 M
38.6% UNDIAGNOSED
6.7%
PREVALENCE
WESTERN PACIFIC
1 in 3 adults with diabetes lives in this region
6 of the top 10 countries for diabetes prevalence are Pacific Islands
70 M
51.1% UNDIAGNOSED
8.7%
PREVALENCE
132 M
8.0%
PREVALENCE
57.9% UNDIAGNOSED
8.3%
PREVALENCE
50% UNDIAGNOSED
WORLD
371 M
people living with diabetes
9.2%
PREVALENCE
26 M
45.5% UNDIAGNOSED
SOUTH AND CENTRAL AMERICA
Only 5% of all healthcare dollars for diabetes were spent in this region
1 in 11 adults in this region has diabetes
4.3%
PREVALENCE
15 M
81.2% UNDIAGNOSED
AFRICA
Over the next 20 years, the number of people with diabetes in the region will almost double
This region has the highest mortality rate due to diabetes
SOUTH-EAST ASIA
1 in 5 of all undiagnosed cases of diabetes is in this region
1 in 4 deaths due to diabetes occurred in this region
*all estimates are presented as comparative rates

糖尿病患病率

More than **371 million** people have diabetes.

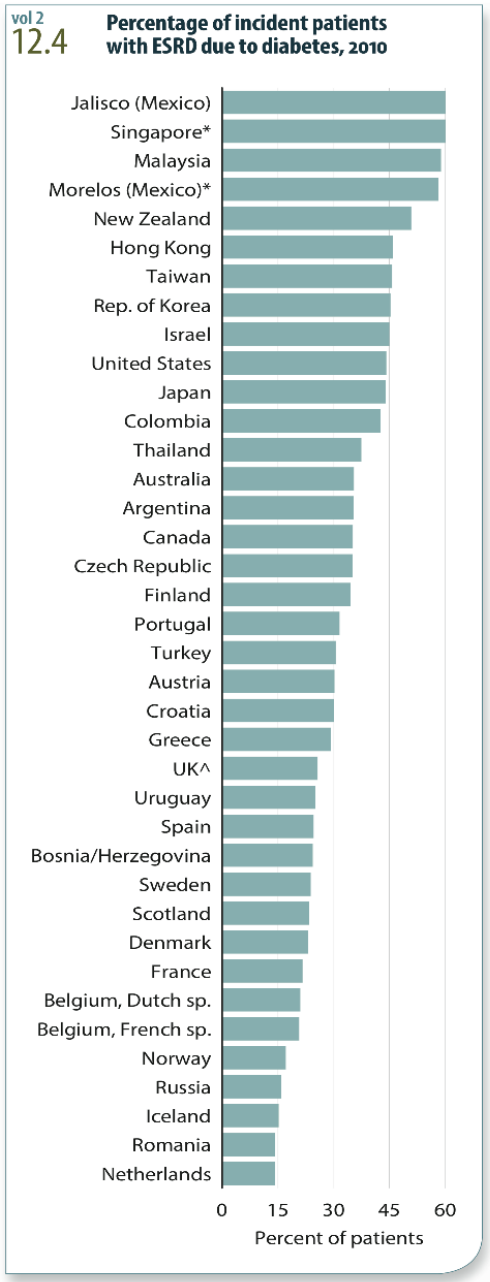
TOP 10 COUNTRIES/TERRITORIES FOR PEOPLE WITH DIABETES (20-79 YEARS)



糖尿病腎病

- 發病率和患病率增加
  - 缺乏運動
  - 飲食西化
  - 代謝綜合徵
- 糖尿病腎病導致約50%的末期腎功能衰竭

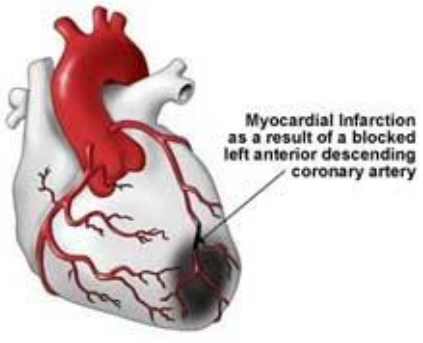
end-stage renal disease due to diabetes

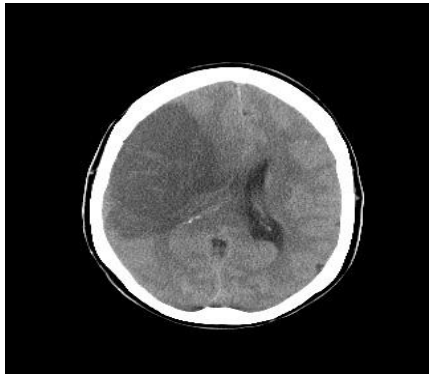


糖尿病和腎病關係

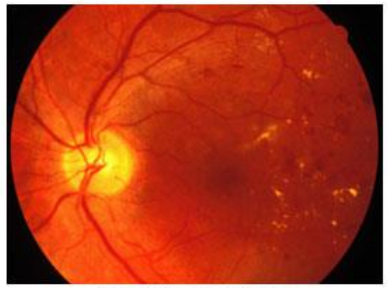
	一型糖尿病	二型糖尿病
發病率/患病率	罕見	十分普遍
發病時間	年輕	~ 中年
病理	推測是胰島細胞的自身免疫性破壞 缺乏胰島素	胰島素抵抗 與代謝綜合徵的相關
腎臟表現	腎功能衰竭發生在 10-15 年	10年後： 25% 微量白蛋白尿 5% 蛋白尿 15-20年後發生腎功能衰竭
治療	通常依賴胰島素（基礎推注）	口服糖尿藥物±胰島素

大血管並發症

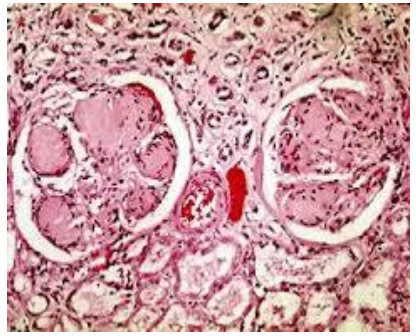


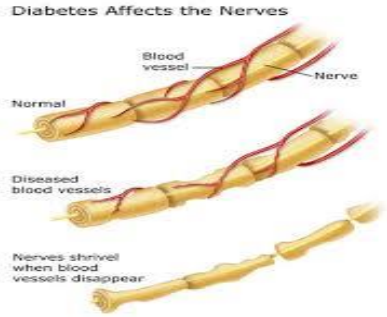


微血管並發症



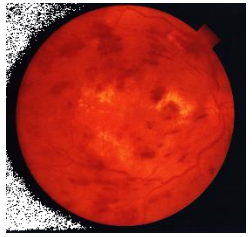
Background Diabetic
Retinopathy (left eye)

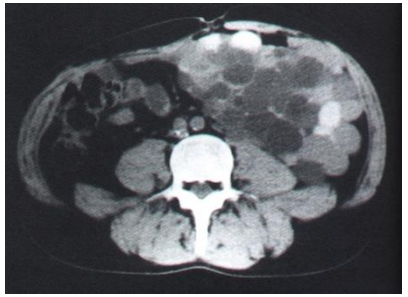


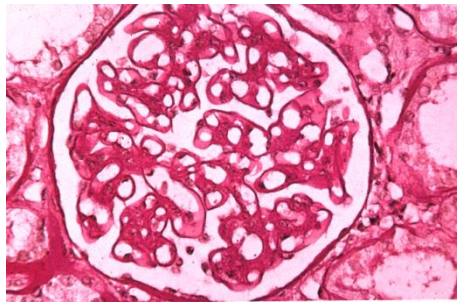


末期腎功能衰竭的成因

	USRDS data	HK Renal Registry
糖尿病腎病	41.8%	49.6%
高血壓腎病	25.4%	9.5%
腎小球炎	9.3%	17%
多囊腎病	2.2%	3.5%

