外　科　部

泌尿外科工作手冊

臺中榮民總醫院

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泌 尿 外 科 工 作 手 冊

目　　錄

壹、　泌尿外科之常規作業及特殊檢查

雖然泌尿科的病人之病情範圍很高，包括一般泌尿道感染、結石、尿路阻塞、腫瘤及功能性的疾病，因此對於病情的描述以及需要的檢查作業則可分成兩大類：

一、常規作業及檢查

1. 病史：
   A. 與本科有關之症狀：
      Urination: Frequency, urgency, Nacturia, Hestancy, Initial or terminal dripping, urine retention, stress incontinence, Incontinence, bladder distention
      Hematuria: Initial, total or terminal, gross hematuria, microscopic hematuria
      Flank pain: Colic or dull pain, Intermittend or continuous, Radiation to gorin or tecticular area
      Pain of scrotum and its content
      Perineal pain – suggest prostatitis or perianal disease
      Urethral pain – related or not related urination
      Sexual function: Normal regular, erectial dysfunction, poor or inadequate rigidity, premature ejeculation, unable ejeculation
      Other symptoms: pneumoturia, hemospermia, milky urine a chyuria, hemochyuria, pyuria
   B. Constitutional symptoms:
      Chill, fever, weight loww, fatque, vomiting, cold sweating, anorexia, hypertention
2. Occupation:
   Include present and past occupation especially relate to GU cancer
3. Family history:
   Cancer, stone disease, BPH, Hypertension
   Personal History:
   Smoking: amount durations
   Eq: 1½ PPD from 1960-1995
4. Medication:
   Past de present and past occupation especially relate to GU cancer

貳、 泌尿道內視鏡檢查之注意事項

- 腎臟鏡

一、腎臟鏡之型式：rigid 與 flexible。

二、適應症(indications)

1. 結石 – 腎結石與輸尿管上端之結石。
2. 腫瘤 – 單一腎臟之早期低惡性腫瘤切除。

三、經皮腎臟造廔碎石術(Percutaneous Nephrolithotomy)

1. 腎臟皮膚造廔(Nephrostomy)

病人採臥姿，在超音波或 X 光透視下進行穿刺，穿刺針進入腎盞(calyx)後，以 Gcride-wire 穿過穿刺針，置入腎盂(renal pelvis)，再擴張廔管。廔管之擴張方式有數種，如 Balloon，Amplatz dilators，Metal coaxial dilators，Optic visuld field 與 Otis dilation 等，視個人習慣而定。此步驟可分 one stage 或 two stage，結石之取出可一次完成或分數次完成，視結石大小與數目而定。廔管進入位置之選擇：依結石之位置決定

lower calyx – 腎結石在 lower 與 upper calyx，renal pelvis。

middle calyx – 結石在 middle calyx，renal pelvis，U-P-J 與 upper ureter。

Upper calyx – (通常需穿過胸膜，除非需要，少使用) – 結石在 upper calyx 而 infundibulum 狹窄，無法從 lower calyx 操作。

2. 經皮腎臟造廔碎石術之適應症：indications

A. 腎結石造成症狀 – 疼痛，血尿。

B. 阻塞。

C. 感染。

3. 經皮腎臟造廔碎石術之禁忌症：(contra-indications)

A. un-correctable coagulation disorders
B. extreme obesity
C. severe kyphoscoliosis
D. very mobile kidney
E. small or bifid intra-renal collecting systems
F. high lying kidney

4. 術前病人面談：

A. 手術之併發症。

B. 結石取出失敗之可能性。

C. 結石可能需分數次取出。

5. 結石之摘除：

PCNL 術前需置導尿管，ureteral catheter 亦可考慮置放，防止碎結石從腎盂掉入輸尿管。輸尿管上端之結石可設法推回腎盂再取出。PCNL 一般可不需用 X 光透視，但有時可借助來確定結石之位置或有無殘餘結石。小於一公分之結石，可直接用網子或夾子(Stone basket or stone

forceps)將結石取出。較大結石，則需用 E.H.L.(electro-hydraulic lithotripsy)或超音波碎石(ultra-sonic litho-tripsy)。

6. 結石取出後皮腎廔管之引流

Nephrostomy tube，safety catheter 與 safety guide wire。

目的：

A. drain the collecting system。
B. provide tamponade of the tract。
C. preserve access to the kidney。

術後 24 小時內，小便需仔細量，若小便量很少，病人合併患側腎臟漲痛，需考慮下列原因：

A. clots in renal pelvis。
B. over-inflation of balloon causing obstruction of pelvis。
C. extra-vasation of urine caused by renal pelvis perforation。
D. mal-positioned catheter outside of renal pelvis。
E. blockage of drain holes against wall of renal pelvis。
F. kinking of nephrostomy tube。
G. kinking of drainage tube。

導尿管於無血尿時即可拔除，Nephrostomy tube 與 safety catheter 需 antegrade pyelogram 確定無殘餘結石、阻塞、腎盂無漏尿方可拔除。

7. Complications：

acute：

A. hemorrhage。
B. perforation-avulsion。
C. urinoma。
D. retroperitoneal hematoma。
E. fever。
F. infection。
G. Pulmonary complications (e.g atelectasis，pneumonia，pneumo-hydrothorax)。
H. systemic absorption of fluid or air。
I. failure to retrieve stone or stone fragments。
J. mal-position of nephrostomy tube or loss of tract acess。
K. contrast media reaction。
L. abdominal organ puncture。
M. temporary U-P junction or ureteral obstruction。

Chronic：

A. delayed hemorrhage (e.g A-V fistula，pseudoaneurysm，vessel erosion by tube)。
B. peri-renal abscess。
C. renal mal-function。
D. accelerated recurrent stone formation。
E. infundibulum，U-P junction or ureteral stricture。

● 輸尿管鏡

一、 輸尿管鏡之型式：rigid 與 flexible。

二、 適應症(indications)

1. 輸尿管結石。
2. 腫瘤之診斷與切除。
   A. 診斷：
      a. 靜脈腎盂攝影懷疑有輸尿管或腎盂腫瘤。
      b. 單側輸尿管有不明原因之血尿。
      c. 單側輸尿管尿液細胞學檢查有惡性細胞。
   B. 治療 – 早期、低惡性度輸尿管與腎盂之腫瘤切除。
3. 輸尿管導管之置放 – 當有輸尿管廔管而輸尿管極度扭曲時，可利用輸尿管鏡來放導尿管做尿液引流。
4. 輸尿管內異物取出。

三、 術前病人之評估：

1. 過去病史：
   A. 患者有無做過骨盆腔手術，如 radical prostatectomy，radical hysterectomy 等，ureter 會與 retroperitoneum 沾粘使輸尿管鏡不易操作。
   B. 曾做過輸尿管取石術(ureterolithotomy)，可能使輸尿管結疤或狹窄不利輸尿管鏡操作。
   C. 做過膀胱輸尿管鏡吻合手術之輸尿管不易擴張。
2. X 光片之評估：
   A. 靜脈腎盂攝影確定石頭之位置、大小、阻塞程度。
   B. 確定結石末端輸尿管有無狹窄或極端扭曲，可於術前從輸尿管末端注入少量顯影劑。
   C. 術前需照腹部 X 光，確定結石位置有無改變。
3. 手術時病人之姿勢：
   A. standard Lithotomy position – 中段與末端輸尿管結石。
   B. steep reverse Trendelenberg position：在腰肌 f(psoa's muscle)上端之輸尿管結石，因輸尿管往後傾斜結石易往腎盂移位，可考慮採用此姿

勢。

4. 術前病人需告訴輸尿管鏡取石術可能之併發症與失敗之可能。

四、 輸尿管開口之擴張：

方式：

1. dilation with successively larger ureteral catheters。
2. passage of conical metal bougies。
3. balloon dilating catheters。
4. passage of olive-shaped metal bongies。

五、 輸尿管結石之取出：

小結石(< 5mm) – 用網子或夾子取出(basket or forceps)

大結石(>5mm) – a. ultra-sonic lithotripsy.　b. E.H.L.

六、 輸尿管鏡取石術失敗之原因：

1. 輸尿管鏡無法進入輸尿管或放至結石處：

A. bladder neck obstruction 與 immobility，如前列腺肥大。

B. 結石末端輸尿管阻塞或極度扭曲。

2. 結石往近端移位。

七、 輸尿管鏡術之併發症<5%。

1. mucosal injury。
2. ureteral perforation。
3. ureteral bleeding。
4. extra-vasation。
5. stricture。
6. infection。

參、 泌尿系統外傷之處理

急診病患約 10% 合併有不等程度之泌尿系統損傷，因此對急診病人的處理除先行穩定病情，止血，治療休克外亦應同時檢查泌尿系統有無受傷。

一、 詳細的病史詢問:

發生意外的機轉，種類，身體受傷部偉，何種凶器，鈍傷或穿刺傷。

二、 受傷部位的檢視:

上腹部，胸部下，上背部 -- 腎臟受傷，骨盤骨折，外生殖器，下腹部 -- 膀胱或尿道受傷，槍傷，刃傷，則視入口位置而異。

三、 理學及檢臉室檢查:

腹部具反彈痛或壓痛。尿逍口有無流血，有無血尿，瘀血或血腫之部位，有無貧血、休克。

四、

1. 例行 X 光攝影：胸部及腹部 X 光 -- 注意有無肋骨、腰椎骨、骨盆骨折，後腹腔 posa's line 有無消失，腎臟大小，位置角度有無改變。
2. 特殊 X 光攝影：先注意尿道口有無出血情形，如有而且骨盆骨或恥骨骨析時，或會陰部跨傷(straddle injury)情形，應懷疑膀胱破裂或尿道斷裂傷，應先作逆行性膀胱道攝影(Retrograde.Cystourethrogram)，切勿逕行插置導尿管。無尿道或膀胱受傷時，應於病人情況穩定下接受靜脈腎臟腎盂攝影(I.V.P.)，以確定血尿是否源出於腎臟或輸尿管部份。當發現腎臟無法顯影時，應接受 renal Anterigraphy，以確定腎動脈有無受傷，腎臟實質是否撕裂。當考慮到腹腔內臟器(肝，脾)合併受傷或後腹腔血腫時可以電腦斷層攝影掃描檢查。

§腎臟受傷(Renal trauma)

以腹部、腰部或上背部之鈍挫傷佔大部份(80-85%)，機車車禍、打架、跌倒或激烈運動是常見之機轉。高速碰撞車禍是造成腎動脈受傷的主要原因。腰部或上腹部之槍傷、刀傷除了合併腹腔內臟的受傷外也會造成腎臟受傷。

病理分類:

一、Minor renal trauma (85%)

-- Renal parenchyma contusion or Bruising, subcapsular hematoma, superficial cortical laceration.

二、Major renal trauma (15%)

-- Deep corticomedullary laceration may extend to collecting system.

三、Vascular injury (l%)

-- 此類病人 30%，不會發生血尿。

治療：

一、 病人情況緊急時，應先矯正出血性休克，但亦需同時評估其他相關鄰近臟器組織損傷。

二、 一般之 minor renal injury 採取非手術之保守性療法處理，但約 15%有持續性後腹腔出血，或腎臟血管受傷或腎臟實質壞死情形應考慮手術方法治療。

三、 關於槍傷、刃傷或一些穿透傷，因 80%可能合併其他內臟受傷，必須手術探查治療。

§輸尿管受傷(Ureter trauma)

原因:

一、 大腸惡性腫瘤或婦科惡性惡性腫瘤之骨盆腔手術，因黏連或浸潤程度利害手術時可能傷及輸尿管。

二、 對輸尿管結石之內視鏡操作時，可能引起穿孔或撕裂傷。

三、 刀傷、槍傷及其他穿刺傷亦均可能傷及輸尿管。

臨床症狀:

一、 發燒。

二、 腰痛或下腹痛。

三、 腸麻痺、噁心、嘔吐。

四、 輸尿管陰道淒管，輸尿管皮膚廔管。

五、 腎水腫等阻塞性症狀。

診斷:

一、 I.V.P.。

二、 Retrograde pyelography。

三、 Ultrasonogram 視有無 hydroureter。

治療:

一、 發生損傷時，如能及早發現，馬上治療，通常預後良好，合併症很少。受傷發生後 10 天至 14 天之內發現而且無發炎，化膿，及其他併發症時可立即手術治療。

二、 發現時間較久時，或合併其他併發症時，應先作 percutaneous Nephrostomy 引流，防止腎機能變壞，俟日後再作進一步手術治療。

對於 1. low ureter injury 可施行:

A. reimplantation into Urinary Bladder, With posa’s hitch procedure.

B. primary ureteroureteiostomy.

C. Boari Bladder flap.

D. Transureteroureterostomy.

2. upper ureter injury:
   A. primary ureteroureterostomy.
   B. Auto transplantation of Kidney.
   C. Bowel replacement of Ureter.
3. Mid ureter injury:
   A. primary ureteroureterostomy.
   B. transureteroureterostomy..

§膀胱受傷(Bladder trauma)

原因:

一、 約 15%的骨盆骨折之病人，合併有膀胱或尿道受傷。

二、 婦科或骨盆腔手術，或疝氣修補手術。

三、 經尿道之內視鏡手術。

1. 腹腔外膀胱破裂(Extraperitoneal bladder 即 perforation)：發生於膀胱未滿脹時的骨盆骨折或下腹部鈍傷可能引起骨盆腔深部膿瘍發生。
2. 腹腔內膀胱破裂(Intraperitoneal bladder perforation)：相同之外傷發生於膀胱滿脹時，會引起腹膜炎。

診斷: A.X 光攝影

-- plain abdominal film.

