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Common Genitourinary Tract Malignancy

Objectives

- Discuss the renal tumors.
- Identify bladder tumor.
- Discuss the testicular cancer.
- Recognize prostate cancer.

Colour Index

- Main Text
- Males slides
- Females slides
- Doctor notes
- Textbook
- Important
- Golden notes
- Extra

Editing File

Renal Tumors

Benign Tumors

- Benign tumours of the kidney are rare.
  - All renal neoplasms should be regarded as potentially **malignant.**
- **Oncocytomas**
  - The most common one.
  - Difficult to differentiate from a kidney cancer on imaging.
- **Angiomyolipomas**
  - Associated with tuberous sclerosis. (autosomal dominant disease with multisystem benign tumours , caused by mutation in TSC1 or TSC2 tumor suppressor genes)
  - Characterised by a typical appearance on CT due to their high fat content.
- Benign tumors **treatment**: observation, embolization or surgery
  - Dictated by symptoms and size.

Malignant tumors

- **Nephroblastoma**.
- **Renal cell carcinoma:**
  - Clear cell **(most common).**
  - Papillary (Type 1 & 2).
  - Chromophobe.
  - Collecting duct.

Renal cell carcinoma:

- **Renal cell carcinomas** arise from the **proximal tubule** cells
- Male : female ratio approximately **2:1**
- Increased incidence seen in **von Hippel-Lindau** syndrome an autosomal dominant disorder due to mutation in VHL gene in short arm of chromosome 3, associated with pheochromocytoma, renal cysts, pancreatic cyst & hemangioblastoma of the eye or spinal cord and **Birt–Hogg–Dubé** (diagnosed by family hx of either: 1- Fibrofolliculomas (benign tumors of the hair follicles) 2- pulmonary cysts 3- kidney tumors. confirmed by a genetic test for mutation in FLCN gene, which codes for the protein folliculin.)

Clinical features:

most of the cases are diagnosed incidentally by imaging (U/S and CT) that is indicated for another purpose.

Classic triad «In 10%»

- Haematuria 
- Loin pain 
- Mass 

Paraneoplastic Syndrome

Treated by Nephrectomy.

- Pyrexia (fever)
  - → Unknown origin.
- Hypertension
- Polycythaemia
  - → due to erythropoietin production.
- Stauffer's syndrome
  - → Signs and symptoms of liver dysfunction due to presence of renal cell carcinoma without tumor infiltration of the liver.

Can be treated medically.

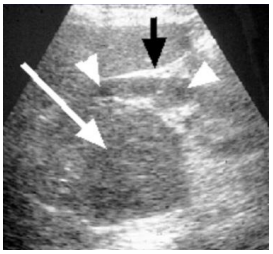
- Hypercalcaemia
  - → due to a PTH-like hormone production.

Renal Tumors

Investigations[1]:

Renal ultrasound

➢ Diagnosis can be confirmed.



CT scan

➢ Assessment of renal vein and caval spread

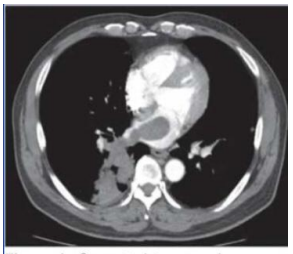
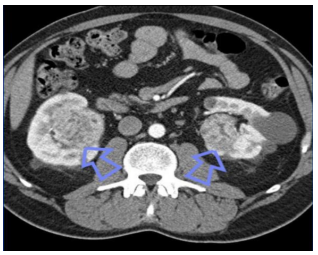
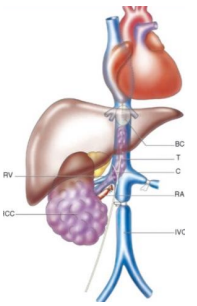


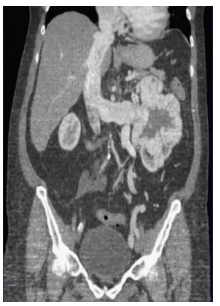
Figure 1: Computed tomography scan o patient's chest when he was first diagnosed with intracardiac extension of disease.