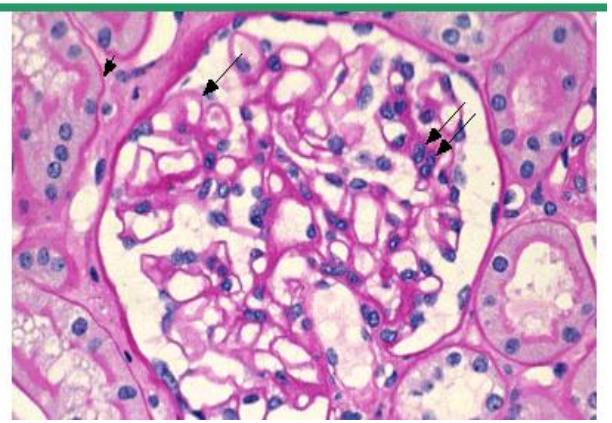




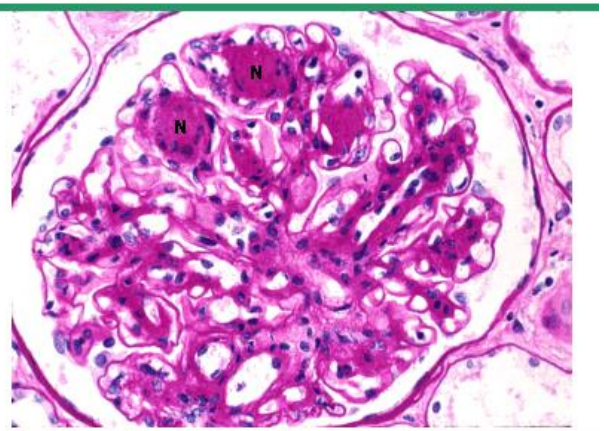


糖尿病肾病

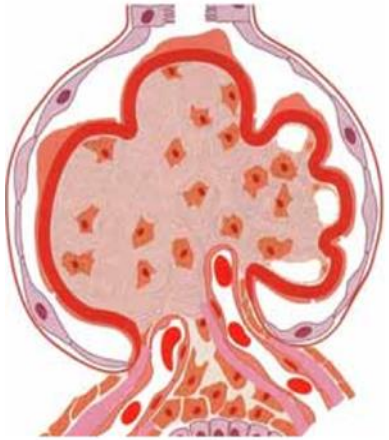
Normal glomerulus



Diabetic nephropathy

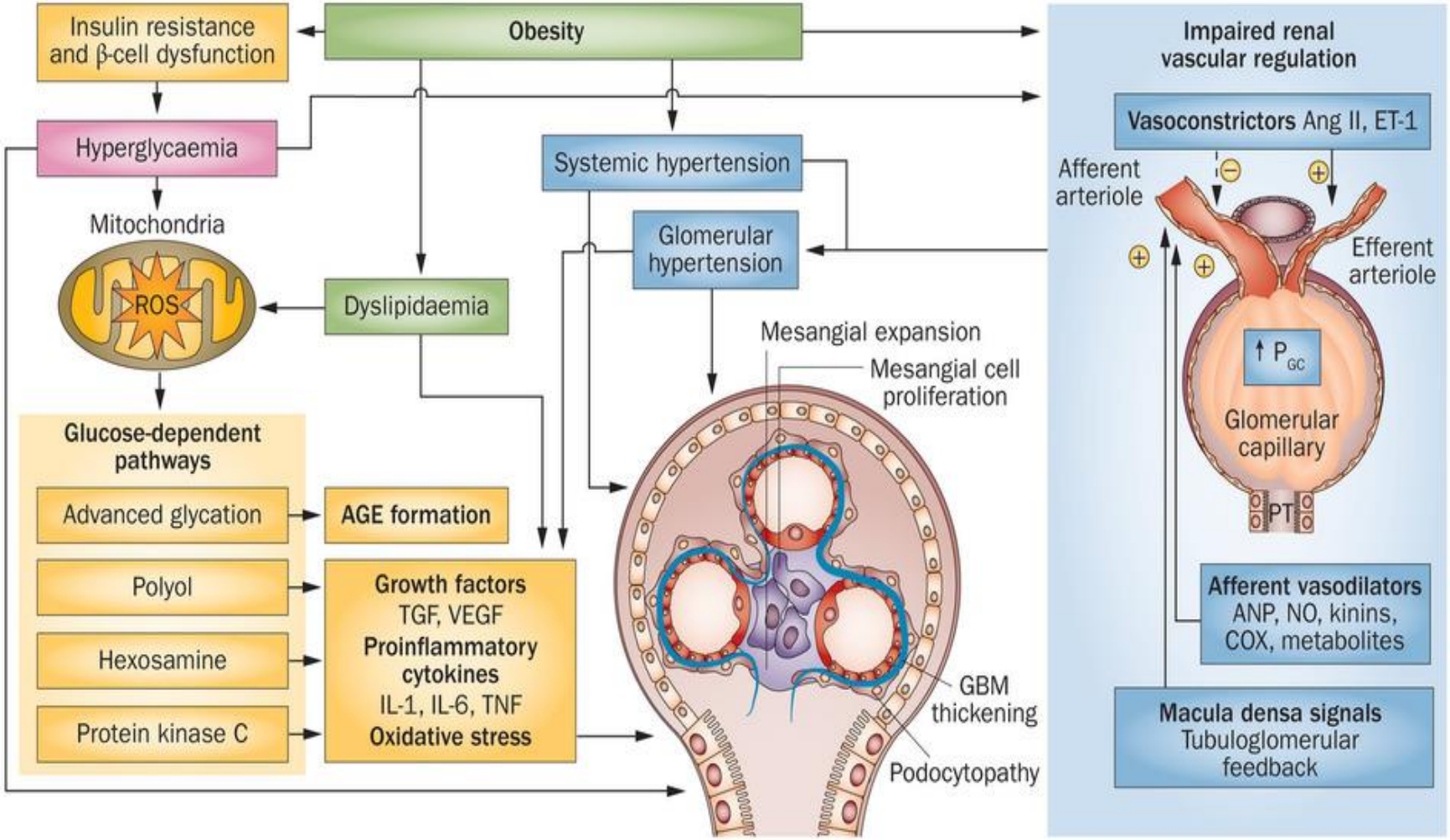


Diabetic Nephropathy

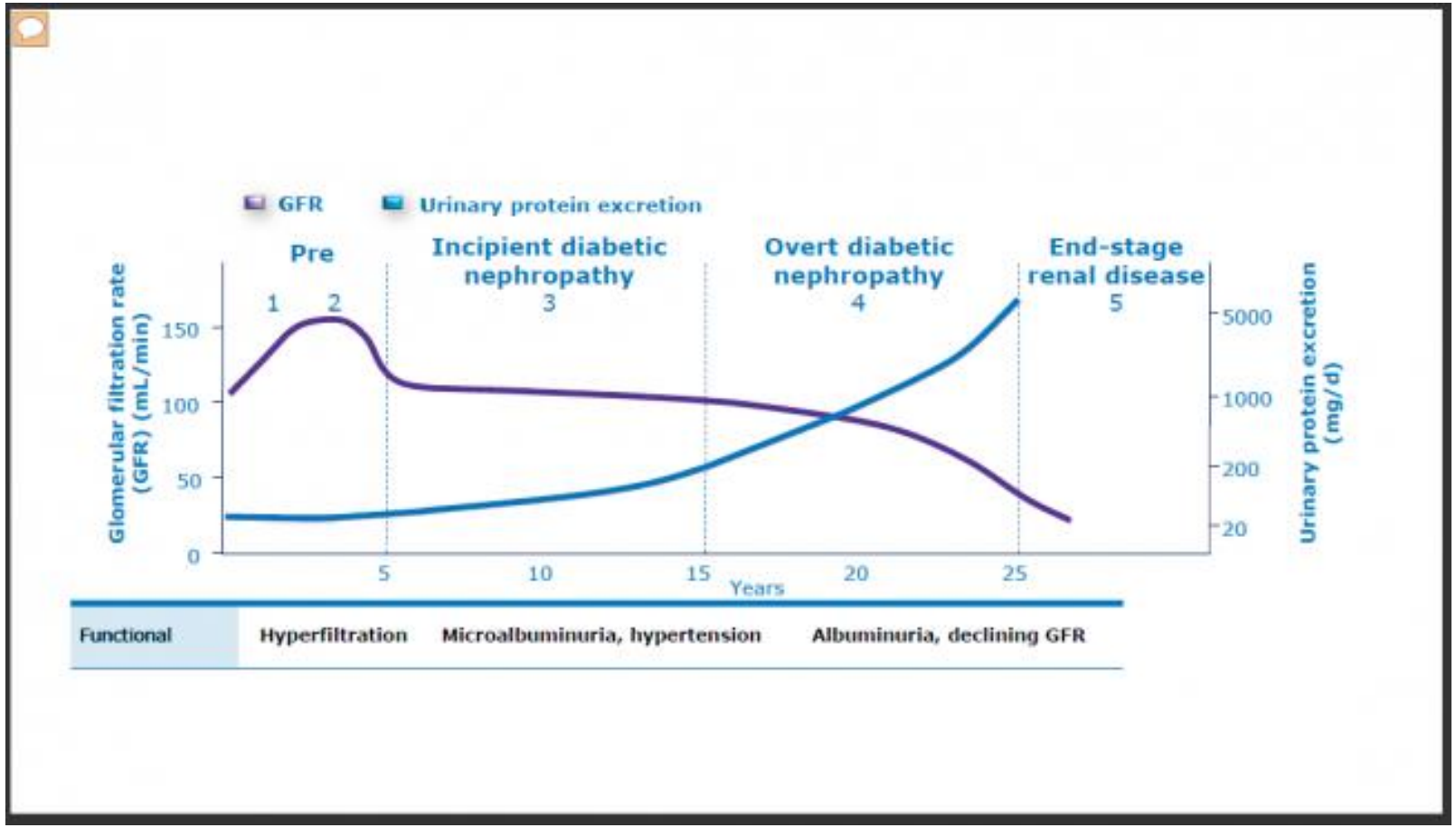


- Basement membrane thickening
  - Glomerular
  - Tubular
- Mesangial sclerosis
  - Diffuse
  - Nodular: KW (Kimmelstiel-Wilson)
  - Microaneurysms
- Arteriolar hyaline
- No immune complexes
- Metabolic

糖尿病肾病


Insulin resistance and β-cell dysfunction
Obesity
Impaired renal vascular regulation
Hyperglycaemia
Systemic hypertension
Vasoconstrictors Ang II, ET-1
Afferent arteriole
Efferent arteriole
Mitochondria
ROS
Glomerular hypertension
Dyslipidaemia
Mesangial expansion
Mesangial cell proliferation
↑ P_{GC}
Glomerular capillary
PT
Glucose-dependent pathways
Advanced glycation
AGE formation
Polyol
Hexosamine
Protein kinase C
Growth factors
TGF, VEGF
Proinflammatory cytokines
IL-1, IL-6, TNF
Oxidative stress
GBM thickening
Podocytopathy
Afferent vasodilators
ANP, NO, kinins, COX, metabolites
Macula densa signals
Tubuloglomerular feedback

糖尿病肾病病程


GFR
Urinary protein excretion
Pre
Incipient diabetic nephropathy
3
Overt diabetic nephropathy
4
End-stage renal disease
5
1
2
Glomerular filtration rate (GFR) (mL/min)
150
100
50
0
5
10
15
20
25
Years
5000
1000
200
20
Urinary protein excretion (mg/d)
Functional
Hyperfiltration
Microalbuminuria, hypertension
Albuminuria, declining GFR

糖尿病和腎病

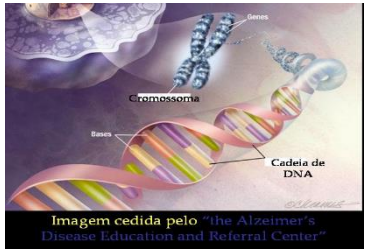
- 遺傳易感性：
  *如果一級親屬患有糖尿病腎病，則患者的風險高達83%

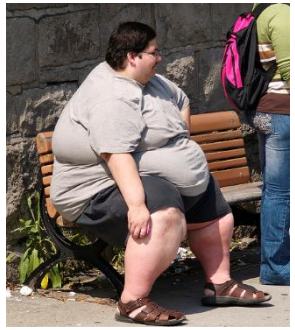
  糖尿病持續時間和類型

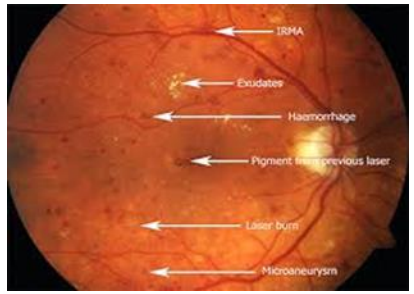
  其他糖尿病微血管並發症的存在

  血壓和糖尿病控制不良

  抽煙







糖尿病腎病

- 控制血糖(HbA1c <7％)
  - SGLT2抑制劑
- 使用ACEI / ARB（130/85 mmHg）
- 控制其他心血管風險因素（如血脂)
- 戒菸

高血壓腎病

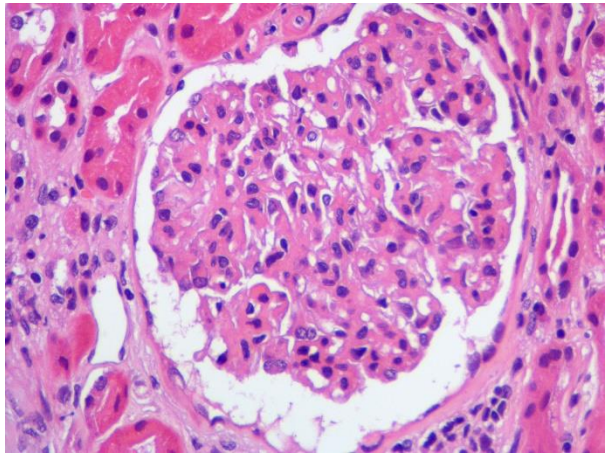
高血壓腎病

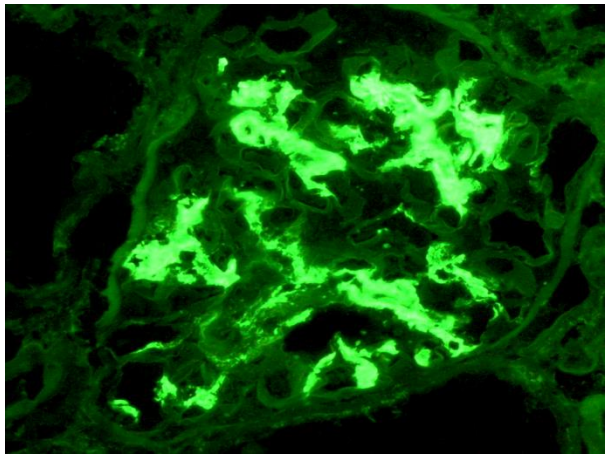
- 高血壓是一個非常普遍的醫學問題
- 高血壓可導致腎臟損害，反之亦然
- 在以下情況中對腎臟的有害影響：
  - 孤立的高血壓（通常長期存在且控制不佳）
  - 高血壓腎小球硬化
  - 加快其他腎小球疾病和慢性腎病的進展
- 血壓目標取決於：
  - 先前存在的腎臟疾病和蛋白尿
  - 其他心血管風險因素
  - 年齡和治療耐受性