-- Cystography 包括 filling film 及 drainage film.

B.一般而言，膀胱鏡沒有幫助，因為出血利害或血塊使檢查無法進行。

治療: A.緊急情況時，先處理出血，矯正休克，穩定病情。

B.內科支持性療法 -- 對比較輕微的受傷，導尿管置放後，觀察。

C.手術治療 -- 剖腹探查，修補膀胱破洞，需小心檢視腹腔內有無其他合併受傷，視後需置放 extraperitoneal suprapubic cystostomy 至少 10 天，俟傷口癒合，情況穩定後再行拔除。

§尿道受傷(Urethral trauma)

常見於男性骨盆骨骨折或跨傷(straddle injury)或尿道狹窄而接受不當之 instrumentation 引起。

程度:

一、contused

二、lacerated

三、transected

位置可為:

一、posterior urethra -- 包括 prostatic 及 membranous part.

二、Anterior urethra -- 包括 bulbous 及 Pendulous Part.

(A) 後尿道受傷(posterior urethra trauma)，常見於 membranous urethra 穿過 urogenital diaphragm 處而此處為尿道外括約肌部位，因其前端固定於恥骨下緣，骨盆骨折時膜狀尿道會從攝護腺膜狀尿道之交換處斷裂，引起攝護腺周圍及膀胱周圍的血腫，使攝護腺與膀胱向上移位。

臨床表徵:

一、骨盆骨骨折。

二、下腹痛，無法解小便。

三、尿道口流血 -- 此時切不可插置導尿管而應立即作 urethrography，以避免使尿道斷裂傷由部份撕裂演變成完全斷裂，同時造成骨盆底血腫發生利害之發炎情形。

四、會陰部或恥骨部份有挫傷之跡象。

五、合併出血性貧血或休克。

治療:

一、緊急時先處理出血性休克，穩定病情。

二、Delay urethral reconstruction -- 先以 suprapubic cystostomy 置放，等 3 個月之後血腫溶解消失之後，向上移位之攝護腺復位後再作尿道重整手術。

三、Immediate urethral realignment -- interlocking procedure.,但因出血利害，有時會危及病情，及日後可能引起陽萎，尿失禁及尿道狹窄之併發症因此目前除非有合併腹腔內臟器受傷，需剖腹探查修補時順便施行外，大多數人均不採取此法。

(B) 前尿道受傷(Anterior urethral trauma).

原因：Straddle injury, iatrogenic 或 self instrumentation 造成。

臨床表徵:

a. 跌倒，或跨騎受傷之病史。

b. 尿道接受 instrumentation 的病史。

c. 尿道口出血，會陰部或陰莖血腫，疼痛時切勿逕行置放導尿管，應作 Urethrogram，必要時以 suprapubic cystostomy 作尿液分流。

治療：

a. urethral contusion -- 病人通常可自解小便，且無繼續出血之情形，無需進一步治療，但如繼續出血時，需置放導尿管。

b. urethral laceration -- 此時不可作內視鏡檢查，先作 suprapubic cystostomy 引流。

c. urethral laceration with extensive urinary extravasation.
因常會有發炎或化膿之情形，需以抗生素預防或治療之，以及 suprapubic cystostomy 引流，俟 3 月後再作進一步處置。

§陰莖受傷(penile trauma)

性交時可能會造成 tunica Albuginea 斷裂，形成陰莖血腫，需手術治療修補之。此外，陰莖根部如有 obstructing ring 時可能造成陰莖壞死及尿道受傷。

機械性傷害有時會造成陰莖皮膚之撕裂及缺損，需立即手術治療或補皮手術。有一點需注意就是大部份之陰莖受傷常會合併尿道受傷，所以記得要作 urethrography 檢查。

§陰囊受傷(scrotal trauma)

superficial laceration -- 修補縫合即可。

鈍挫傷引起之瘀血或血腫，需注意有無合併睪九破裂，如果機械性傷害引起陰囊皮膚之缺失時應馬上手術治療，可先將裸露之睪九及精索移位到大腿內側之皮下，容日後再以皮瓣作重建手術。

§睪丸受傷(testis trauma)

睪丸鈍挫傷時會引起很利害之疼痛及噁心，嘔吐和下腹痛，有時會形成血腫，此時可藉助超音波掃描，幫忙診斷睪丸外或內之血腫，有無睪丸破裂，如有的話，應立即手術治療之。

肆、 攝護腺肥大(Benign Nodular Hyperplasia of Prostate)

診斷:

初步評估(Initial Evaluation)

一、 病史詢問: focusing on the urinary tract, previous surgical procedure, and general health issues include a history of hematuria, UTI, DM, nervous system disease(e.g., Parkinson's disease or stroke), urethral stricture disease, urinary retension, and aggravation of symptoms by cold or sinus medication.

二、 理學檢查: digital rectal examination and a focused neurologic examination must be done to detect prostate or rectal malignancy, to evaluate anal sphincter tone, and to rule out any neurologic problems.

三、 尿液分析: to rule out urinary tract infection and hematuria.

四、 腎功能評估: serum creatinine should be performed in all patients with symptoms of prostatism to exclude renal insufficiency due to the presence of obstructive uropathy. Elevated serum creatinine is an indication for imaging studies(ultrasound) to evaluate the upper urinary tract.

五、 攝護腺抗原檢查: PSA and DRE to detect prostate cancer

症狀評估(Symptom Assessment)

IPSS(AUA Symptom Index): for the baseline assessment of symptom severity in each patient presenting with prostatism, assess the response to therapy, and detect symptom progression in those men managed by watchful waiting.

Mild 0-7, moderate 8-19, severe 20-35.(參考附表)

其他輔助檢查(Additional Diagnostic Tests)

一、 Uroflowmetry, postvoid residual urine, pressure-flow studies

二、 膀胱鏡檢查: Urethrocystoscopy is recommended for men with prostatism who have a history of microscopic or gross hematuria, urethral stricture disease, bladder cancer, or prior lower urinary tract surgery(e.g., TURP).

三、 影像學檢查(IVU or Sono): hematuria, urinary tract infection, renal insufficiency(ultrasound recommended), a history of urolithiasis, or a history of urinary tract surgery.

藥物治療

一、 Alpha-Blockers: based on the hypothesis that clinical BPH is, in part, dut to prostate smooth muscle-mediated bladder outlet obstruction.

Nonselective—phenoxybenzamine 10mg bid

Alpha 1—prazosin 2mg bid

Long-Acting Alpha 1—terazosin 5 or 10mg qd doxazosin 4 or 8mg qd

Subtype(Alpha 1a) Selective—tamsulosin 0.4 or 0.8mg qd

副作用: dizziness, fatigue, headache, somnolence, hypotension, nausea, flulike syndrome, asthenia and syncope.

二、 Androgen Suppression: based on the observation that the embryonic development of the prostate is dependent on the androgen dihydrotestosterone

藥物 Finasteride(Proscar) 5mg qd—a selective competitive inhibitor of isozyme type II of 5α-reductase. 注意用藥3至6個月後serum PSA值約降40%至50%.

手術之適應症補充(AHCPR Guideline):

1. Refractory urinary retension(failing at least one attempt of catheter removal)
2. Recurrent urinary tract infection
3. Recurrent gross hematuria
4. Bladder stones
5. Renal insufficiency
6. Large bladder diverticula

伍、 泌尿道結石之診治

尿路結石是一種古老的疾病，遠在古埃及的木乃伊身上就曾發現膀胱結石。西元前 1500 年,在北美的印地安人身上也發現過磷酸鈣膀胱結石:先哲 Hippocrate 時代治療尿路結石的任務掉在 Lithotomist 所謂治療膀胱結石的專門醫師身上，但由於他們對人體解剖學並不熟悉，所以治療效果非常差。歷經 Celsus，Franco，Dupuytren 等外科先輩之努力，一些新穎，安全的傳統手術都陸續地解決了尿路結石的問題。尤其是近十年來，由 Frenstorm，Marberger 等人發展內視鏡泌尿道學(endourology), Chaussy 在體外震波碎石術(Extracorporeal shockwave lithotripsy, ESWL)之試驗成功，更是大放異彩，使尿路結石的手術治療，由傳統的大刀口手術法進步到小刀口的手術法，甚至無傷口的 ESWL。

遺憾的是雖然外科手術進步非凡，但是尿石發生的確實原因，仍然不明，所以術後的保養和預防，很難進行，無怪乎尿石病人之復發率特別高。在門診，我們常可發現患者左右腰部各一刀疤，還很痛苦的告訴我們說他(她)又有了。這真叫泌尿科醫師汗顏。幸虧近年來 Finlayson, Coe 和 Pak 在尿路形成的物理、化學理論上有重大突破，而引導出相當有效的尿路結石藥物治療。在他們長期的追蹤觀察，經過他們的分類，再給予特定，單一的藥物，這些病人之尿石復發率降到非常低，再手術率也幾乎等於零。

以下，我們將摘要地把尿路結石之成因，症狀，手術適應症，手術方法，尿石成份分析，新陳代謝評估及藥物療法，作一簡單介紹，希望對新進住院醫師，實習醫師及其他醫護人員和患者有所幫忙，讓我們共同合作來克服這個難纏的痼疾。

一、Pathogenesis of urinary calculi:

尿路結石的致石機轉，理論很多，但以下面兩種說法最為大家所接受：

1. Urinary supersaturation:

   尿中的結石成份過飽和。例如鈣離子、草酸離子或尿酸離子之濃度過高，即容易沉澱造成結石。當然尿中之 PH 值影響很大，例如尿酸在 PH 值低時(PH<5.5)很容易凝集，而感染性結石(struvite)則在 PH 值高時(PH>7.0)，其溶解度非常低。

2. Stone formation inhibitor:

   這些抑制物包括有機物與無機物，例如 glycopeptide, chondroitin sulfate, glycosaminoglycans (GAGS), citrate, pyrophosphate, magnesium 等。這些 inhibitors 可以使尿石的凝集和生長減緩，所以當 inhibitors 減少時，尿石非常容易形成。

簡單的以方程式表示如下:

Saturation factor

↓

Urine at equilibrium ---------- Cystal formation

↑

Absence of inhibitors

二、Symptoms/signs and Diagnosis

絕大部份的尿路結石所造成的尿路阻塞都是不完全的。所以泌尿科醫師要確定病人的阻塞是急性或慢性，持續性或間歇性，完全或不完全。同時要判定其阻塞的位置，有無腎功能缺損和有無尿路感染。

尿路結石之臨床症狀大致如下:

l. 腎絞痛(renal colic)

2. 血尿(Hematuria)

3. 發燒(Fever)

4. 尿毒(uremia) -- 兩側性尿石併阻塞，單一腎臟併結石或感染性結石(struvite)若不治療，最後都會造成腎功能不全或尿毒。

診斷方法:

l. 尿液常規檢查(urinalysis)

可以發現血尿，大都只是 microscopic hematuria，少數是 gross hematuria；膿尿和一些尿石的結晶。

2. 尿路攝影(Intravenous pyelogram, IVP.)

這是診斷尿路結石最有價值的檢查，可以知道尿石位置、大小、形狀、阻塞的程度。

3. 超音波 – 非侵犯性，可診斷腎水腫的程度，檢視腎皮質，發現 Radiolucent stone，更可用於不適合 IVP 之病患(Cr > 2.0)。

4. 其它診斷方法:

諸如逆行性腎盂造影術(retrograde pyelogram)，甚至電腦斷層，都能提供更多的資料供泌尿科醫師參考。

三、尿路結石的手術適應症:

發現有尿路結石，醫師和病人需馬上考慮如何治療。過去，由於手術的技術較不進步，而且尿石之復發率很高，所以手術之適應症訂得比較嚴謹，例如:

1. 尿路阻塞(obstruction)

2. 尿路感染(infection)

3. 大量血尿(hematuria)

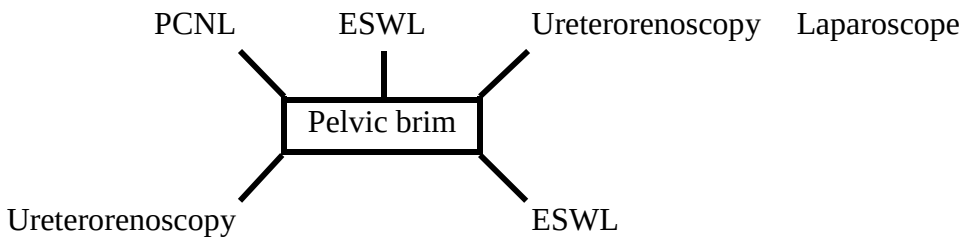
4. 不可控制的腎絞痛(intractable colic pain)

但目前，因各方面較進步，如果能用 non-invasive 或 less invasive procedure 治療，取出尿石，作尿石分析，再給病人藥物治療，並不失為一種早期診斷，

早期治療的好方法。至於如何來取捨，還是需由泌尿科醫師來診斷、決定。

四、手術方法:

目前之尿石手術治療，是以 endourology 和 ESWL 為主，傳統性手術為輔。大致上的原則如下圖：



1. 在 pelvic brim 以上的輸尿管結石或腎結石，首先考慮 ESWL。如果沒有 ESWL 的設備，或結石>2cm 可用 PCNL(percutaneous nephrolithotomy)或 ureterorenoscopy 來取石。
2. 中上段輸尿管結石如果結石太大，ESWL 或 URS 失敗，可以考慮腹腔鏡。
3. 在 pelvic brim 以下的輸尿管結石，用 ureterorenoscopy 來取石，輔以各種碎石器械(Sono, Laser, lithoclast, EHL)及 forcep, basket 等將碎石取出。用 ESWL 定位較難，病人須將 prone position。
4. 膀胱和尿道結石。使用膀胱尿道鏡，用碎石鉗或電震波碎石器將尿石擊碎後，再將之沖出。結石太大、太硬或合併 large prostate，可考慮 open (suprapubic)。

以上述 endourology 和 ESWL 的方法，大約可解決 90~95%的各種尿石。但仍有 5~10%的患者仍需借助傳統性的手術方法。尤其是(a)鹿角型腎結石，(b)輸尿管狹窄併結石，(c)輸尿管鏡手術不能成功的病例(輸尿管粘連或先天異常等)，(d)堅硬，難擊碎的尿石(e)操作 PCNL, ureteroscopy 和 ESWL 時發生併發症時(大量出血或集尿系統破損)。

特別是鹿角型腎結石，幾乎所有的進步方法都無法很完美的取出所有結石，最好的治療還是無萎縮性腎截石術(Anatrophic nephrolithotomy)，這種方法是分離後腎動脈，確定腎臟無血管區，然後在局部低溫(使用冰花)的情況下，自腎臟無血管區切開腎實質，迅速取出尿石，最後將大、小腎盞有狹窄部位重建後，縫回腎實質。所有的步驟需在 30~60 分鐘內完成。這種方法是最徹底，腎實質傷害最小的手術，但其併發症亦多，所以宜由資深泌尿科醫師來執行。

五、尿石成份分析:

成功的外科手術，只是完美的尿石治療的第一步。因為尿石的復發率極高，不加上飲食及藥物治療，常在幾年內又有大結石，又需第二次的手術。所以所有經由手術或自行排出的尿石都應作尿石成份分析。

由尿石成份分析檢查，可將所有尿石分類成:

l. 鈣尿石(Calcium stone)，約 75%。

2. 感染性尿石(Struvite stone)，磷酸胺鎂結石，約 15%。

3. 尿酸鹽尿石(Uric acid stone)，約 10%。

4. Cystine 尿石，小於 l%。

對於尿酸鹽和 Cystine 尿石，其生理致石機轉已為大家所了解，可以給予藥物治療;而感染性尿石患者，也可接受抗生素治療。但對於佔大多數的鈣尿石患者，其生理致石原因仍有待進一步新陳代謝評估才能確定。

六、新陳代謝評估(Metabolic evaluation)(repeat, active stone former)

尿石患者抽血驗 SMA-12, PTH, T3, T4，並在普通飲食及低鈣、低鈉限制飲食之情況下收集二次 24 小時尿液檢驗尿中之 PH 值，Ca, P, uric acid, oxalate, citrate Na, K 及其總尿量。由這些結石，可做新陳代謝評估，依 Dr. Pak 的分類而確定其尿石之原因，包括:

l. 吸收性高尿鈣症(Absorptive hypercalciuria, type I, type II)

2. 腎性高尿鈣症(Renal hypercalciuria)

3. 原發性副甲狀腺亢進症(Primary hyperparathyroidism)

4. 高尿酸鈣尿石症(Hyperuricosuric calcium urolithiasis)

5. 腸性高草酸症(Enteric hyperoxaluria)

6. 尿酸尿石(Uric acid lithiasis)

7. 感染性尿石症(Infection lithiasis)

8. 腎小管酸血症(Renal tubular acidosis)

9. 非代謝性異常類(No metabolic abnormality)

10.未分類高尿鈣症(Unclassified hypercalciuria)

其中各種成因的比率大致如表一。

表一、尿路結石症之成因分類

成因	病例數	百分比(%)
吸收性高尿鈣症		
Type I	59	24.5
Type II	72	29.8
腎性高尿鈣症	20	8.3
原發性副甲狀腺亢進症	14	5.8
高尿酸鈣尿石症	21	8.7
腸性高草酸症	5	2.1
尿酸尿石症	5	2.1
感染性尿石症	5	2.1
腎小管酸血症	1	0.4
非代謝異常類	26	10.8
未分類高尿鈣症	13	5.4
合計	241	100.0

七、尿石的藥物治療

依據新陳代謝評估的結果，可以給予病人單一、高度選擇性的藥物治療，當然鼓勵病人多喝開水(每天尿量至少 2 公升)和避免食用含豐富鈣質、草酸及尿酸的食物是最基本的原則，絕對不可忽視。

以下摘要出各種尿石之藥物治療:

l. 吸收性高尿鈣症

Type I: thiazide 或 sodium cellulose phosphate.

Type II: 飲食治療。

2. 腎性高尿鈣症 Thiazide。

3. 原發性副甲狀腺亢進症: 副甲狀腺切除手術。

4. 高尿酸鈣尿石症: Allopurinol, potassium citrate.

5. 腸性高草酸症: B6, Mg-gluconate 和飲食治療。

6. 尿酸尿石症: Allopurinol 和 Potassium citrate.

7. 感染性尿石症: 抗生素和 Acetahydromatic acid (AHA).

8. 腎小管酸血症: Potassium citrate.

9. 非代謝異常類: 矯正腹瀉，喝水少之可能原因。

由於國內外學者及研究人員之努力，尿路結石之治療已漸趨完美，其結果也非常良好。當然在實行方面一定還有很多困難，期待醫療人員及尿石患者，大家能戮力以赴，使這個與人類歷史同樣久遠的疾病不再困擾我們。

陸、 性功能失調之診治

男性性功能是一套十分精密的有機體，藉著內分泌、神經、動靜脈及心理等因素的協調，來達成它的基本任務 -- 陰莖勃起、流精、射精及性高潮。

ED: consistent inability to achieve an erection, or to maintain an erection long enough to successfully complete sexual intercourse.

一、病史詢問:

l. 確定有無陽萎。

2. 鑑別精神性或器質性陽萎。

3. 有無可致陽萎之疾病: 心肌梗塞、腦血管意外、糖尿病、高血壓、週邊血管疾病或商脂血症、抽煙、喝酒。

4. 有無可致陽萎之手術或外傷。

5. 有無可致陽萎之藥物、如降血壓或抗憂鬱藥物。

二、理學檢查:

l. 總體外觀: 神智、營養狀態。

2. 內分泌系統: 第二性徵發育狀況，有無男性女乳化。

3. 血管系統: 血壓檢查有無足背動脈、腘動脈之脈動，並檢查頸動脈、腹主動脈或股動脈有無異常。

4. 神經系統: 有系統地檢查全身感覺、運動與小腦功能特別注意會陰部及肛門周圍之感覺，球海綿體反射及肛門反射。對糖尿病的病人檢查有無週邊神經病變。

5. 外生殖器官，以及前列腺指診。

三、實驗數據檢查:

l. 一般 CBC, SMA, BS 血液檢查 2. 尿液檢查 3. FSH 4. LH 5. Prolactin 6. T3 7. T4 8. Testosterone 9. PSA 10. Fasting lipid profile

四、特別檢查:

l. 夜間陰莖膨脹檢查(NPT): 可用以區分器官性及心理性陽萎。用這種方法可量度陰莖周徑之變化，勃起之次數及勃起時間之長短，特別是陰莖周徑變化至最大及其維持時間之長短，更為重要。通常作三次。

2. 視覺性刺激檢查(VSS): 與 NPT 同樣器械，輔以影片與圖片性刺激。

3. 陰莖動脈壓: 陰莖動脈壓除以手臂壓即 penilebrachial index (PBI)。正常男性的陰莖動脈接近手臂壓力，因而 PBI 大約是 l.0。若 PBI 是 0.6 或是低於此值，就得考慮有血管性陽萎症的可能，而大於 0.75 則考慮是正常的。

4. 陰莖的杜卜勒複合超音波檢查: 自藥物(PGE1)注射前後測動脈(arterial insufficiency)血流(RI)(間接測量有無 venous leak)，檢查者須有熟悉技術。

5. 罌粟鹼或前列腺素注射陰莖海綿體試驗。

6. 動脈攝影檢查: 陽萎病人經非侵襲性檢查，診斷為血管病變，在接受血管手術前，血管攝影可提供一個解剖的診斷，以敬為手術之方針。

7. 陰莖海綿體攝影，亦可配合罌粟鹼或前列腺素陰莖海綿體注射，以得到勃起時的解剖變化。可檢查 venous leak 之部位(Dorsal vein, crural vein, cavernosal vein)。

五、治療:

1. 性治療: 診斷為精神性陽萎時，性治療可幫助其重建信心; 當有精神性及器官性陽萎併存時，性治療可改善其症狀。
2. 藥物治療:
   A. 口服 – viagra, Levitra, Cilalis (PDE5 inhibitor)。
   B. 海棉體內注射 – PGE1。
   C. 尿道內置放 – PGE1。
   B. 男性荷爾蒙 – 維持第二性徵及性慾，對勃起功能幫助不大，且會刺激 prostate growth，引起 prostate ca.故須小心。
3. 陰莖血管重建術或靜脈結紮。
4. 人工陰莖植入: 器官性陽萎且無法治療者可考慮人工陰莖植入。可分為半硬體式及充水式。
   A. 半硬體式人工陰莖的優點:
      a. 病人可立即開始性交，陰莖部份不必事先有任何操作。
      b. 手術簡單。
      c. 便宜。
      d. 很少發生故障。
      e. 手術併發症少。
   B. 半硬體式人工陰莖的缺點:
      a. 陰莖經常在勃起狀，日常生活中不易隱藏。
      b. 如因需要必須做膀胱鏡檢查時較為困難。
   C. 充水式人工陰莖的優點:
      a. 不充水時，病人的陰莖是軟的，不影響日常生活。
      b. 充水後陰莖勃起的硬度甚強，甚至於比他以前正常還好。
      c. 如因需要，仍可做膀胱鏡檢查。
   D. 充水式人工陰莖的缺點:
      a. 性交前必須充水使陰莖勃起。
      b. 手術較為複雜。
      c. 費用較高。
      d. 故障率較高。
5. 真空吸引器(Vacuum constriction device)：利用吸引器之負壓造成海棉充血、膨脹，再用 constricting ring 放在 penile base 維持勃起。

   優點 – 較不具侵襲性、可重複使用、可逆性(不同於人工陰莖)。

   缺點 – 須器械、操作麻煩、局部疼痛。

Prostate Cancer -- guidlines

The incidence of prostate cancer is dramatically increased in recent 10 years and become a most common urologic cancer. However the major problems still exist in this country as: 1. the mortality rate is also increasing. 2. majority of new cases are detected in late stage and 3. no curable treatment modality for advanced or metastatic disease. In most cases, death from prostate cancer results from distant metastatic disease. Increase of the clinical stage of local diseases will increase the incidence of metastasis. Therefore, early control of local disease before metastatic event happen is essential for possibility of cure.

Prostate cancer may cause symptoms of urinary obstruction, hematuria and bone pain that all are the manifestations of late stage disease. The early prostate cancer is usually asymptomatics. This early stage disease can be diagnosed incidentally by TURP due to prostatism and suspected by abnormal digital rectal examination or elevation of serum PSA. In addition of recent PSA tests the use of transrectal ultrasound (TRUS) guide systemic biopsy of prostate has much improved diagnostic sensitivity of prostate cancer.

Diagnostic problems: the dilemma between screening and case finding

1. Screening or nonscreening?
   balance between benefit and cost
2. Awareness of Family practitioners and people.
   for early detection program
3. Methodology to achieve early detection.
   a. Annual serum PSA and DRE for men over the age of 50.
   b. Do TRUS and systemic biopsy of prostate, if he has abnormal serum PSA
   c. level (3.5 to 5.5 ng/ml, according to age) or abnormal DRE.

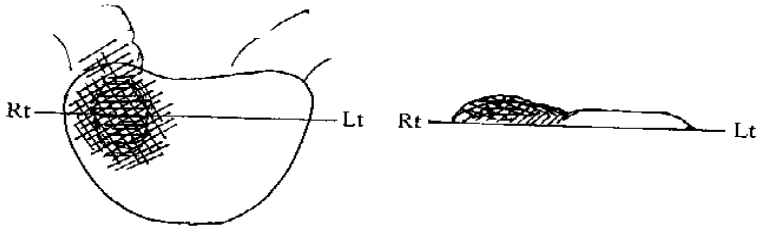
Digital rectal examination (DRE) --

DRE for diagnosis and staging(From Whitmore's OSCC Committee): preperation of a two dimensional diagram indicating the estimated: ① actual size in centimetes and shape of the prostate, ② the size, shape, location, and degree of induration:

first degree or equivocal	/////	one crosshatch
second degree or moderate,		two crosshatch
third degree or stony hard		3 crosshatch

The diagram should include a transverse sectional view (s), at specified level (s) of the prostate, to characterize any symmetry of the rectal surface of gland.

eg:



4.5x4 cm, firm on Rt lobe with hard area
2.0x1.6cm, SV±

A definitive statement regarding the examiners opinion of stage should be made. Be specific ie. stage B2 (T2b) , or stage C (T3).
In addition, the anal sphincter function and any lesions of rectal wall should be also described.