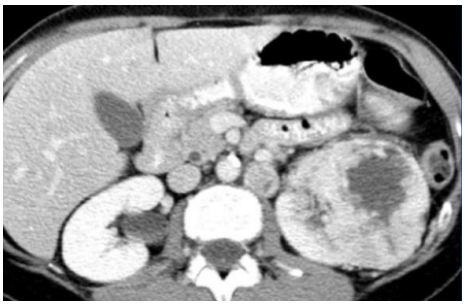
Echocardiogram

➢ should be considered if clot in IVC extends above diaphragm





RCC with IVC thrombus



Renal tumors may present bilaterally "in this cases you have to think about genetic disorders LIKE VHL & tuberous sclerosis
and you have to do genetic screening for the family also

Staging:

- **Staging:** TNM staging

Table 23.3 TNM-7 classification of kidney cancer

T (Tumour)	
• T_0	No evidence of primary tumour
• T_X	Primary tumour cannot be assessed
• T_1	Tumour <7 cm in greatest dimension, limited to the kidney
◦ T_{1a}	Tumour <4 cm in greatest dimension, limited to the kidney
◦ T_{1b}	Tumour >4 cm but <7 cm in greatest dimension
• T_2	Tumour >7 cm in greatest dimension, limited to the kidney
◦ T_{2a}	Tumour >7 cm but <10 cm in greatest dimension
◦ T_{2b}	Tumours >10 cm limited to the kidney
• T_3	Tumour extends into major veins or perinephric tissues but not into the ipsilateral adrenal gland or beyond Gerota's fascia
◦ T_{3a}	Tumour grossly extends into the renal vein or its segmental (muscle-containing) branches, or invades perirenal and/or renal sinus fat (peripelvic), but not beyond Gerota's fascia
◦ T_{3b}	Tumour grossly extends into the IVC below the diaphragm
◦ T_{3c}	Tumour grossly extends into IVC above the diaphragm or invades the wall of the IVC
• T_4	Tumour invades beyond Gerota's fascia (including contiguous extension into the ipsilateral adrenal gland)
N (Nodes)	
• N_0	No regional lymph node metastasis
• N_X	Regional lymph nodes cannot be assessed
• N_1	Regional lymph node metastasis
M (Metastases)	
• M_0	No distant metastasis detected
• M_X	Distant metastasis cannot be assessed
• M_1	Distant metastasis

IVC, Inferior Vena cava.

1.
- US or CT urogram (**initial investigation)**
- CT of abdomen and chest (**Key investigation)**

Renal Tumors

Management:

- Unless extensive metastatic disease it invariably involves surgery.
- **Organ-confined:** laparoscopic or open nephrectomy.
- **<7 cm confined to one pole:** partial nephrectomy
  - open, robot assisted or laparoscopic
- Surgical option usually involves a radical nephrectomy. radical → removal of the kidney & its surrounding tissues: adrenal gland, upper part of ureter, and lymph nodes.

Radical Nephrectomy

Approach (Incision)

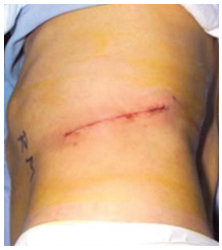
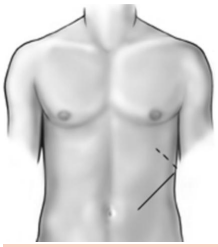
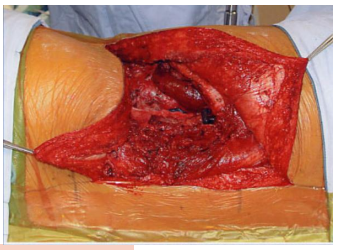
- **Transabdominal**
- **Loin incision**

Ligation

- **Renal vein**
  - ➔ early to reduce tumor propagation

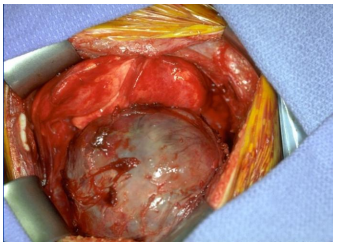
Excision

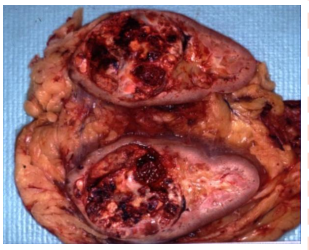
- **Kidney**
- **Adjacent tissue**
  - ➔ Adrenal fat
  - ➔ Perinephric fat

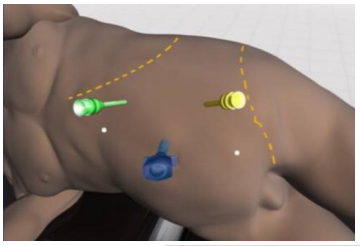
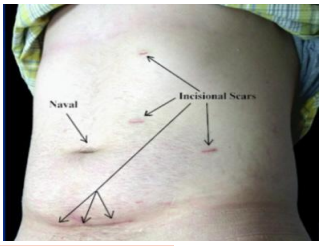
Open Radical Nephrectomy

This is the old method, unfortunately it's painful & extensive surgery.patients hospitalized for week to 10 days after surgery, it takes time to recover from this surgery.