腎小球炎 (glomerulonephritis)

IgA 腎小球腎炎

- IgA 腎小球炎 - 亞洲和香港最常見的原發性腎小球炎
- 臨床表徵: 無症狀、顯微鏡下或肉眼可見的血尿、蛋白尿、腎功能損害
- 腎活檢為確診方法
- 處理:
  - ACEI/ARB
  - 特定患者需要免疫抑制





系統性紅斑狼瘡與狼瘡腎炎

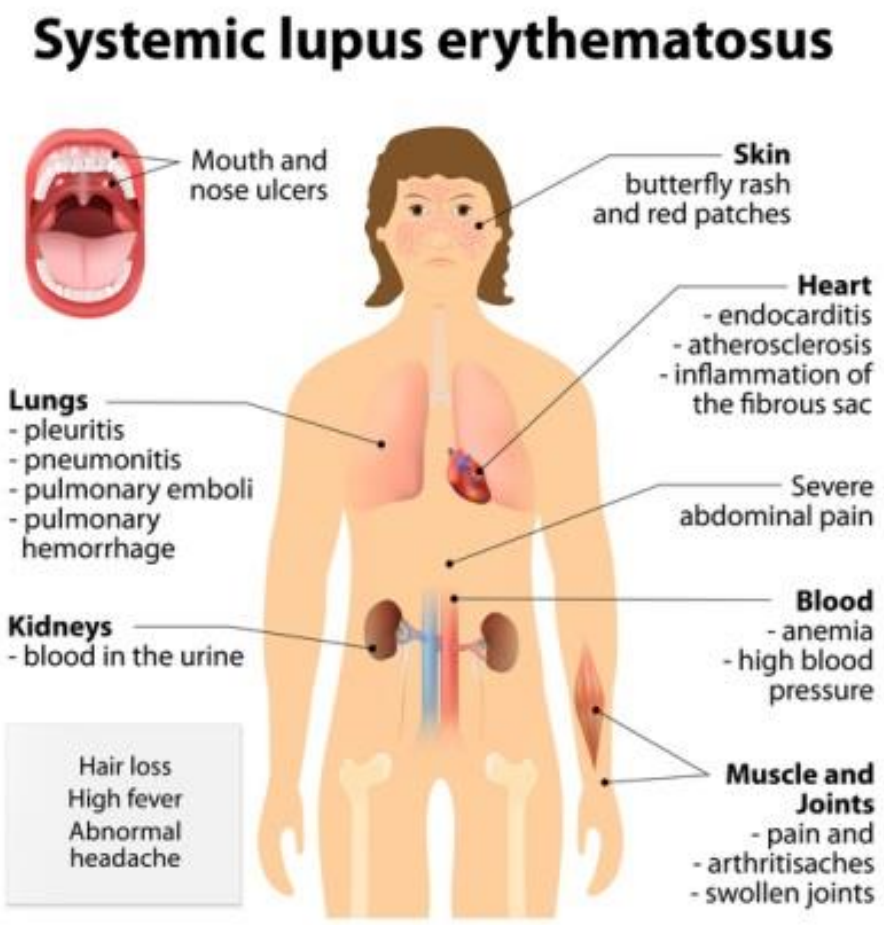
系統性紅斑狼瘡 的特徵是自身耐受性的破壞和自身抗體

影響多個器官; ~60-70% 的亞洲紅斑狼瘡患者患有狼瘡腎炎

典型病程：發作期+疾病靜止期

不同的腎臟表現：

通常為蛋白尿 ± 鏡下血尿和急性腎損傷
不同類別的狼瘡腎炎和臨床病理有相關性

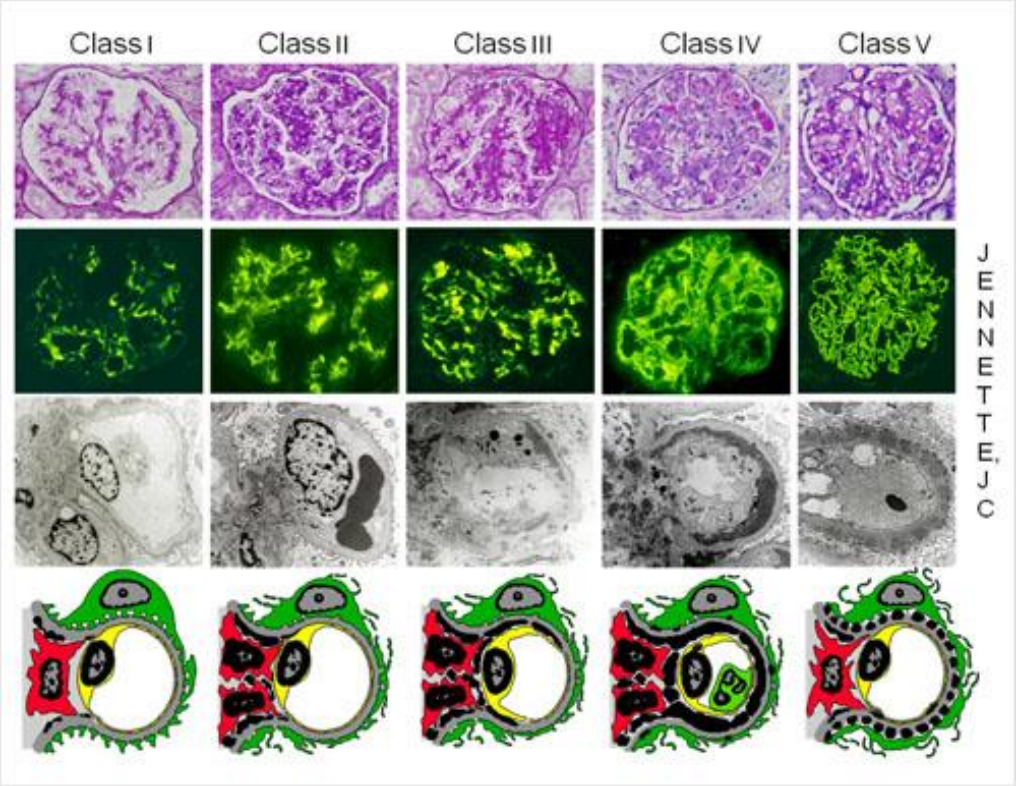


狼瘡腎炎

- 通常根據腎臟參數和組織學檢查結果指導治療

- 誘導治療：大劑量皮質類固醇+ CYC / MMF
  維持治療：低劑量皮質類固醇+ AZA / MMF
  其他治療方法：難治性病例 - CNI /生物製劑

- 預後取決於:
  - 診斷和治療時間
  - 對治療的反應
  - 種族
  - 復發

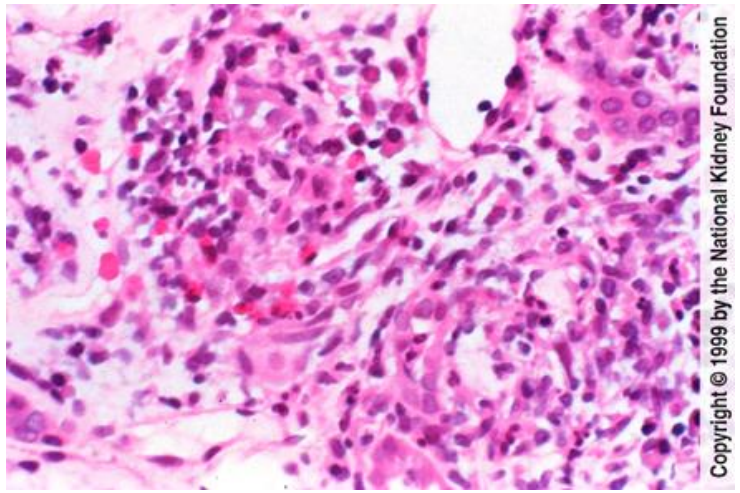


急性/慢性間質性腎炎

- 通常與藥物有關
  - 例如利福平(rifampicin)、別嘌呤醇 (allopurinol)、非類固醇類消炎止痛藥(NSAID)、質子泵抑製劑(PPI)、免疫療法 (immunotherapy)

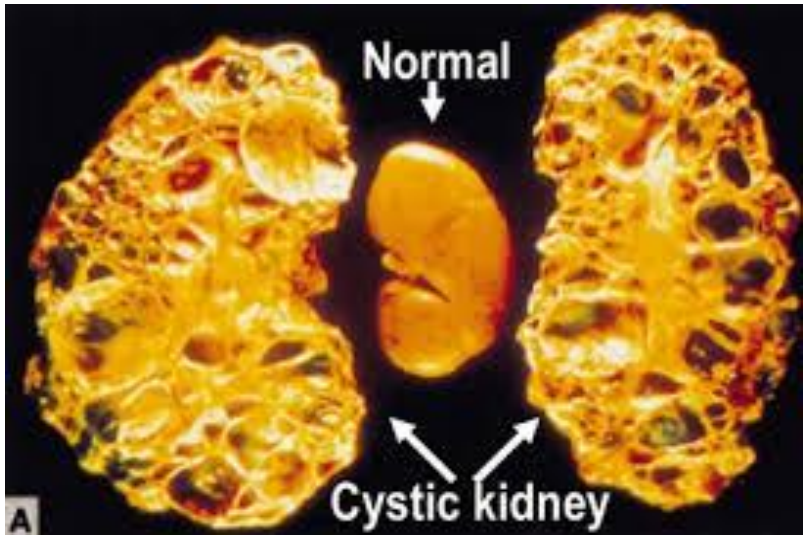
- 其他病因：
  - 感染（例如漢坦病毒、鉤端螺旋體病）
  - 自身免疫性疾病（例如 SLE）