The PSA test --

PSA is an organ specific serine protease produced by prostate epithelial cells of prostate acini and ducts. It is expressed in both benign and malignant cells of the prostate gland. Under normal physiologic conditions, PSA is secreted into the lumen of prostate duct system, and only a small proportion is absorted into the blood stream. Although PSA is less expressed in prostate cancer cells than in benign acinar epithelium. However the cancer cells leaks much more amount of PSA molecules into bloodstream that cause higher serum level of PSA in patients with prostate cancer. PSA has been introduced in this country for clinical use since 1990. It has been used as a marker to monitor the response of therapy, to measure the tumor relapse after therapy and also to be a marker for early detection (case finding or screening).

Indications for PSA test:

1. Men over the age of 50 years (40 years for high risk family)
2. Men who request PSA testing.
3. Prostate cancer patients on treatment or watch waiting.
4. Before prescribing drugs for BPH.
5. Following TURP or open prostatectomy on annual basis.

PSA test is not appropriate under the following conditions:

1. During the episodes of urinary infection.
2. During the episodes of urine retention.
3. Shortly after prostate biopsy or prostate surgery.
4. During the episodes of prostatitis.
5. Immediately after prostate massage.
6. Within 72 hr after ejaculation.

Transrectal Ultrasound for Diagnosis of Prostate Cancer --

Ttransrectal ultrasound (TRUS) of prostate has become the important diagnostic tool for prostate disease after recently developed 7.5 MH probe and coupled with biplane devices. The abilities of TRUS are:

1. To see the 3-dimentional texture of prostate
2. To visualize hypoechoic and other abnormal zones of prostate
3. To measure the size or abnormal lesion of prostate
4. To perform an accurate systemic biopsy of prostate
5. To evaluate pelvic recurrence following prostatectomy

The general accepted indications for TRUS of the prostate in patients with known or suspected prostate cancer are:

1. Evaluation of the patient with abnormal digital rectal examination (DRE)
2. Evaluation of the patient with abnormal PSA test
3. Guidance for directed sonographic biopsy
4. Monitoring response following treatment for prostate cancer
5. Staging of known prostate cancer (controversy)

Preperation of TRUS examination:

1. Antibiotics -- Bactrium or quinolone on the morning or 2hr before examination, and three days after.
2. Empty rectum -- fleet enema on the morning of examination if necessary.
3. Half full bladder.

Methods of TRUS examination:

1. The probe is covered with a condom and filled with ultrasound gel (without gas).
2. Left lateral decubitus position with flexible knee and hips.
3. With transverse plane, both seminal vesicles and prostate from base to apex are visualized, and record abnormal echo area.
4. Measure the size of prostate and abnormal lesion when it is presented.

The findings of TRUS in patients with abnormal DRE could be: ① hypoechoie lesion due to cancer, BPH, cyst or inflammatory lesion ② prostate calcification or stone ③ normal TRUS. TRUS guide biopsy in indicated, if prostate cancer is still suspected.

Before performing TRUS and biopsy, obtaining informed consents is important. Although the proceduce is generally well tolerated, possible complications of hematuria, blood in the stool, hemospermia and fever should be discussed with the patients.

Methods of TRUS guide biopsy:

1. Biopsies should be performed on any suspicious lesion on TRUS, as well as any palpable abnormality on DRE.
2. Systemic biopsies include cores with tissue from the peripheral zone and the transitional zone, as well as from the base, middle and apex of the prostate bilaterally.

Limtation of TRUS in prostate cancer detection

1. Most hypoechoic lesions found on TRUS are not cancer.
2. Around 50% of nonpalpable cancer more than one cm are not visnalized.
3. 25 to 30% of cancers would be missed if only hypoechoic area is biopsied.

Rebiopsy policy:

1. Suspicious pathological findings: (Atypical hyperplasia or high grade PIN)
2. Persistent high level of PSA or any PSA $\geqq$10 ng/ml
3. Increased PSA velocity (> 0.75 ng/ml/yr) even PSA lever < 4 ng/ml
4. Considered 3rd set biopsy if PSA level still $\geqq$10 ng/ml, or free PSA percentage < 25 or 30%

Staging Work up:

No further staging work up for clinical asymptomatic stage T1 or T2 with PSA level less than 10 and low Gleason score and CT scan

Bone scan:

1. For clinical stage T1 or T2 with PSA level over 10 or high Gleason score or symptomatics
2. Clinical stage T3a, T3b or T4

目前最為大家接受之 Staging system 為 1992 AJCC 與 UICC 版本及 1997 AJCC 版本 TNM system。

Staging 目標：(1) 評估預後、(2)引導治療方向

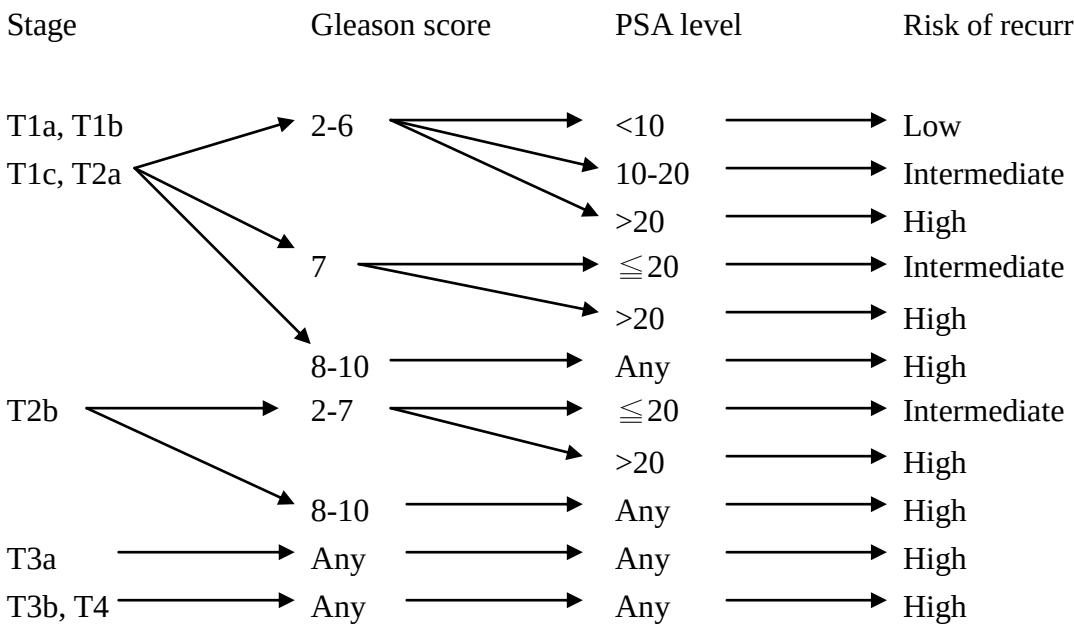
Primary tumor (T)	1997 AJCC

T1	Clinically inapparent tumor not palpable or visible by imaging	
T1a	Tumor incidental histologic finding in 5% or less of tissue resected	
T1b	Tumor incidental histologic finding in more than 5% of tissue resected	
T1c	Tumor identified by needle biopsy (because of elevated PSA)	
T2	Tumor confined within the prostate	Tumor confined within the prostate
T2a	Tumor involves half of a lobe or less	Tumor involves one lobe
T2b	Tumor involves more than half of a lobe, but not both lobes	Tumor involves both lobes
T2c	Tumor involves both lobes	
T3	Tumor extends through the prostate capsule	Tumor extends through the prostate capsule
T3a	Unilateral extracapsular extension	Extracapsular extension (unilateral or bilateral)
T3b	Bilateral extracapsular extension	Tumor invades seminal vesicle(s)
T3c	Tumor invades seminal vesicle(s)	
T4	Tumor is fixed or invades adjacent structures other than the seminal vesicles	Tumor is fixed or invades adjacent structures other than the seminal vesicles: bladder neck, external sphincter, rectum, levator muscles, and/or pelvic wall
T4a	Tumor invades bladder neck, external sphincter, rectum	
T4b	Tumor invades levator muscle or pelvic wall	

Regional lymph node(N)		
N0	No regional lymph node metastasis	
N1	Metastasis in a single regional lymph node≦2cm in greatest diameter	取消 N1, N2, N3 之分
N2	Metastasis in a single regional lymph node 2～5cm or multiple regional lymph node≦5cm	
N3	Metastasis in a regional lymph node ≧ 5cm	
Distant metastases (M)		
M0	no distant metastasis	
M1a	involvement of nonregional lymph node	
M1b	involvement of bone(s)	
M1c	involvement of other distant site	
Histologic grading		(註) 相當於 Gleason grade
G1	well differentiated	2-4
G2	moderately differentiated	5-7
G3-4	poorly differentiated	8-10

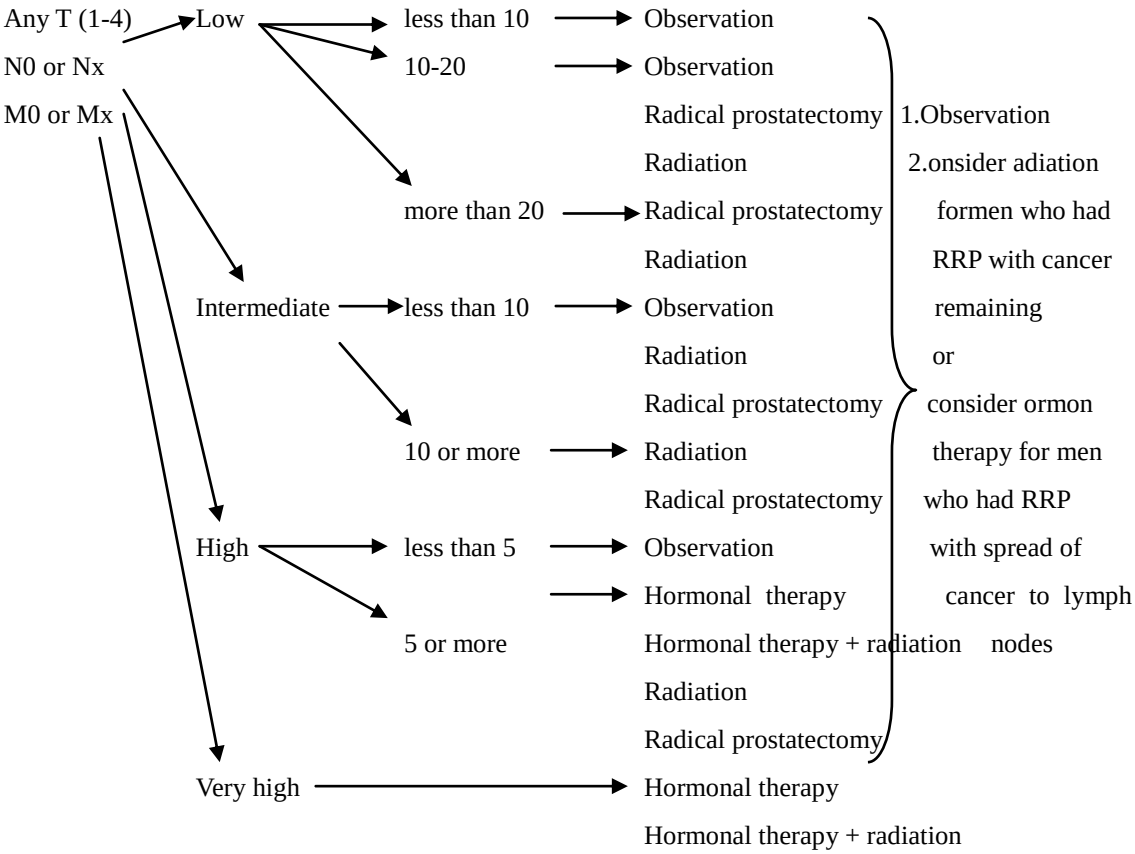
1992 AJCC 與 UICC 版本					1997 AJCC 修正版本				
Stage 0	T1a	N0	M0	G1	Stage I	T1a	N0	M0	G1
Stage I	T1a	N0	M0	G2,3-4	Stsge II	T1a	N0	M0	G2,3-4
	T1b	N0	M0	any G		T1b	N0	M0	any G
	T1c	N0	M0	any G		T1c	N0	M0	any G
Stsge II	T2	N0	M0	any G		T2	N0	M0	any G
Stage III	T3	N0	M0	any G	Stage III	T3	N0	M0	any G
Stage IV	T4	N0	M0	any G	Stage IV	T4	N0	M0	any G

Prediction of risk of recurrence according to clinical stage, Gleason score and PSA level