- 與藥物相關的 AIN 通常在停用有問題的藥物後解決；皮質類固醇的使用有爭議



遺傳性腎病

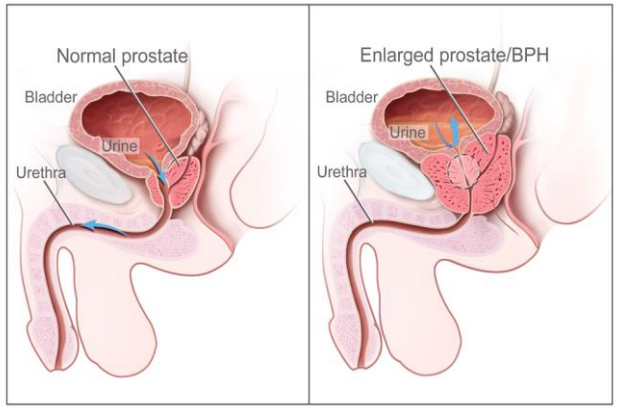
- 多囊腎腎病最常見的遺傳性腎病
  - 顯性遺傳
  - 發生率為千分之一
- 腎臟和肝臟多發囊腫
- 其他並發症：高血壓、腎結石、血尿、腦動脈瘤
- 50-60歲: 腎功能衰竭



前列腺問題

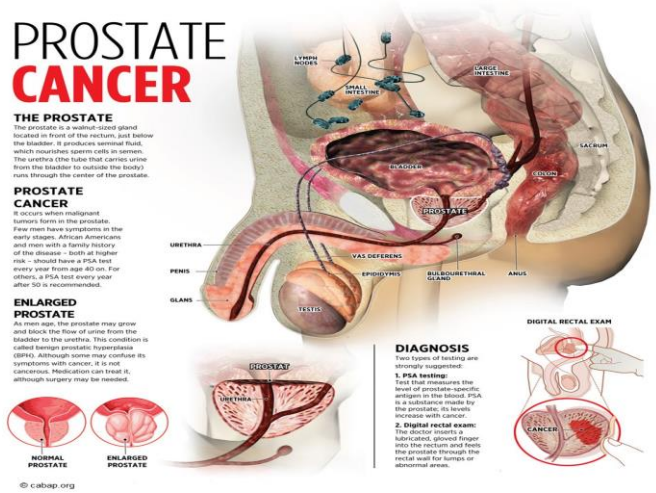
良性前列腺增生 (BPH)

- 男性雙側腎積水最常見的原因
- 小便猶豫/ 尿頻/小便弱流
- 可被尿道炎誘發



前列腺癌

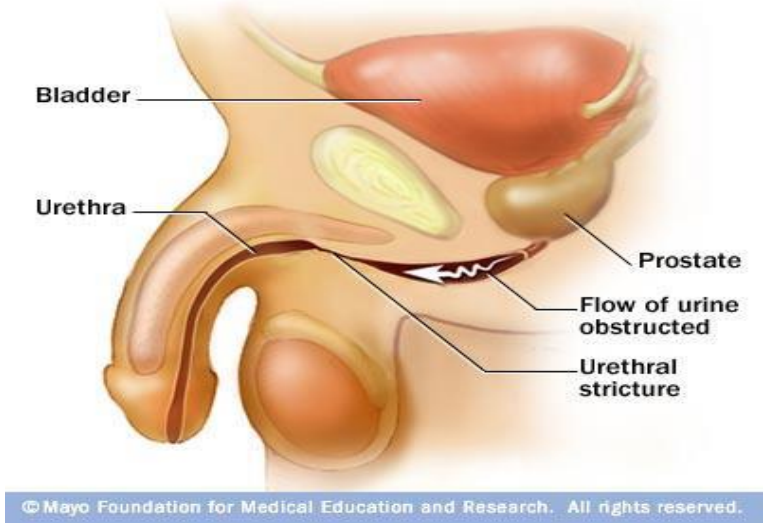
- 前列腺/背痛（骨轉移）



尿道問題

- 尿道狹窄/狹窄
- 先前的創傷或長時間的導管插入術

- 較低的尿道炎很少導致腎功能損害



膀胱問題

膀胱癌

- 無痛性肉眼血尿
- 可引起雙側輸尿管梗阻

膀胱結石

- 排尿困難/血尿/復發性尿道炎

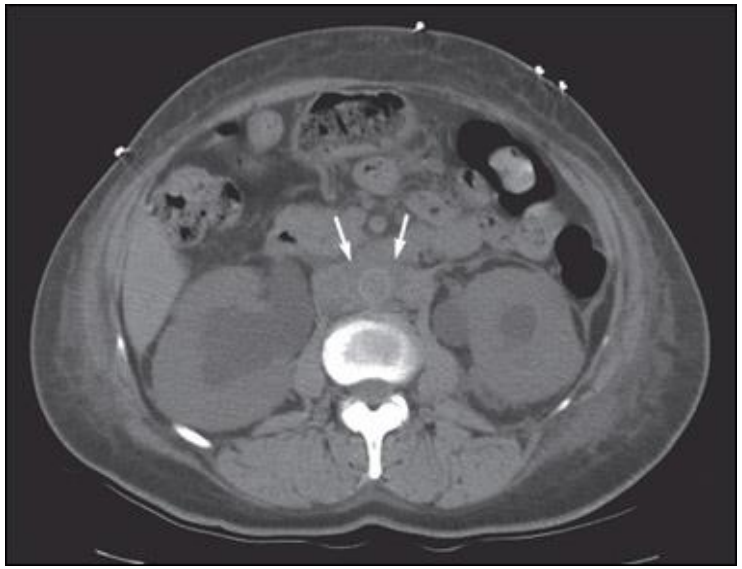
輸尿管問題

輸尿管壁外

- 轉移性淋巴結
- 放射後纖維化
- 罕見特發性腹膜後纖維化

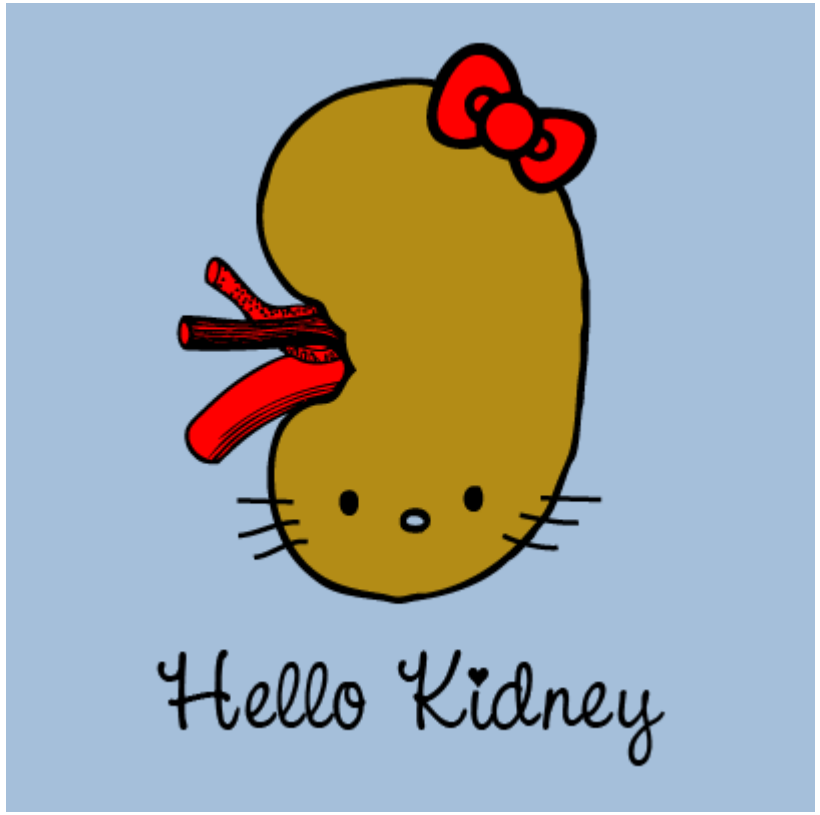
輸尿管壁內

- 輸尿管癌



預防慢性腎病

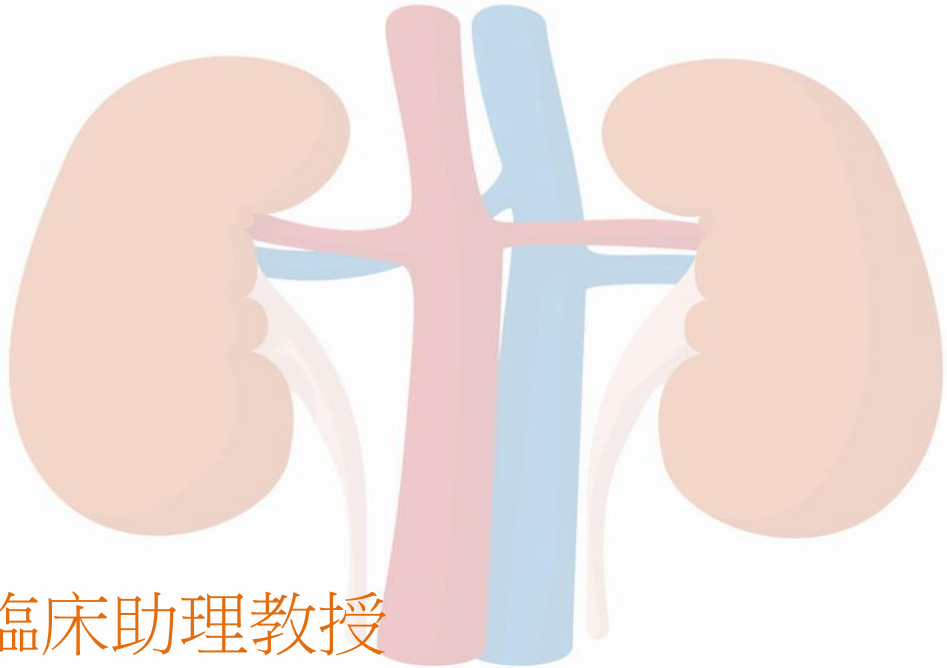
- 適量飲水
- 低鹽攝取量 (1500-2000 mg/day)
- 良好的血糖控制
- 良好的血壓控制
- 避免使用非類固醇類消炎止痛藥 (NSAID)
- 謹慎使用顯影劑檢查 (iodine contrast)
- 定期身體檢查



THANK YOU!

HKU Med
LKS Faculty of Medicine
Department of Medicine
香港大學內科學系

末期腎衰竭
-傳統及最新療法



馬錦文醫生
香港大學內科學系名譽臨床助理教授

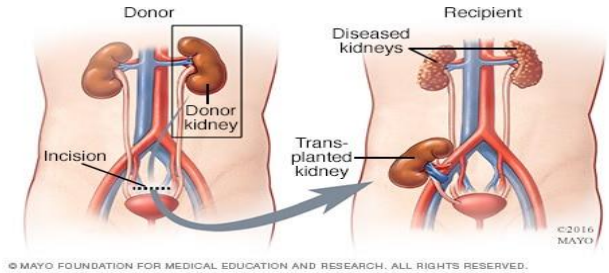
若我的腎功能漸漸衰退。。。
我有甚麼選擇？

末期腎衰竭的治療選擇

- 大部分腎衰竭病者需要接受**透析治療**，清除體內積聚的毒素、廢物及過多水份
  - 透析治療只能代替腎臟的排泄功能，並不能根治腎衰竭。
- **腎臟移植**是腎衰竭病者最理想的治療方法
  - 移植患者與透析患者相比，所受的限制更少，生活的質量更高。大多數患者比透析時感覺更好，更有體力。

末期腎衰竭的治療選擇

1.腎臟移植



2.透析

- 腹膜透析

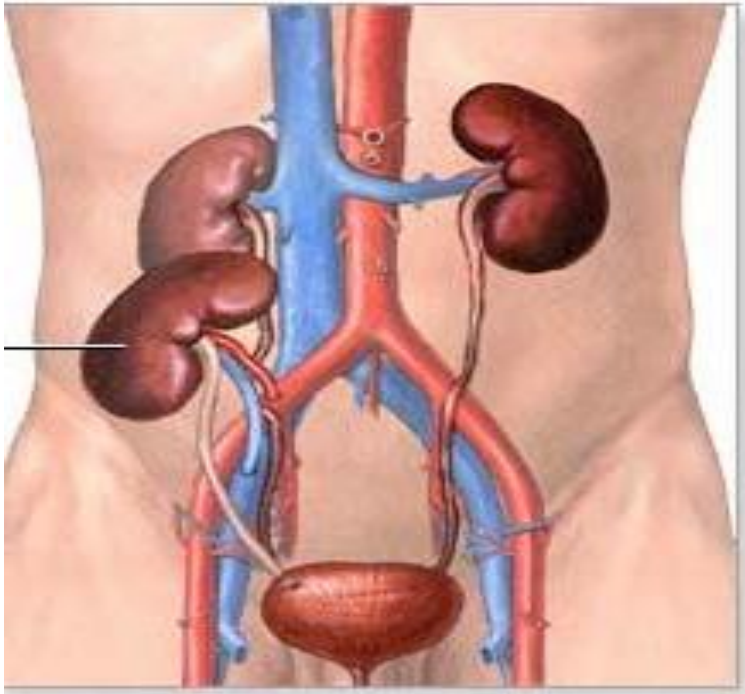
- 血液透析

3.紓緩治療

腎臟移植

- 健康捐贈者的腎臟移植給腎衰竭病者
- 必須使用抗排斥藥物預防移植腎被排斥

- 腎源:
  - 遺體腎臟捐贈
  - 活體捐贈



遺體腎臟捐贈

- 在中央器官捐贈登記名冊中的**透析病人**有機會接受遺體腎臟捐贈

- **遺體腎臟捐贈者：**
  - 3至70歲腦死亡人士
  - 具備一般器官捐贈者的條件
  - 沒有腎病
  - 腎功能正常
  - 肝炎帶菌者捐贈腎臟可移植給亦是肝炎帶菌的輪候者

器官/組織	2019	2020	2021 (1月至3月)	等候人數 (截至31.3.2021)
腎臟捐贈 由遺體捐贈 由活體捐贈	42 15	55 10	13 1	2301

活體捐贈腎臟移植

近親活體腎臟移植

- 捐腎者: 可以為有血源關係的近親， 夫妻.....
  - 活體捐贈受《人體器官移植條例》規範

- 可在洗腎前進行， 避免洗腎
- 減短須洗腎的時間
- 病人及移植腎的存活率比遺體腎移植好

活體捐贈腎臟移植

近親活體腎臟移植

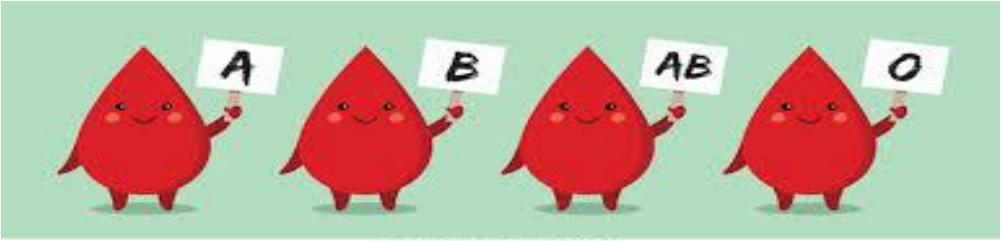
- 受贈者及捐腎者須作詳細評估
  - 確保*受贈者*身體情況適合換腎
  - 確保*捐贈者*身體情況適合捐腎
  - 確保血型和組織型上是否良好*匹配*
- 檢查需時， 應盡早安排

傳統活體捐贈腎臟移植
血型配對

		受贈者			
	血型	O	A	B	AB
捐贈者	O	✓	✓	✓	✓
	A	✗	✓	✗	✓
	B	✗	✗	✓	✓
	AB	✗	✗	✗	✓

當捐贈者及受贈者的血型或組織抗原不相容時該怎麼辦?

等待遺體腎移植?



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跨血型
交叉配對。。。

活體器官交叉捐贈 草案下月交立會審議

【本報訊】需要接受器官移植的病人，如親友不適合贈，只能輪候遺贈器官。政府早前研究活體器官交叉贈，以增加器官供應。昨將《2018年人體器官移植(訂)條例草案》刊憲，容許在香港進行配對或匯集器捐贈。草案將於下月九日提交立法會審議。

人間大愛

不相容血型換腎
術前須去敏除抗體

香港器官捐贈率持續偏低，回顧過去十年，每年腎臟捐贈個案均少於一百宗，由於輪候屍腎時間漫長，有人會選擇捐贈自己一個腎臟，解救至愛親友的痛苦。

很多人以為血型不相容親人是不能活體捐贈，但隨着醫學進步，血型不相容的活體腎臟移植已在世界各地進行。病人只需在移植前接受去敏化治療（Desensitization），使用免疫抑制藥物抑制B細胞，以及利用血漿置換術（Plasmapheresis）將洗腎病人體內對抗不同血型的抗體移除，就可進行移植手術，效果與傳統血型相容活體腎臟移植相若。

及早移植　病人存活率更高

研究顯示，輪候腎臟時間愈長，病人健康情況會愈差，發生各樣併發症風險亦愈大。相反，如能盡早進行移植，包括血型不相容活體腎臟移植，病人的短期和長期存活率，都比繼續進行透析治療以等待屍腎移植優勝。

香港去年四月成功進行了首宗本地血型不相容腎臟移植，筆者期望隨着本港引入移植新技術，我們的腎病病人能有更多移植機會，重獲新生。

馬錦文醫生
香港移植學會義務秘書

- 其實隨著醫學進步，不相容的活體腎臟移植，已在世界各地進行
- **血型不相容的活體腎臟移植的效果亦與傳統血型相容活體腎臟移植相若。**

跨血型活體捐贈腎臟移植

- 其實隨著醫學進步，不相容的活體腎臟移植，已在世界各地進行
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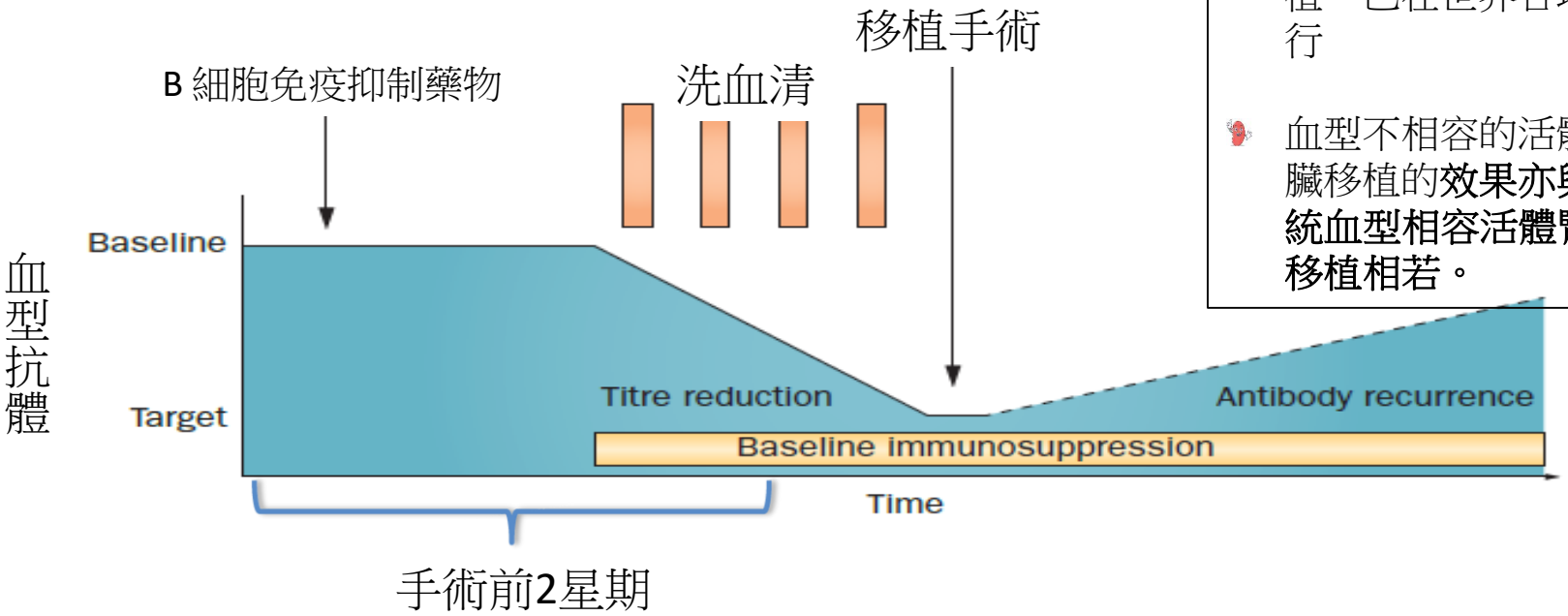