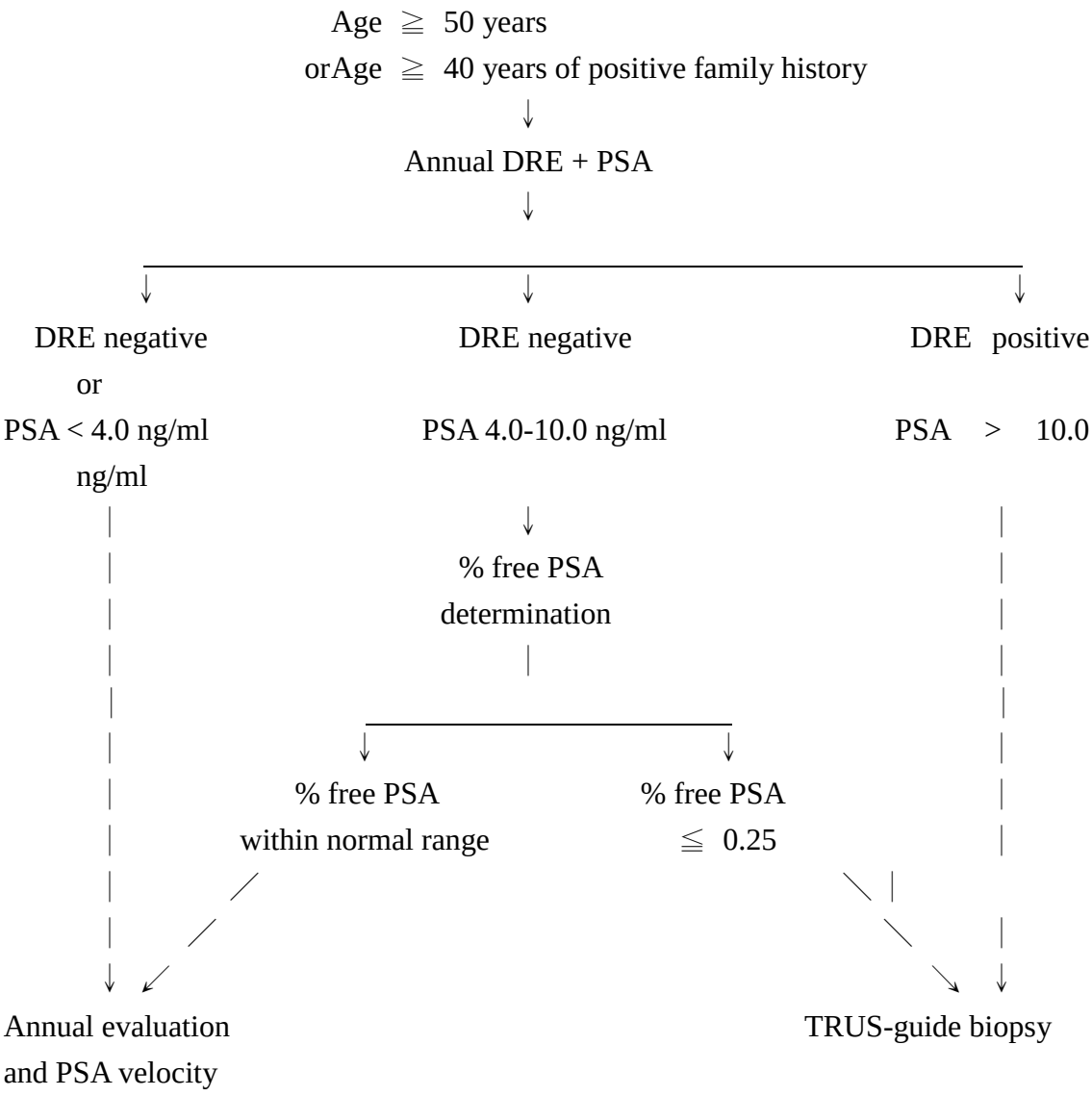
Treatment options – guidelines

Stage	Recurrence Risk	Life expectancy (years)	Initial therapy	Adjuvant therapy



Stage	Treatment	
Any TN1	Observation or Hormonal therapy or Hormonal + Radiation	Follow up
Any T Any N. M1	Hormonal therapy	

The application of free PSA --



膀胱癌 (Carcinoma of bladder)

一、 History:

1. Family history of cancer.
2. Local symptoms; Hematuria, dysuria, frequency.
3. Other symptoms: Flank pain, bone pain, sciatica, peripheral edema, weight loss.
4. Carefully record nature and date and pathology finding relative to all previous treatments.

二、 Past and social history:

1. Occupation related Carcinogen exposure, time, durations.
2. Smoking habit: Amount and duration.
3. Faimily factors: Parents occuption, or special prefer food intake.
4. Analgesico or herb drugs medication (Dose and duration)

三、 Physical examination:

Palpation of neck, abdomen, groins, urethra and pelvic examination (rectal in males; rectal and pelvic examination in females.)

四、 Special laboratory studies:

Urine cytology, initially and immediately post treatment and at appropriate intervals during follow up.

五、 Tumor spreading:

1. Regional Lymph Nodes. The regional lymph nodes are the nodes of the true pelvis, which essentially are the pelvic nodes below the bifurcation of the common iliac arteries.

The significance of regional lymph node metastasis in stasins bladder cancer lies in the number and size and not in whether metastasis **is** unilateral or contralateral.

Regional nodes include:

Hypogastric
Obturator
Iliac (internal, external, NOS)
Perivesical
Pelvic, NOS
Sacral (lateral, sacral promontory [Gerota's])
Presacral

The common iliac nodes are considered sites of distant metastasis and should be coded as Ml.

2. Metastatic Sites. Distant spread to lymph nodes, lung, bone, and liver is most common.

六、 Clinical Staging:

Primary tumor assessment includes bimanual examination under anesthesia before and after endoscopic surgery (biopsy or transurethral resection) and histologic verification of the presence or absence of tumor when indicated. Bimanual examination following endoscopic surgery is an indicator of clinical stage. The

finding of bladder wall thickening, a mobile mass, or a fixed mass suggests the presence ofT3a, T3b, and T4b disease, respectively. Add "m" for multiple tumors. Add "is" to anv T to indicate associated carcinoma in situ.

Appropriate imaging techniques for lymph node evaluation should be used. When indicated, evaluation for distant metastases includes imaging of the chest, biochemical studies, and isotopic studies to detect common metastatic sites. Computed tomography or other modalities may subsequently be used to supply information concerning minimal requirements for staging. The primary tumor may be superficial or invasive and can be partially or totally resected with sufficient tissue from the tumor base for evaluation of full depth of tumor invasion. Visually adjacent cystoscopically normal mucosa should be considered for biopsy; urinary cytology and pyelography are important.

七、 Pathologic Staging:

Microscopic examination and confirmation of extent is required. Total cystectomy and lymph node dissection generally are required for this staging. Laterality does not affect the N classification.

DEFINITION OF TNM

1. Primary Tumor (T)

TX Primary tumor cannot be assessed
T0 No evidence of primary tumor
Tis Carcinoma *in situ:* "flat tumor"
Tl Tumor invades subepithelial connective tissue
T2 Tumor invades muscle
T2a Tumor invades superficial muscle (inner half)
T2b Tumor invades deep muscle (outer half)
T3 Tumor invades perivesical tissue
T3a microscopically
T3b macroscopically (extravesical mass)
T4 Tumor invades any of the following: prostate, uterus, vagina, pelvic wall, abdominal wall
T4a Tumor invades prostate, uterus, vagina
T4b Tumor invades pelvic wall, abdominal wall

2. Regional Lymph Nodes (N)

Regional lymph nodes are those within the true pelvis; all others are distant lymph nodes.

NX Regional lymph nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Metastasis in a single lymph node, 2 cm or less in greatest dimension
N2 Metastasis in a single lymph node, more than 2 cm but not more than 5 cm in greatest dimension; or multiple lymph nodes, none more than 5 cm in greatest dimension
N3 Metastasis in a lymph node more than 5 cm in greatest dimension

Distant Metastasis (M)

MX Distant metastasis cannot be assessed
M0 No distant metastasis
M1 Distant etastasis

3. STAGE GROUPING

Stage 0a	Ta	N0	M0
Stage 0is	Tis	N0	M0
Stage I	Tl	N0	M0
Stage II	T2a	N0	M0
	T2b	N0	M0
Stage III	T3a	N0	M0
	T3b	N0	M0
	T4a	N0	M0
Stage IV	T4b	N0	M0
	AnyT	N1	M0
	Any T	N2	M0
	Any T	N3	M0
	Any T	Any N	M1

八、 HISTOPATHOLOGIC TYPE

The histologic types are:

Transitional cell carcinoma (urothelial)

In situ

Papillary

Flat

With squamous metaplasia

With glandular metaplasia

With squamous and glandular metaplasia

Squamous cell carcinoma

Adenocarcinoma Undifferentiated carcinoma

The predominant cancer is transitional cell carcinoma.

九、 HISTOPATHOLOGIC GRADE (G)

GX	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3-4	Poorly differentiated or undifferentiated

十、 X-ray and scans:

1. I.V.P.
2. Staging procedures.

CT Scan of abdomen & pelvis Liver & bone scan.

十一、 Every patients subjected to bimanual examination

Endoscopic procedure under general anesthesia. TURBt for resectable lesion with deep cut (to musule) biopsies. Complete bladder diagram include representation of the size and extent of the tumors, and operator's impression of clinical stage.

十二、 Treatment.

1. Benign papilloma/low stage, low grade carcinoma:

TUR. and/or fulguration. Follow up cystoscopy 6 months intervals for two years, thereafter one year intervals.

In-travesical therapy for multiple, or recurrent low stage &; low grade tumor

following TUR.

2. In situ carcinoma:

Focal: TUR

Diffuse: Intravesicle BCG or chemotherapy (MMC or Doxorubicin). Follow up cystoscopy and cytology at 2-3 months interval. Cystourethrectomy for patients failing conservative treatment.

3. Low stage, high grade carcinoma.

TUR. with Intravesical BCG therapy and close follow up.

Consider repeat TUR staging following BCG immunotherapy in selected case.

Radical cystectomy preceded or recurrent or advanced cases.

4. High stage carcinoma:

a. Segmental resection or radical cystectomy with ilial conduit or continent ilial bladder.

b. Adjuvant MEC chemotherapy for high risk patients.

十三、 Follow up:

1. For patients with superfical TCC of bladder who have had T.U.R.B.
   - ♦ Cystoscopy and cytology every 3 months for first 2 years thereafter every 6 months.
2. In patients who have had cystectomy:
   - ♦ Arranged IVP before dischange or within one month after surgery.
   - ♦ Follow up visits are scheduled every 3 months for 3 years and at 6 months interval thereafter. Urine cytology at each vist.
   - ♦ Examination include neek, abdomen, pelvis, perineum and stoma (periodic check of residual urine)
   - ♦ Careful palpation of urethra with cytologic studies ofurthral washing every 6 months.
   - ♦ I.V.P. every year for 3 years and every 2 years thereafter
   - ♦ I.V.P. every year for 3 years and every 2 years thereafter
   - ♦ BUN, creatinine, electrolyte and chest x-ray every 6 months.
   - ♦ Abdominal CT scan.

十四、 Pre-operative preparation for radical cystectomy:

1. Chest physiotherapy instruction.
2. Preoperative electrolyte & fluid supplements.
3. Mark the Suitable site for stoma.
4. Urine culture & sensitivity test.
5. Complete date (CBC, coagulation profile/chest, EKG.)
6. Bowel Preparation:

   Low residual diet for 2 days.

   Citrate of magnesia 240ml (or caster oil 30ml) 2 days preop.

   Clear fluids for 48hr preop.

   Enema until clear night before surgery.

   Neormycin 1.0 gm p.o. at 12N, 2:00 pm, 6:00 pm 10:00 pm on day prior to surgery.

十五、 Post-operative care:

1. Antibiotics pre-op. and immediately post-op.

   No antibiotics without specific indication.
2. N/G sump drain on low pressure suction for 3-5 days check patency.

3. Early ambulation.
4. Periodic electrolyte CBC, BUN.
5. Heal conduit are intubated with 26 F catheter at least until small bowel peristalsis return.
6. In patients with ureteral stent placed is generally removed at day 10 and the remaining stent one day later.
7. In patients having cutaneous ureterostomies, the ureteral catheter should be kept securely in place until such time as either primary skin to mucosa healing, or slough with secondly organization of tract has occurred.

腎盂及輸尿管癌 (Carcinoma of the renal pelvis and/or ureter)

一、History:

1. Family history of cancer.
2. Local symptoms: Gross hematuria, flank pain, mass.
3. Systemic symptoms: weight loss, weakness, fever back pain.
4. G-I symptoms: Anorexia nausea, vomiting.

二、 Past history:

1. Past history of bladder tumor.
2. Renal calculus, disease, prior hematuria or prior surgery.
3. If the patient has already been treated elsewhere then include the details of prior surgery, radiation or chemotherapy.

三、 Social history:

History of exposure to known carcinogens; smoking habits, analgesics and herb drug.

四、 Laboratory Studies:

Urine cytology. Renal function test, ERPF

五、 Diagnostic X-ray:

1. I.V.P.
2. Retrograde pyelograms.
3. CT Scan of abdomen when indicated for staging work up.

六、 Possible spreading:

1. Regional Lymph Nodes. The regional lymph nodes are:

For Renal Pelvis:
- Renal hilar
- Paracaval
- Aortic
- Retroperitoneal

For Ureter:
- Renal hilar
- Iliac (common, internal [hypogastric], external)
- Paracaval
- Peri-ureteral
- Pelvic, .KgS

Any amount of regional lymph node metastasis is a poor prognostic finding and outcome is minimally influenced by the number, size, or location of the regional nodes which are involved.

2. Metastatic Sites. Distant spread to lung, bone, or liver is most common.

七、 Staging:

Clinical Stagins. Primary turmor assessment includes radiographic imaging, usually by intravenous and/or retrograde pyelography. Computerized tomography scanning can be used to assess regional nodes. Ureteroscopic visualization of the tumor

is desirable and tissue biopsy through the ureterocope may be performed if feasible. Urine cytology may help determine tumor grade if tissue is not available. Staging of tumors of the renal pelvis and ureter is not influenced by the presence of any concomitant bladder tumors which may be identified.

八、 Pathologic Staging.

Pathologic staging depends upon histologic determination of the extent of invasion by the primary tumor. Treatment frequently requires resection of the entire kidney, ureter, and a cuff of bladder surrounding the ureteral orifice.

Appropriate regional nodes may be sampled. A more conservative surgical resection may be performed, especially with distal ureteral tumors or in the presence of compromised renal function.

Endoscopic resection through a ureteroscope or a percutaneous approach may be used in some circumstances. Submitted tissue may be insufficient for accurate histologic examination and pathologic staging. Laser or electrocautery coagulation or vaporization of the tumor may be performed, especially if the visible appearance is consistent with a low grade and low stage tumor. Under these circumstances, there may be no material available for histologic review.

DEFINITION OF TNM

1. Primary Tumor (T)

TX Primary tumor cannot be assessed
T0 N0 evidence of primary tumor
Ta Papillary noninvasive carcinoma
Tis Carcinoma in situ
Tl Tumor invades subepithelial connective tissue
T2 Tumor invades the muscularis
T3 (For renal pelvis only) Tumor invades beyond muscular is into peripelvic fat or the renal parenchyma
T4 Tumor invades adjacent organs, or through the kidney into the perinephric fat

2. Regional Lymph Nodes (N)*

NX Regional lymph nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Metastasis in a single lymph node, 2 cm or less in greatest dimension
N2 Metastasis in a single lymph node, more than 2 cm but not more than 5 cm in greatest dimension; or multiple lymph nodes, none more than 5 cm in greatest dimension
N3 Metastasis in a lymph node more than 5 cm in greatest dimension

* Note: Laterality does not affect the N classification.

3. Distant Metastasis (M)

MX Distant metastasis cannot be assessed
M0 N0 distant metastasis
Ml Distant metastasis

STAGE GROUPING

Stage 0a	Ta	N0	M0
Stage 0is	Tis	N0	M0
Stage I	Tl	N0	M0

Stage II	T2	N0	M0
Stage III	T3	N0	M0
Stage IV	T4	N0	M0
	Any T	N1	M0
	Any T	N2	M0
	Any T	N3	M0
	Any T	Any N	Ml

九、 HISTOPATHOLOG1C TYPE

The histologic types are:

Transitional cell carcinoma
Squamous cell carcinoma
Epidermoid carcinoma
Adenocarcinoma
Urothelial carcinoma

十、 HISTOPATHOLOGIC

GX	Grade cannot be assessed
Gl	Well differentiated
G2	Moderately differentiated
G3-4	Poorly differentiated or undifferentiated

十一、 Preoperative evaluation:

1. Cystoscopy-evaluation of bladder.
2. Retrograde catheterization of the ureter for retrograde pyelograply or obtaine cytology with the help of a brush ureteral catheter.
3. C. Ureteroscopy with poto record and biopsy for grading when indicate.

十二、 Treatment:

A. Radical nephroureterectomy with resection of bladder cuff.
Regional lymph node dissection is done depending on circumstance.

B. Selected patients may be considered for local resection, or endoscopic fulguration.

十三、 Treatment of far advanced disease (≧T3 or N^+)

Systemic chemotherapy with MEC Protocol. For a. definete therapy of metastastic disease, b. Adjuvant therapy after complete surgical excision.

十四、 Following up:

1. Urine cytology and cystoscopy every 3 months for the first two years and every 6 months thereafter.
2. I.V.P. every one year for first 2 years and very 2 years.
3. Abdominal CT scan every 3-6 months for 2 years, for advanced or high risk disease.

Guidelines on Renal Cell Carcinoma

1. Introduction (Reference 1-5):

A. Renal cell carcinoma (RCC)佔所有癌症約 2%，每年增加約 1.5-5.9%。診斷平均年齡約 70 歲，男性是女性的 1.5-3.1 倍。

B. 由於診斷技術的進步，近年來許多腎細胞癌是由超音波或電腦斷層診斷意外發現，本院每年新診斷的病例約 20 例。Incidental RCC 佔所有 RCC 的比率為 4.8% (1982-1989)，25.5% (1990-1995)，40.3% (1996-2001)，近年有明顯增加，但還是約有 25%~30%的 RCC 在診斷時已經轉移，近年存活率稍有增加，本院的結果：10 年存活率分別為 87% (第一期)，65% (第二期)，40% (第三期)；第四期 5 年存活率為 8%，10 年存活率為零。

2. Classification and stage (Reference 6-9):

A. Classification

Clear cell: 60-85%

Chromophilic: 7-14%

Chromophobic: 4-10%

Oncocytic: 2-5%

Collecting duct: 1-2%

B. Stage

Table 1. Staging system of Renal Cell carcinoma

The staging system used is that of Robson and is adequate for practical purposes.

Stage I- tumor confined to kidney

Stage II- tumor beyond renal capsule but confined to Gerota's space

Stage III- local spread

a. Renal vein or inferior vena cava
b. Local lymph nodes
c. Venous and lymphatic involvement

Stage IV- advanced disease

a. Adjacent organs other than adrenal
b. Distant metastases

Table 2. UICC TNM Classification of Renal Cell Carcinoma (1997)

Kidney ICD-0 C64

Rules for Classification

The classification applies only to renal cell carcinoma. There should be histological confirmation of the disease.

The following are the procedures for assessing T, N, and M categories:

T categories Physical examination and imaging

N categories Physical examination and imaging

M categories Physical examination and imaging

Regional Lymph Nodes

The regional lymph nodes are the hilar, abdominal para-aortic, and paracaval nodes. Laterality does not affect the N categories.

TNM Clinical Classification

T—Primary Tumour

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- Tl Tumor 7.0 cm or less in greatest dimension, limited to the kidney (Tla ≦ 4cm, 7cm ≧ T1b > 4cm)
- T2 Tumor more than 7.0 cm in greatest dimension, limited to the kidney
- T3 Tumor extends into major veins or invades adrenal gland or perinephric tissues but not beyond Gerota fascia
  - T3a Tumor invades adrenal gland or perinephric tissues but not beyond Gerota fascia
  - T3b Tumor grossly extends into renal vein(s) or vena cava below diaphragm
  - T3c Tumor grossly extends into vena cava above diaphragm
- T4 Tumor invades beyond Gerota fascia

N-Regional Lymph Nodes

- NX Regional lymph nodes-cannot be assessed
- N0 No regional lymph node metastasis
- N1 Metastasis in a single regional lymph node
- N2 Metastasis in more than one regional lymph node

M-Distant Metastasis

- MX Distant metastasis cannot be assessed
- M0 No distant metastasis
- M1 Distant metastasis

pTNM Pathological Classification

The pT, pN, and pM categories correspond to the T, N, and M categories.

G Histopathological Grading

- GX Grade of differentiation cannot be assessed
- G1 Well differentiated
- G2 Moderately differentiated
- G3-4 Poorly differentiated/undifferentiated

Stage Grouping

Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	Tl	N1	M0
	T2	N1	M0
	T3	N0, N1	M0
Stage IV	T4	N0, N1	M0
	Any T	N2	M0
	Any T	AnyN	M1

Summary

- T1 ≦7.0 cm; limited to the kidney
- T2 >7.0 cm; limited to the kidney
- T3 Into major veins; adrenal or perinephric invasion
- T4 Invades beyond Gerota fascia

N1 Single
N2 More than one

C. Grade

一般採用Fuhrman nuclear grading system分四級

3. Diagnosis (Reference 5)

目前腎細胞癌的症狀大部分無症狀而意外發現的。而有症狀的病人以血尿及腰背痛較常見，典型的血尿、腰背痛加上摸到腫塊教課書上所稱的 triad 已經極少。另外有些病人以副腫瘤症候群的症狀來表現，這些症狀包括體重減輕、癌病惡體質、發燒、貧血、alkaline phosphatase 增高、erythrocytosis, calcium 增高、高血壓....等等，所以以下一些實驗室資料應該評估：

♦Hemoglobin，erythrocyte sedimentation rate，CRP：評估預後

♦Creatinine: 整體腎功能

♦Alkaline phosphatase: paraneoplastic syndrome 或是 liver metastasis 或是 bone metastasis

♦Serum calcium: paraneoplastic syndrome 或是 bone metastasis

♦Ferritin: 預後因子

大部分 RCC 先以超音波檢查被意外發現,標準的放射學檢查是 Abdominal CT scan。而血管攝影對診斷不明或是考慮作部分腎切除的病人是需要的，MRI 在鑑別診斷腎臟肌肉血管瘤或 RCC 有一點幫助，Fine needle biopsy 在一些情況下也可施行。

CxR 是必要的檢查，bone scan、brain CT、Chest CT scan 則是需要才作，懷疑 IVC thrombus，需作 Inferior vena cavogram，懷疑有 Right artial thrombus 需作 Echocardiogram。

4. 治療(Reference 10-17)

只有根除性腎切除手術提供 RCC 治癒的機會。而在 tumor ≦ 4 公分位於腎臟週邊的腫瘤,可考慮部分腎切除。根除性腎切除包括腎臟腫瘤及 Gerota's fascia 內的 adrenal gland。如果腫瘤較小且位置在腎的下半部 adrenal gland involvement 的機會極微，可考慮不切除 adrenal gland。

徹底淋巴腺摘除包括：hilar, laterocaval, precaval, retrocaval and interaortocaval lymph nodes from the right cross of the diaphragm to aortic bifurcation (for Right RCC). For L't RCC included hilar, lateroarotic, preaortic, retroaortic and interaortic lymph nodes from left crus of the diapragm to aortic bifurcation。淋巴腺摘除的價值在於正確的分期，而治療的效益尚未證實，在顯微轉移的病人似乎有一些幫忙。

對於無法完全切除乾淨腫瘤者，作 palliative tumor nephrectomy 在一些有症狀（血尿、貧血），年齡較輕而且要做輔助免疫化學療法時，可考慮施行。

在一些特殊情況下如兩側腎腫瘤、單一腎腫瘤、多發腎腫瘤、腎功能不全時，則需要視情況而定，不適於一般的原則。

5. 追蹤(Reference 18-20)

追蹤的主要精神是儘早發現局部復發或遠處轉移，而儘早採取治療步驟。追蹤的原則，視病人的 tumor stage、手術的方式、預後因子而定。

建議的追蹤方式

Stage	門診	檢查	選擇	目的
AII T	術後 4-6 wks	1.身體檢查 2. BUN, Cr 3. CBC 4. CT scan	Alkaline Phosphotase (述前 A.P 增高的病人)	建立術後的 CBC、腎功能、影像的基準點或是有無術後合併症
T1 (Radical Nephrectomy)	♦ 前 5 年每半年一次 ♦ 第 5 年後每年一次至 15 年	1.身體檢查 2. CxR 3.每年一次 CT scan 4.每年一次 BUN, Cr, CBC		發現局部復發或淋巴腺轉移、肺轉移
All T (Partial Nephrectomy) 或 T2 (Radical Nephrectomy	♦ 前 5 年每半年一次 ♦ 第 5 年後每年一次至 15 年	1.身體評估 2. CxR 3. CT scan 4. BUN, Cr		發現局部復發或淋巴腺轉移、肺轉移
T3, T4 (Radical Nephrectomy)	♦ 前 5 年每半年一次 ♦ 第 5 年後每年一次至 15 年	1.身體評估 2. CxR 3. CT scan 4. BUN, Cr 5. Bone scan (懷疑時)		發現局部復發、淋巴腺轉移、肺轉移、對側腎轉移或對側新生腫瘤

6. 預後因子如下表所列(Reference 6)

病人相關因子：

- 表現症狀
- 體重下降 > 10% body weight
- Performance status ECOG 2-3
- ESR > 30
- Anemia < 10g/dl (female); 12g/dl (male)
- Hypercalcemia
- Elevated alkaline phosphate

腫瘤相關因子：

- Macroscopic positive surgical margins
- 多處轉移
- 單一處不可切除之轉移

- ♦ Liver and lung metastaes
- ♦ pTNM stage
- ♦ Grade
- ♦ Histologic type
- ♦ Sarcomatoid type

7. 免疫化學療法(Reference 21,22)

免疫化學療法對於轉移腎細胞癌有效率約不到百分之 20，最有效的為肺轉移。目前的 regimen 為 interferon，5-FU 加上 Interleukin 2。

<u>推薦療法、療程</u>

♦轉移性腎細胞癌 MRCC (Dr. Atzpodien, Dr. Kirchner 1992)

週數	1			2			3			4			5			6			7			8		
日數	1	3	5	8	1 0	1 2	1 5	1 7	1 9	2 2	2 4	2 6	2 9	3 1	3 3	3 6	3 8	4 0	4 3	4 5	4 7	5 0	5 2	5 4
Proleukin	■	■	■	▌	▌	▌	▌	▌	▌	■	■	■												

■：皮下注射 Proleukin 30 MIU/m^2/天 (分兩次各 15 MIU/m^2 於 8 a.m.及 6 p.m.投與)；

30 MIU/m^2/天 x 6 天÷18 MIU/支=10 支

▌：皮下注射 Proleukin 9 MIU/m^2/天 (於 6 p.m.投與)；

9 MIU/m^2/天 x 6 天÷18 MIU/支= 3 支

* 每兩個月為一治療週期 (以上為單一藥物治療，併用 IFN-α；5-Fu 時)

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捌、 腹腔鏡手術概論

Introduction to Laparoscopic Surgeries in Urology

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History of Laparoscopy in Urology

1. Cortesi (1976): abdominal orchiectomy
2. Schuesler (1990): pelvic lymph nodes dissection
3. Clayman (1991): radical nephrectomy
4. Gagner (1992): adrenalectomy
5. Schuesler (1992): radical prostatectomy
6. Tierney (1994): hand-assisted nephrectomy (HAL nephrectomy)
7. Kavoussi (1995): donor nephrectomy
8. Abbou (2000): robot-assisted radical prostatectomy

Indications for Laparoscopy in Urology

As we approach to a new century, minimally invasive surgery is rapidly evolving to assume a prominent position in health care delivery. Although most of the urological procedures are already endoscopic or minimally invasive, laparoscopy has opened another new scope of treatment. Laparoscopy has evolved from a diagnostic tool to assume an important role as an alternative to open surgery. Technical advancements, improved instrumentation and a pioneering spirit, have made complex laparoscopic interventions commonplace in many of the surgical sub-specialties.