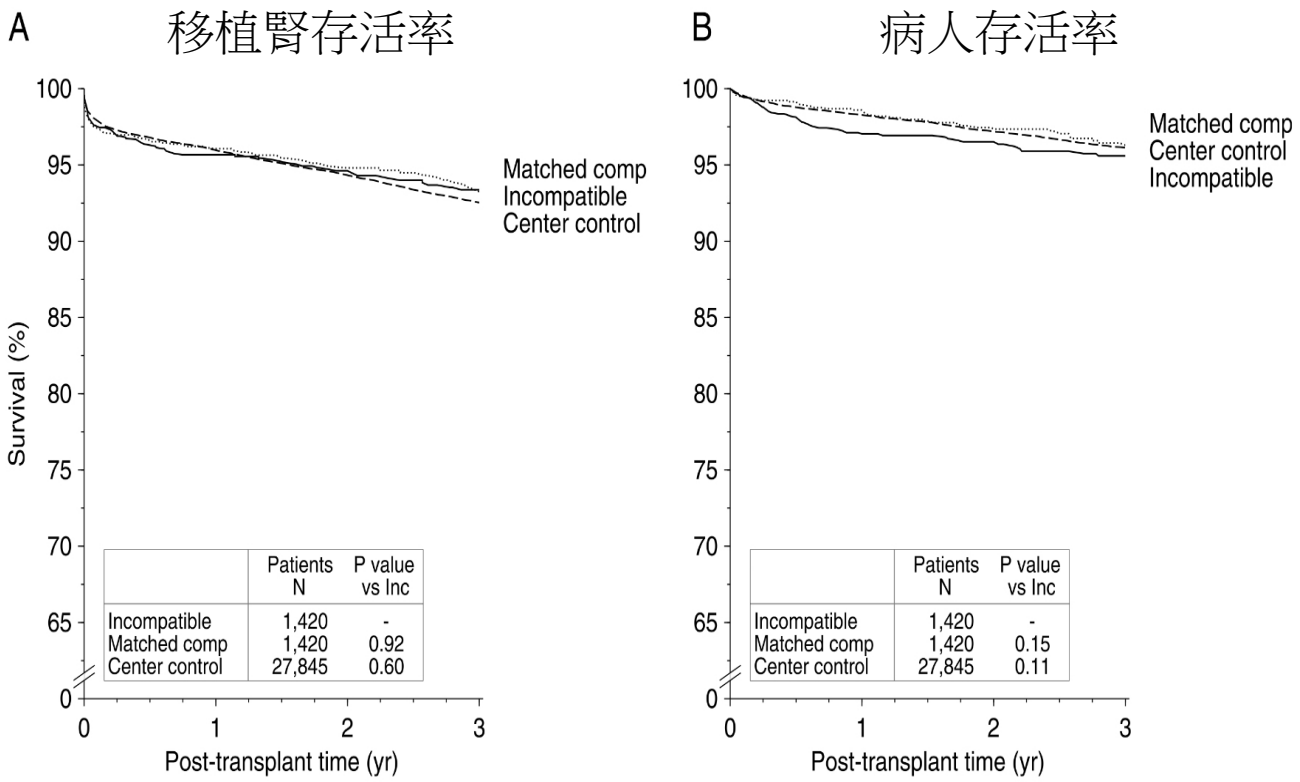

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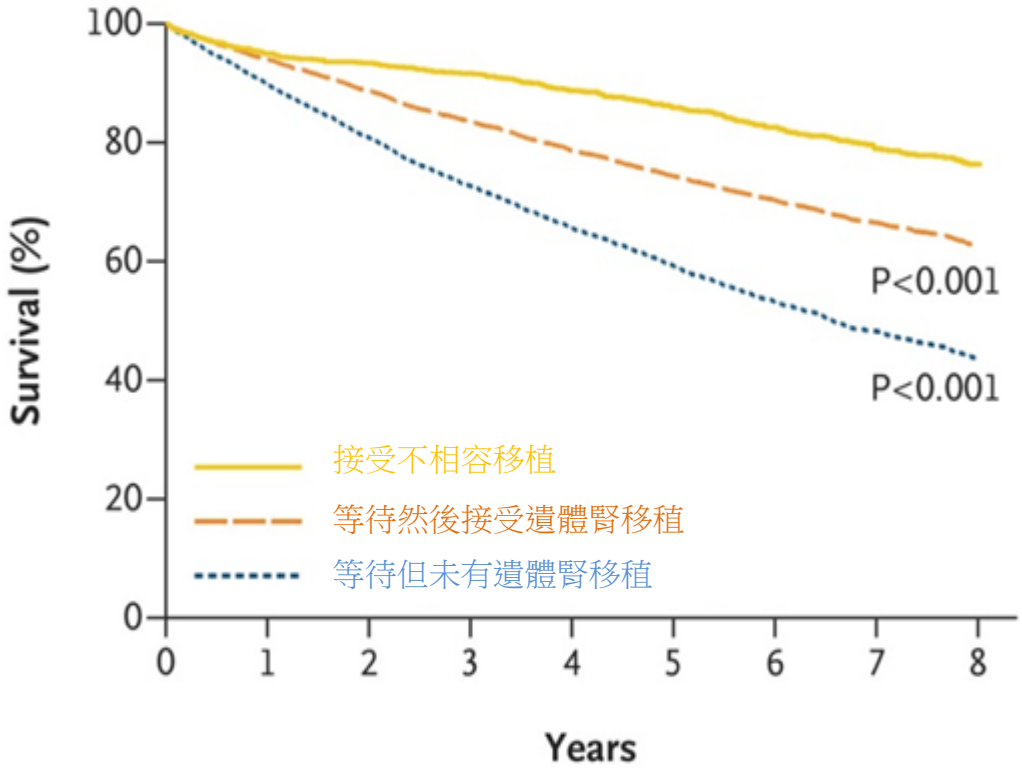
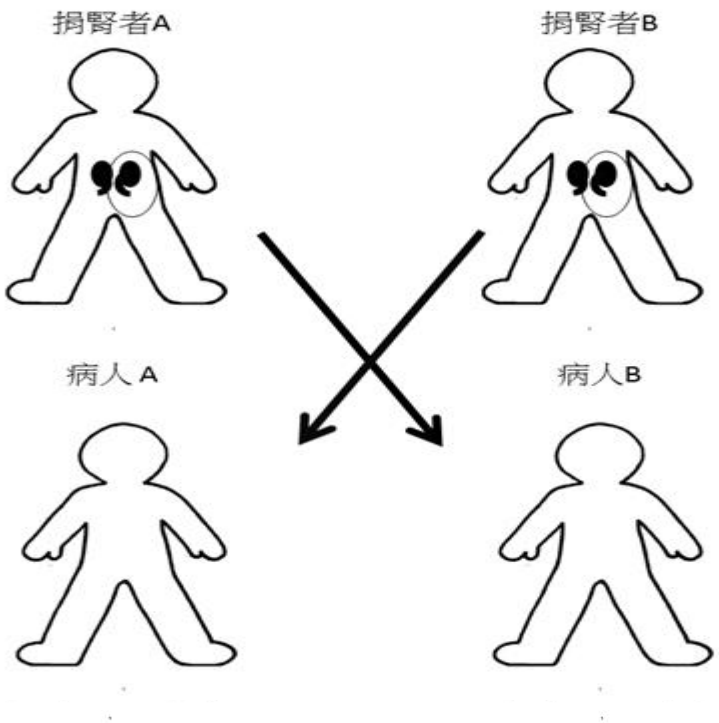


及早移植
(包括接受不相容移植)
病人存活率更高

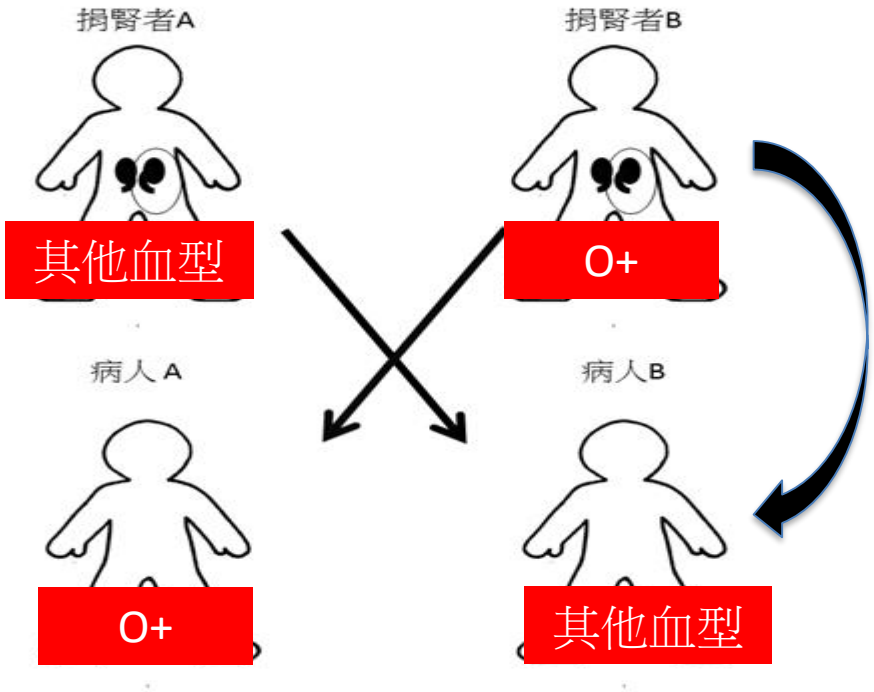
新英倫醫學雜誌
2016; 374:940-950



好處:
- 血型或組織抗原相容

難處:
- 協調比較困難
- 個別組合較難配對

交叉配對是甚麼?



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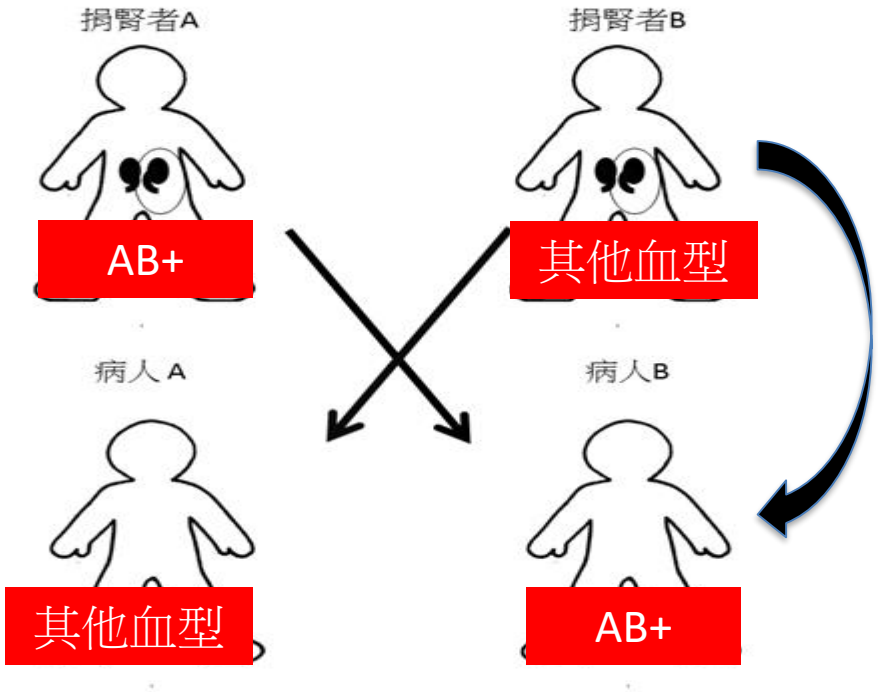

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難處:
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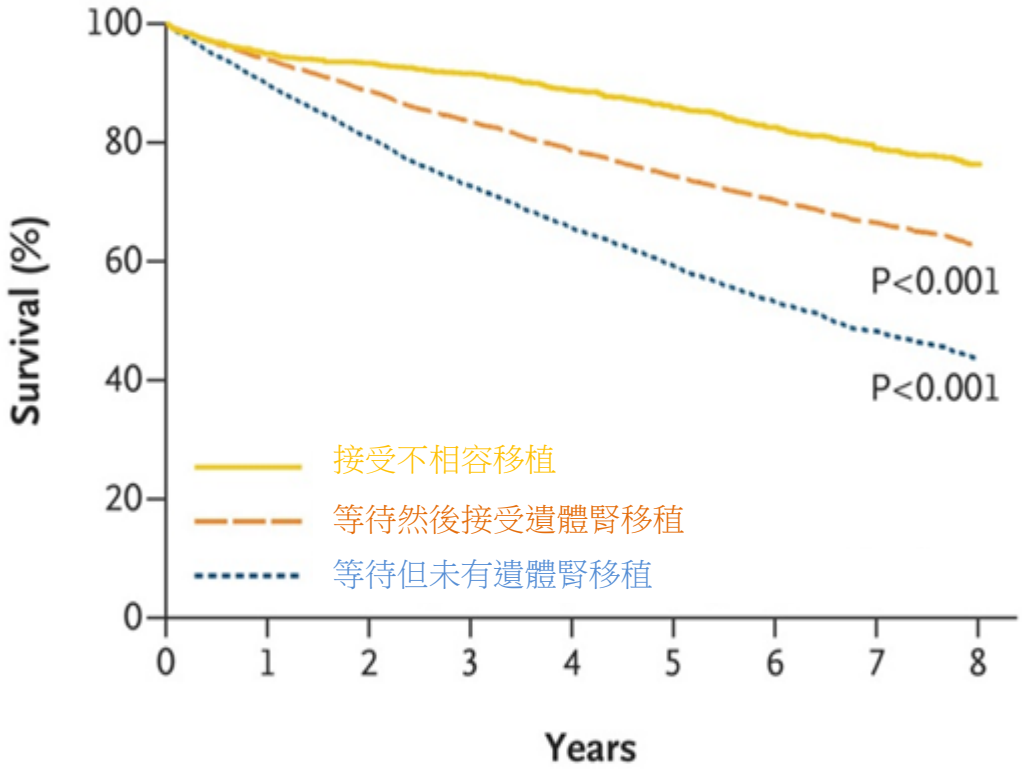
  - O血型病人
  - AB血型捐贈者

交叉配對是甚麼?