Potential Benefits of Laparoscopic Surgeries

- Less intra-operative bleeding
- Diminishing postoperative pain
- Less post-operative analgesics
- Decreased admission days
- Less potential complications post-operatively
- Better cosmetic results of operative wounds
- Early return to daily works

Major Drawbacks of Laparoscopic Surgeries

- Longer operative time
- Steep learning curve
- Higher instrumentations
- Expensive operative charges

What are HAL and Why HAL?

Hand-assisted laparoscopy (HAL) is a hybrid technique that incorporates features of both standard laparoscopy and open surgery. The surgeon's dominant hand controls the laparoscopic instruments for dissection, suturing, and clip application, etc. The surgeon's non-dominant hand replaces a laparoscopic instrument: it enters the abdominal cavity through a 7cm incision to palpates tissues, providing the surgeon with spatial orientation, tactile sensation, blunt dissection, and retraction, as in open surgery.

The learning curve appears to be less steep. For the experienced laparoscopist, hand-assisted laparoscopy facilitates the performance of more complex cases. Moreover, hand-assisted laparoscopy offers an alternative to conversion to open access the value of the hand-assisted technique is evident when large whole organ retrieval is necessary.

HAL facilitates the successful completion of laparoscopic surgery without compromising the prompt recovery and short hospital stay associated with laparoscopy alone. Moreover, faster operating times, and the ability to perform complex surgeries without compromising cost or outcome make HALS an attractive procedure.

Laparoscopic Procedures in Urology

Ablation of Benign Diseases

- Adrenalectomy
- Abdominal orchiectomy
- Unroofing of renal cyst
- Simple nephrectomy
- Ureterolithotomy

Ablation of Malignant Diseases

- Pelvic and retroperitoneal lymphadenectomy
- Radical nephrectomy
- Nephroureterectomy
- Radical prostatectomy
- Radical cystectomy
- Partial nephrectomy

Reconstruction

- Donor nephrectomy
- Pyeloplasty
- Neobladder
- Pelvic floor reconstruction

Robot-Assisted Procedures

Since laparoscopic reconstructive procedure are highly technique recommended and time consuming, medical robot was designed to take place the difficult part of surgical reconstruction such as intracorporeal suturing technique. Thanks to additional third articular

construction, robot could offer two more freedom of movement than traditional laparoscopy. Moreover, through computer analysis, the robot could screen out the hand tremor and perform precise instrumental application. However, high machine purchase fee and expensive metainance cost are the major drawback of this modern technique.

Keys to Successful Laparoscopy

- A consistent operative team
- Repetition of the procedure
- Clear communication with the patient
- Video documentation reviewing

Relative Contraindications to Laparoscopy

- Severe cardiopulmonary disease
- Uncorrected bleeding disorder
- Pregnancy
- Severe intra-abdominal adhesions
- Renal tumor with thrombus in the vena cava
- Large renal tumors
- Severe perirenal adhesions
- Ipsilateral stoma

Complications of Laparoscopy

Intraoperative complications

- Entry and exit injury
- Bleeding
- Bowel and visceral injury
- Gas embolus
- Neuromuscular injury

Postoperative complications

- Bleeding
- Wound hernia
- Infection
- Prolong ileus

玖、 腎臟移植概論

一、 前言

延長尿毒病人生命，改善尿毒病人生活品質的方法有三：血液透析、腹膜透析及腎臟移植。1906 年，第一例的 Xenograft human kidney transplantation 開啟人類腎移植的大門。1987 年 6 月後「人體器官移植條例」公佈實施後台灣每年的器官移植人數約為 200 人次，其中腎移植數約為 120 人次。本院從 1983 年施行第一例腎移植迄今，已有超過 270 例腎移植病患，讓我們累積了相當豐富的處理經驗及成為中台灣腎移植病人照護中心。

二、 捐腎者及受腎者的條件

捐腎者之選擇：

捐腎者最好能合乎以下條件。然而，由於器官之短缺，某些條件不甚理想之捐腎者（所謂 marginal donor），亦可勉強使用：

（1） 年齡小於 65 歲

（2） 無系統性疾病，如高血壓、糖尿病，全身性感染症

（3） 無腎臟疾病，且腎功能正常。但因低血壓引起之輕度腎衰竭者不在此限。

（4） 無惡性疾病。但原發性腦瘤之患者除外。

（5） 無 B 型肝炎及愛滋病

所謂 marginal donor 是指年齡大於 55 歲，小兒捐腎者，已無心跳的捐腎者及肌酐酸(creatinine, Cr)大於 3mg/dL 的捐腎者

如為屍腎移植，最好再加上下列條件：

（1）尿量維持在 0.5 cc/kg/hr 以上

（2）正常之 BUN 及 Creatinine (輕度腎前性衰竭不在此限)

（3）溫血缺血時間（warm ischemic time）小於 60 分鐘。

所有的屍腎捐贈者都必須經由專業醫師（神經內外科、麻醉科）判定腦死（前後兩次，間隔四小時），方可摘取器官。以下是腦死之定義：

（1）確定原因但不可逆之腦病變。應排除新陳代謝障礙，藥物中毒與低體溫者

（2）不能自行呼吸且無自發性運動

（3）無腦幹反射

受腎者之選擇：

一般認為一歲以上，70 歲以下皆適合腎移植。但具有下列任何情況者不適合：

（1）散播性惡性腫瘤

（2）頑固型心衰竭

（3）慢性呼吸衰竭

（4）進行性肝病
（5）嚴重之血管病變（心,腦及周邊血管）
（6）嚴重之先天性尿路異常
（7）無法治療之慢性感染症
（8）愛滋病
（9）持續性之血液凝固異常疾病
（10）嚴重之心智退化
（11）控制不良之精神病患，酒精中毒或藥物濫用者
（12）重度透析癡呆症

三、 手術方法及器官保存：
（1）Native kidney 需作 Nephrectomy 的適應症
A. 上泌尿道腫瘤或感染，腎水腫
B. 無法控制的高血壓，(a rare indication)
C. 多囊腎併發血尿或感染
（2）器官保存的方法有：hypothermic storage and pulsatile perfusion 前者的 postoperative dialysis is high，而後者的保存方法可維持至 3 天之久。目前常用的保存液為 UW solution (University of Wisconsin Solution)及 Euro-Collins solution。這保存液可以 minimized cellular edema and the loss of intracellular K^+，目前本科使用 4-10℃的 UW solution 作 by gravity perfusion，加上 packed with crushed ice 保存腎臟，並且在 24 小時內完成移植。
（3）腎臟移植術式上，包含兩部分：經由下腹部的 Gibson incision 作腎血管的吻合及輸尿管膀胱的重建。
A. 血管吻合：
a. end-to-side，renal vein-to-ext. iliac vein
b. end-to-end，renal artery-to-int. iliac artery
or
c. end-to-side，renal artery-to-ext iliac artery
B. 輸尿管的吻合方法有：Politano-Leadbetter 及 Lich method 目前本科使用 Lich method 作吻合，並且不用 D-J stent。
C. 術後照顧：
a. 術後第一天即可 try water 準備進食
b. 術後第七天即可拆線及拔除 Foley，隔天若引流量未增加，可考慮拔除引流管

四、 抗排斥藥物的使用：coventional immunosuppression 是 prednisolone 與 azathioprine (imuran)，其最大的壞處是 lacks of specificity causes concomitant depression of multiple organ system and immunologic response。從 1976 年

Cyclosporine (抑制 T-淋巴球釋放 Interleukin-2) 使用後，不僅提高 graft survival rate 也保存宿主的抵抗力，其用法為手術前 4-12 hr 給予 8-10 mg/kg/D，每天一劑，手術後二週內減量至 5-10 mg/kg/D，每天一劑。其最大的副作用是腎毒性，所以需要監視其血中濃度

Maintainance regimen

（1） FK506 (Tacrolimus)：

作用：與 cyclosporine 類似

用法：起始量 0.15-0.3 mg/kg/D 至血中濃度為 5-15 ng/L 分二次投予，Q12H，需測 whole blood trough level

（2） Prednisolone：

作用：活化血管內的 T-lymphocyte 及抑制 T-lymphocyte release lymphokines

用法：0.1-0.2 mg/kg/day

（3） Imuran (AZT)：

作用：干擾 DNA 及 RNA 合成，抑制 T 及 B lymphocyte 活化

用法：3-5 mg/kg/D，依 WBC 數目，調整劑量

（4） Cellcept (MMF, mycophenolate mofetil)：

作用：類似 imuran,經由 De Novo pathway block purine 代謝

用法：術後 1g BID AC，依病情調整維持劑量 1-1.5g BID AC

（5） Sirolimus (SRL, Rapamycin,Rapamune)

作用 ：經由 mTOR (mammalian target of rapamycin, a multifunctional kinase)在 cell cycle 的 G0-G1 phase inhibit cytokine synthesis and protein synthesis

用法 : 2cc PO ,QD

Acute rejection therapy

（6） Methylprenisolone：

作用：活化血管內的 T-lymphocyte 及抑制 T-lymphocyte release lymphokines

用法：Induction regimen: Day 0: 500mg, Day 1: 250mg, Day 2: 125mg. Pulse therapy for acute rejection: 500 mg iv drip for 1 hour，連續 3 天

（7） Muromouab-3 (OKT-3)：

作用：阻斷 T 細胞膜上 CD3 分子的作用

用法：急性排斥時 5 mg/D iv，10 至 14 天。使用前需作 a) skin test，b) 注射 solumedrol 8 mg/kg to prevent cytokines release syndrome，c) 使用 gancyclovior to prevent CMV infection

（8） ALG (antilymphocyte globulin)：

作用：與 lymphocyte surfaceAg 結合，以減少胸腺衍生來的淋巴球

用法：acute rejection 時 10-15 mg/kg/D，使用 14 天

五、 併發症：

（1） 術式併發症：bladder leakage，ureteral obstruction，ureteral leakage 等，可以 reanastomosis 及 D-J stent 來處理。在血管吻合的併發症，如 renal artery stenosis 有些情況可以 transluminal angioplasty 來解決，而造成 stenosis 的可能原因為 1) reaction to suture material，2) extensive periadventitial cicatritical formation。一般手術的併發症是 2%左右

（2） 抗排斥藥物的併發症：如感染，opportunity infection，cancer incidence 增加

六、 結果：

截至 2000 年，已有超過 270 例的腎移植手術在本院進行，包含超過 30 例的活體腎移植手術，其病人與移植腎的存活情況如下表：

Years	1	2	3	4	5	6	7	8	9	10
Patient (%)	99.2	97.6	95.0	92.7	91.8	89.4	86.6	80.5	77.6	76.0
Graft (%)	97.2	94.4	90.6	86.2	85.3	81.1	76.8	68.0	63.8	63.0

腎臟之存活率則視腎臟來源及組織型配對之吻合度而有所不同，一般而言屍腎移植之一年存活率約為大於 90%，五年存活率約為 60-70%，而十年存活率則僅有 50%。本院的移植結果在移植團對的合作下則有不錯的成果，尤其活體腎移植的成果，在腎源不足的情況下更值得大力推廣。

壹拾、 機器人手臂手術概論

達文西系統 (da Vinci® System)簡介：

達文西系統 (**da Vinci®** System)是設計在執行胸腔鏡及腹腔鏡手術時，由專業人員在手術室內操作, 控制內視鏡器材。達文西系統由三個主要的部分組成：

- Surgeon Console: 由兩個主要控制器，及一個 3D 立體顯示器構成的醫師控制中心
- Surgical Cart: 裝備有攝影機臂及3隻器械臂的手術車台
- Vision Cart: 裝備有攝影機及影像處理設備影像車台

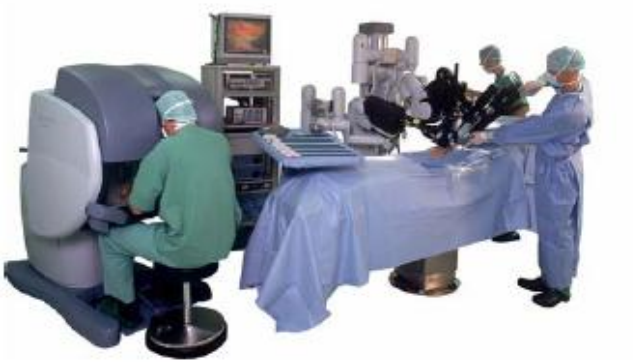


Figure 1-1 由左至右: 醫師控制中心, 影像車台及手術車台

醫師坐在Surgen Console裡，看著放大的手術區域 3D 影像顯示，操作主要控制器 (Master)。將頭靠在觀視窗 (View Port) 上，兩邊的頭部感應器之間，就可看到立體顯示器內的3D 影像。醫師可如同平常手術一般, 利用主要控制器 (Master) 來精準地控制器械及動作方向。

達文西系統讓醫師可以直接並即時地操作器械。利用了運動學架構來讓醫師們由控制台來運用傳統手術技巧，這些技巧被立即轉換成低傷害性手術 (minimally invasive surgery, 或 MIS) 動作。藉由達文西系統，醫師可以輕鬆地由極小的開口，靈敏精準地執行手術。

醫師控制中心概覽

位於消毒範圍外的控制中心整合了高解析度立體顯示系統，醫師可坐在控制中心前，從立體顯示器觀看手術區域來操作。

主控制器 (Masters)

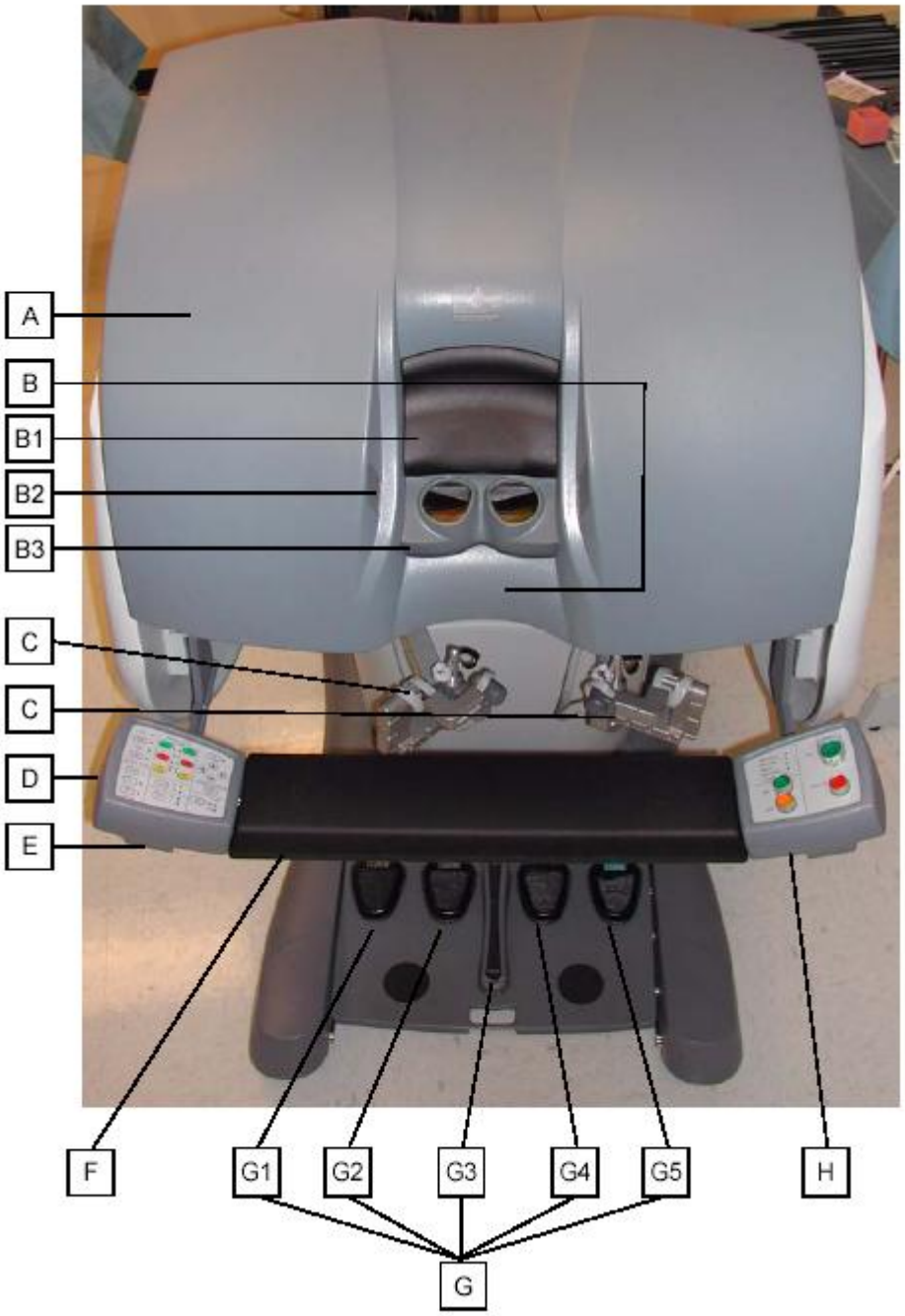
主控制器由醫師操作，控制連接在手術車台上的器械及內視鏡攝影機，主控制器會隨著醫師的雙手自然的控制手術車台上的器械。

3D顯示系統(3D Display System) 及立體顯示器 (Stereo Viewer)

兩個獨立光學頻道在 CRT 螢幕上顯示手術區域的立體即時影像，立體顯示器則顯示達文西系統的文字訊息及圖示。

控制 (Controls)及指示器 (Indicators)

醫師及助理經由按鍵及踏板來操作達文西系統的主要功能。手術程序中會用到但手術中會不用到的系統功能按鍵位於扶手上，手術中會使用到的功能在控制台的踏板上。電源、緊急停止按鍵、待機按鍵則在扶手上，供醫師隨時使用。



圖例:

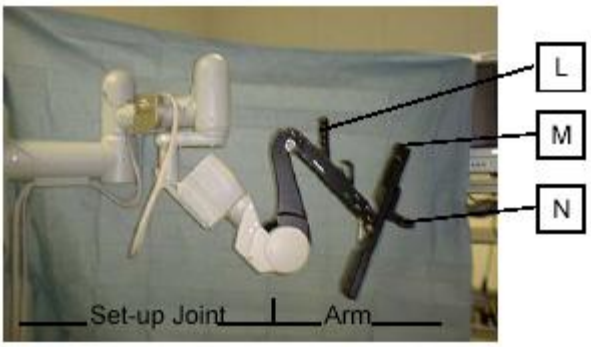
A. 醫師控制中心外殼
B. 觀視窗 (View Port)
   B1. 頭靠墊
   B2. 紅外線感應器
   B3. 立體顯示器 (Stereo Viewer)
C. 主控制器 (Master)
D. 觀察者高度控制
E. 使用者介面控制板 (User Interface Panel)
F. 扶手
G. 踏板組合
   G1. 離合器 CLUTCH
   G2. 攝影機控制
   G3. +/- (攝影機對焦)
   G4. UNUSED
   G5. COAG
H. 使用者開關控制板(User Switch Panel)

Figure 1-2醫師控制中心 (Surgeon's Console)

手術車台概覽

手術車台有一支攝影機臂，附有攝影機/內視鏡組合，還有兩支以上的器械臂，支援 ISI 的全系列器械。

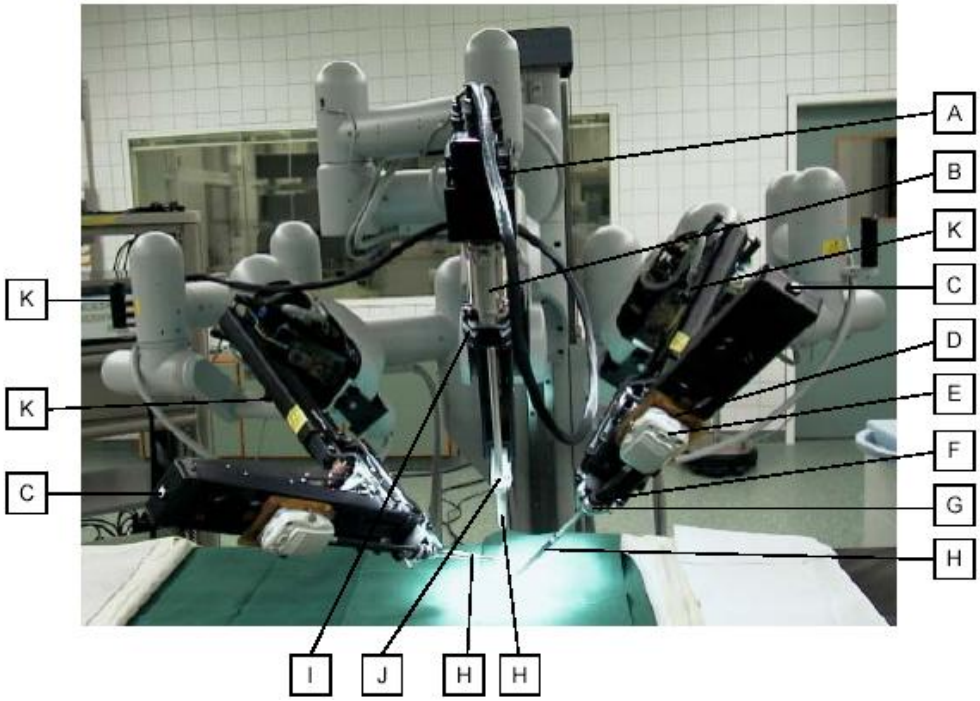
定位接合 (Setup Joint) 是每支機械臂與中心支柱的連結，可將機械臂放置到手術時的最佳位置。機械臂包括了器械的托架，及套管的安裝托座。



攝影機臂圖例:

A. 定位接合鬆放
B. 攝影機裝備鍵
C. 攝影機消毒轉接頭托座

Figure 1-3 攝影機臂



A. 攝影機頂部 (連接到攝影機臂)
B. 內視鏡 (鏡頭)
C. 器械臂裝備鍵
D. 器械臂消毒轉接頭
E. Intuitive Surgical 器械
F. 器械臂套管托座
G. 器械臂套管
H. 轉動中心點
I. 攝影機臂消毒轉接頭
J. 攝影機臂套管托座
K. 定位接合鬆放

Figure 1-4 手術車台攝影機臂及器械臂零件範例

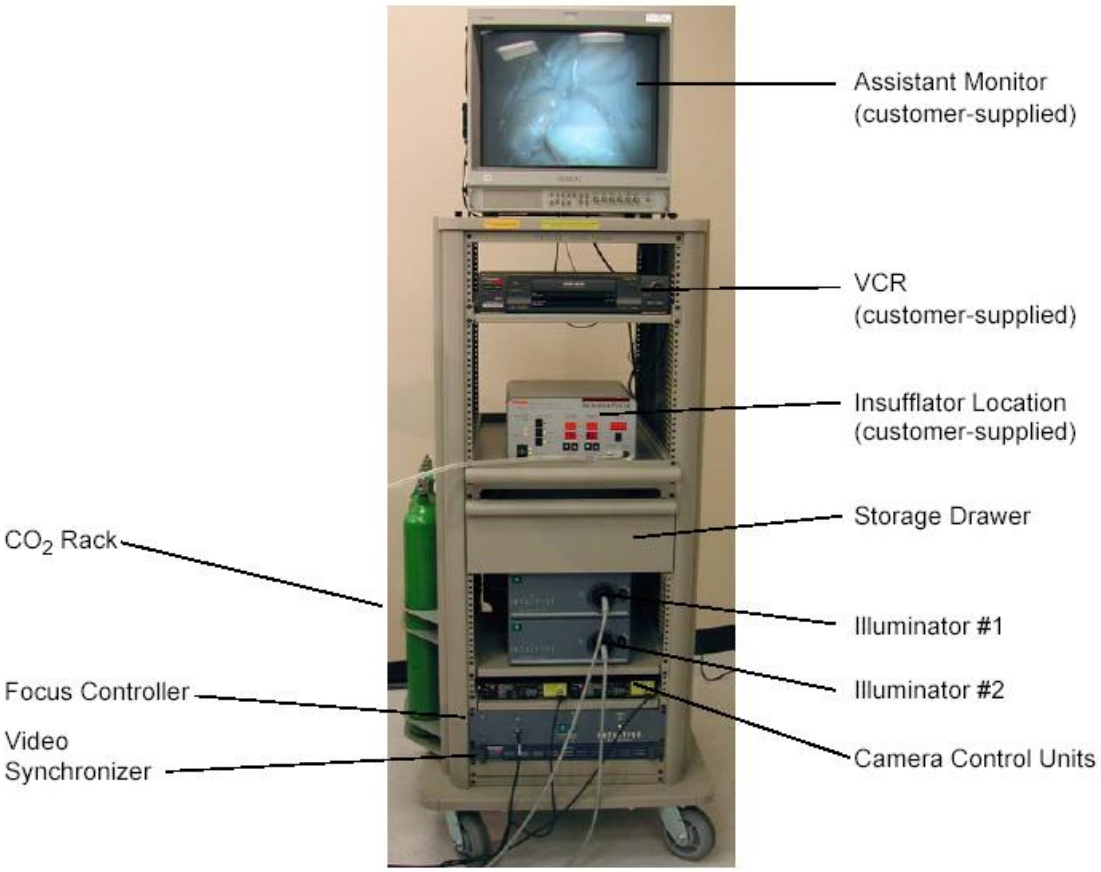


Figure 1-5 Example of Vision Cart Components