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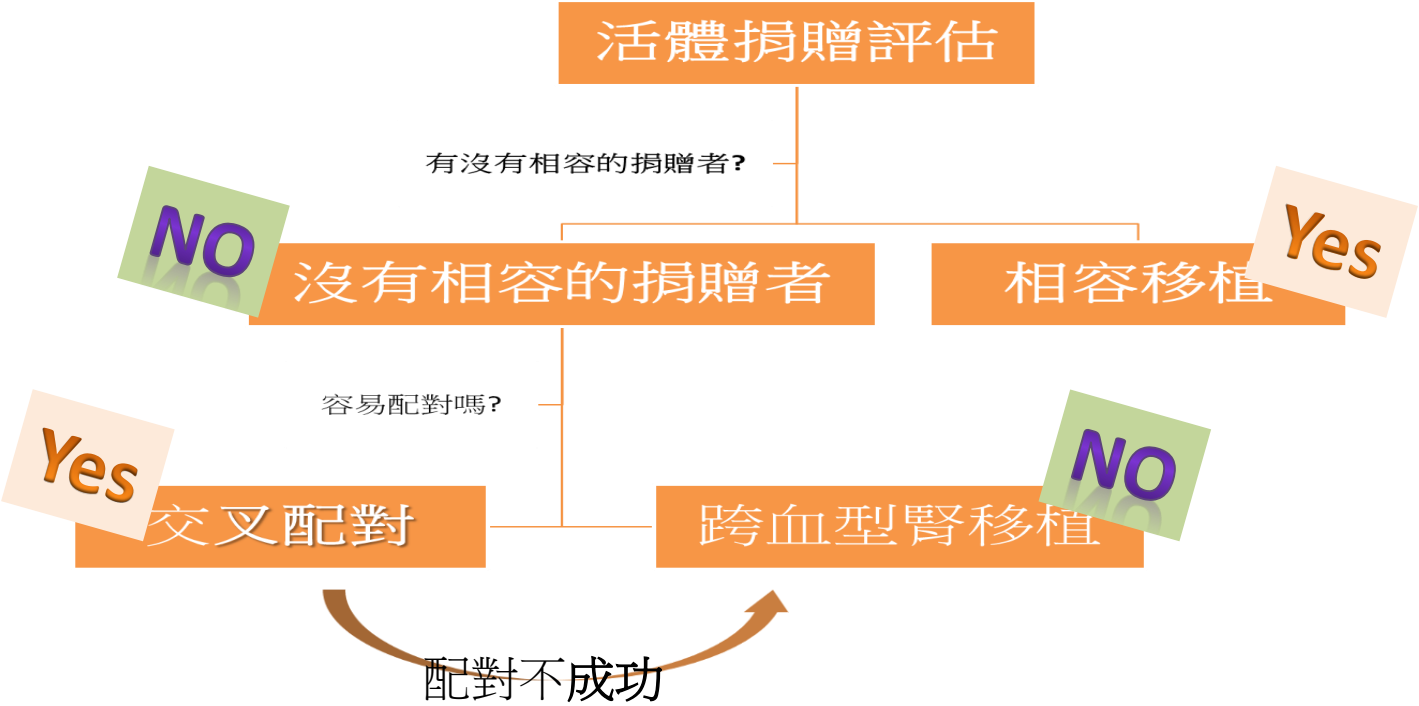
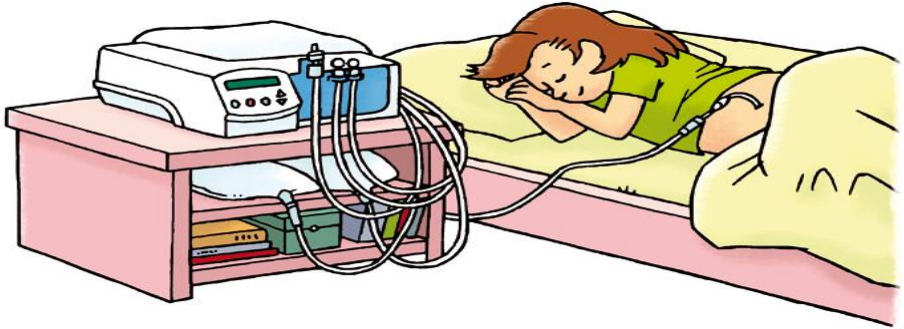
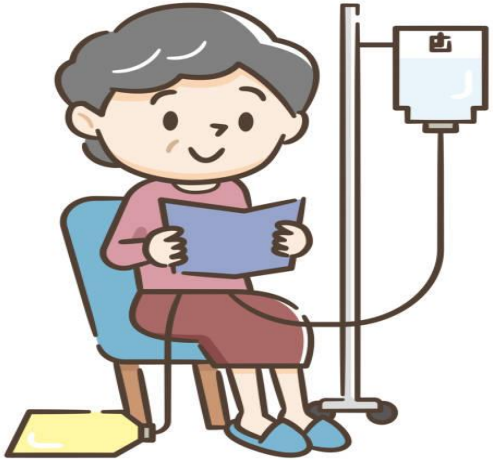




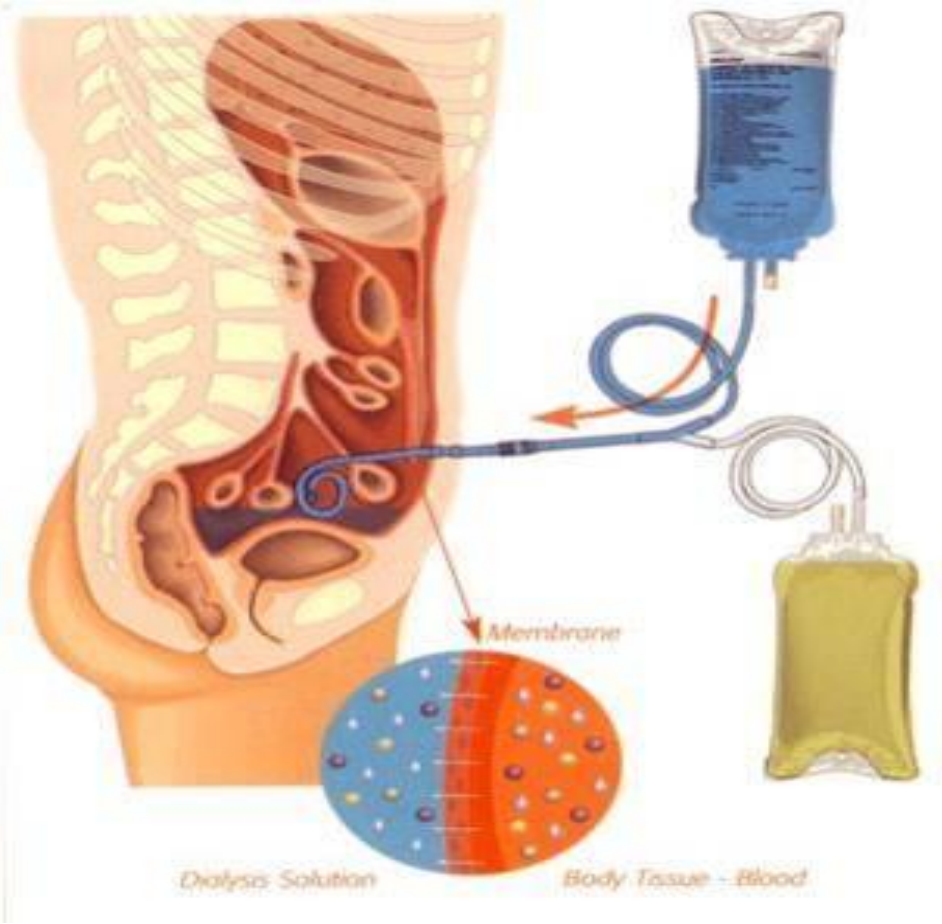


透析治療
(洗腎)

甚麼時候要開始洗腎？

- 腎工能少於一成
- 鉀質高
- 出現腎**衰竭症狀**。。。

腹膜透析
(俗稱洗肚)



腹膜透析

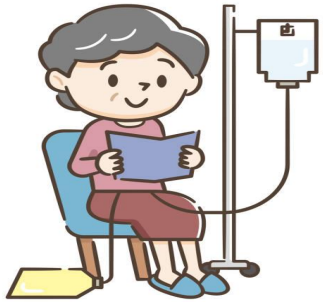
- 醫生會把腹膜透析導管（洗肚喉）植入腹腔內，作為透析液出入腹腔的渠道

- 手術多以局部麻醉方式進行在特別情況下，手術亦會安排在全身麻醉下進行

腹膜透析

連續性可攜帶式腹膜透析

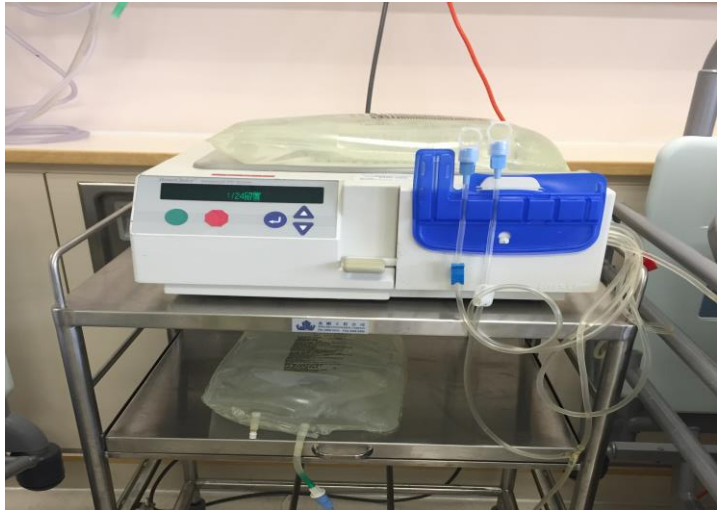
- 每日更換腹內透析液 (換水)三至四次
- 更換過程約需一 小時
- 在本港，大部分腹膜透析病人使用此法

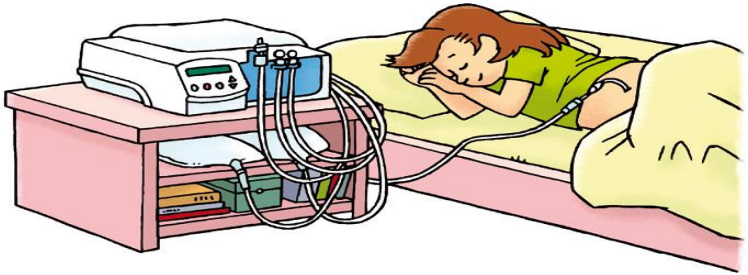


腹膜透析

家居自動腹膜透析

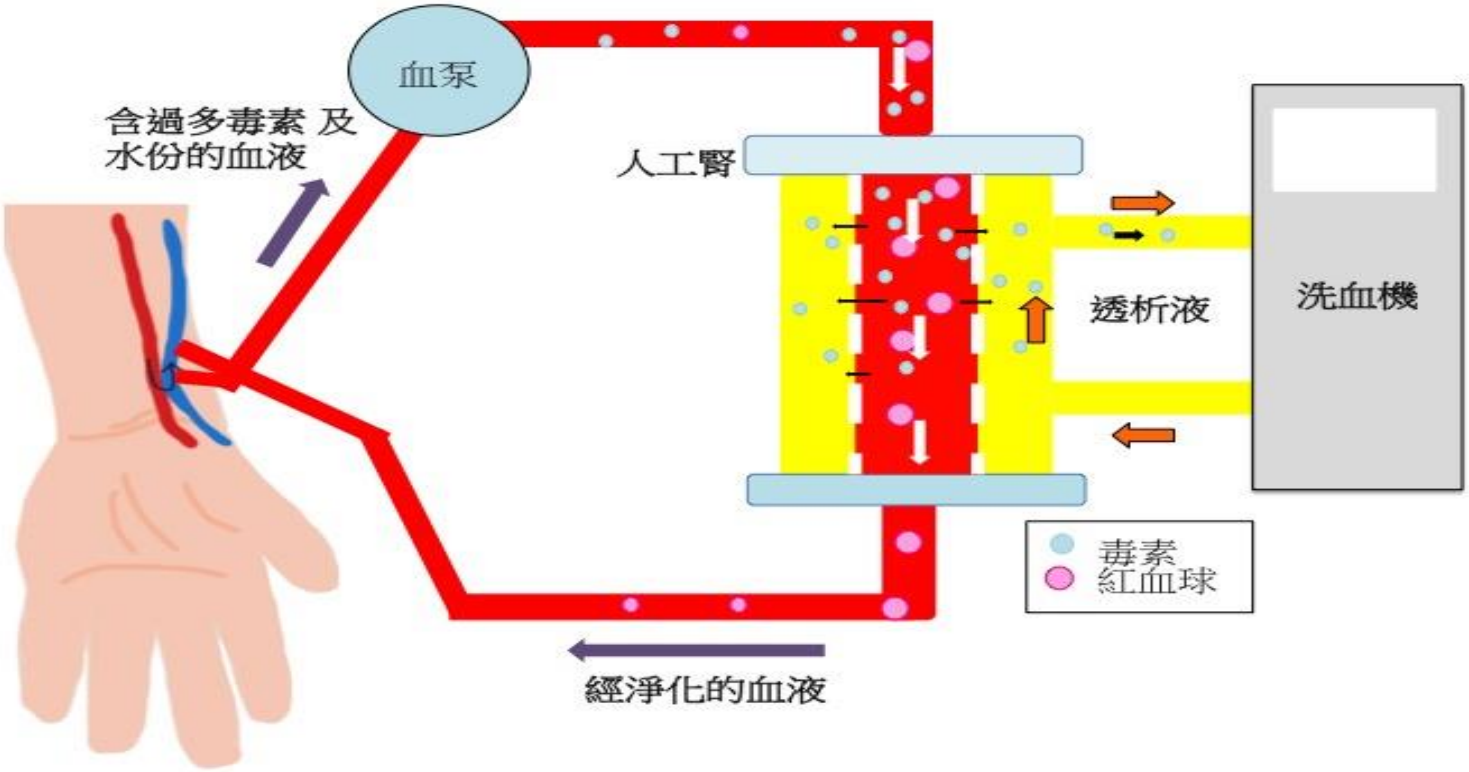
- 每晚睡前接駁自動腹膜透析機(洗肚機)
- 洗肚機會按照預先設定的程序, 在十至十二小時內自動進行大約四至五次的「換水」步驟



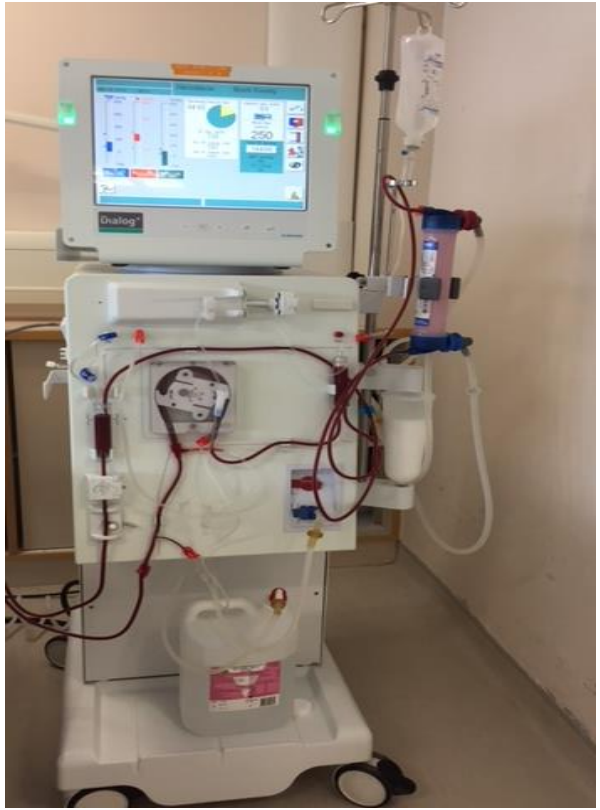


血液透析

血液透析



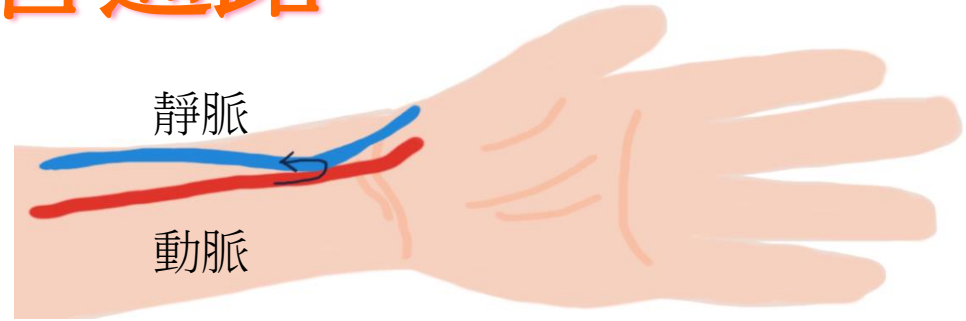
血液透析



人工腎

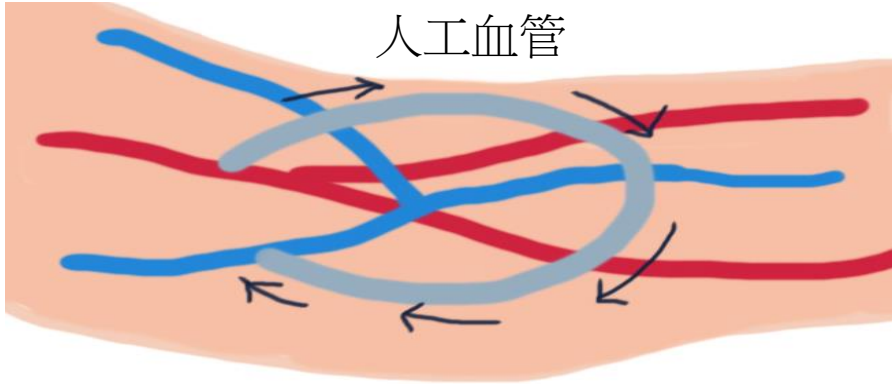
血管通路

- 動靜脈瘻管



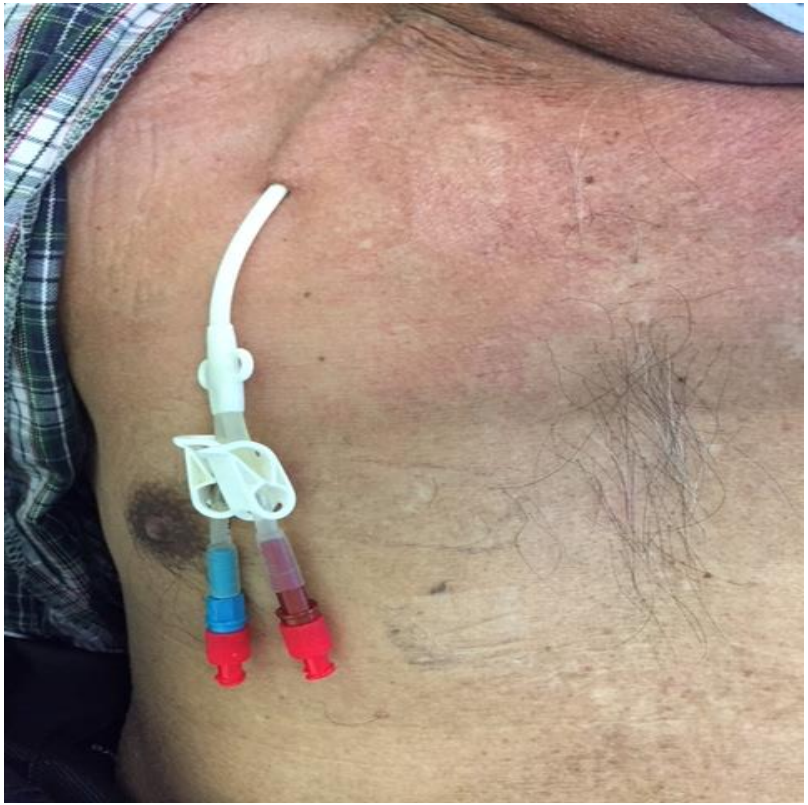
血管通路

- 人工血管



血管通路

- 靜脈導管



傳統血液透析

- 一星期兩至三次
- 每次四至六小時

家居洗血透析

- ❤病人自行在家中洗血
- ❤隔天進行， 每次六至八小時
- ❤須經過八至十二星期的訓練

紓緩治療

紓緩治療

甚麼是腎衰竭紓緩治療？

- 不洗腎
- 從身、心、社、靈多個層面， 通過住院治療、門診服務、家居探訪及日間中心協助病人及其家屬減輕腎衰竭所帶來的痛苦。在人生最後的路程上，保持生活質素和尊嚴

- 透過藥物減少腎衰竭引起的症狀
- 醫生，護士，臨床心理學家和社工的團隊會對病人及家屬在紓緩治療路上提供心理支持, 商討照顧安排、處理福利事宜
- 對有宗教信仰的病人提供不同宗教的輔導

問題?