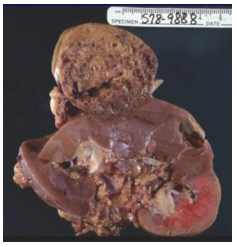


In gross pathology, clear cell carcinoma (most common type) is embedded within the kidney.

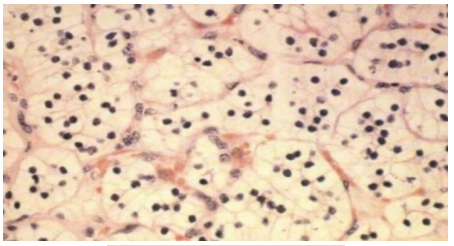



Laparoscopic Nephrectomy

Now, we excise tumor by this method. not painful, patient hospitalize for nearly only 1 day or maximum 2 days after surgery.



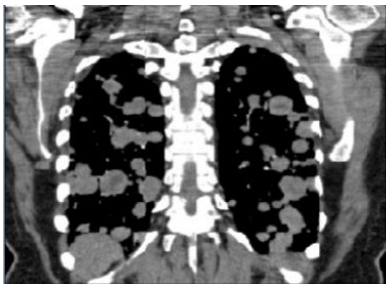
In this picture, we see a bulging mass of the kidney, this is "chromophore" (2nd most common type) which is another type of kidney tumors



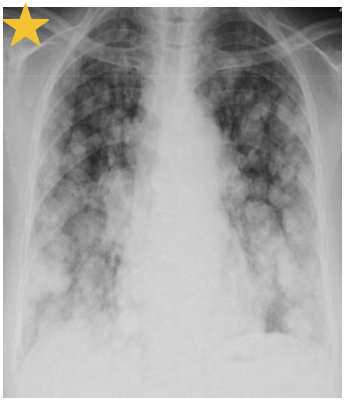
Microscopic CRCC

Renal Tumors

Metastases:

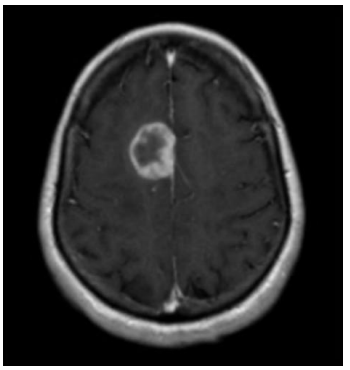


- Spread:
  - **Direct spread :** perinephric tissues **(common)**
    - the whole fascial envelope and kidney should be removed at the same time
  - **Lymphatic:** para-aortic nodes.
- Pathologically may extend into renal vein and inferior vena cava and reaches the right atrium.
- Blood borne spread can result in 'Cannon ball' pulmonary metastases.
  - ★ Cannon ball pulmonary metastases: multiple white patches (deposits of renal cancer metastasis) that resemble miliary TB



Metastasis Rx

Lymph node dissection — Of no proven benefit
May be applied if the tumor metastasized only into renal lymph nodes.



Solitary (e.g. lung metastases) — Occasionally resected.

Radiotherapy & chemotherapy — <u>Have No role</u>
★ (Radio & chemo resistant)
- Multitarget tyrosine kinase inhibitors (TKIs) **(antiangiogenic)**
  - median 12 months progression-free survival benefit.

Immunotherapy

E.g: IL-2 or IFN-gamma
it can control the disease and improve survival for few months (does not cure the tumor)

Can help (Performance status). ★
We must evaluate the performance status of the patient before starting immunotherapeutic agents.
Performance factor is an important prognostic factor.
- (T-cell checkpoint inhibitors)
  - survival advantage in the 2nd line setting

Renal Tumors

Malignant tumors:Nephroblastoma (Wilm's tumor)

- Most common childhood urological malignancy (<4 years).
- Better prognosis in those presenting in 1st year of life.
- Rapid Growth -> early local spread -> invasion of the renal vein.
- Invasion of the renal pelvis occurs late -> hematuria not common.
- Distant metastases to the lungs, liver and bones.

01

- large abdominal mass **(cardinal sign)**

02

- Unusual: fever, hypertension

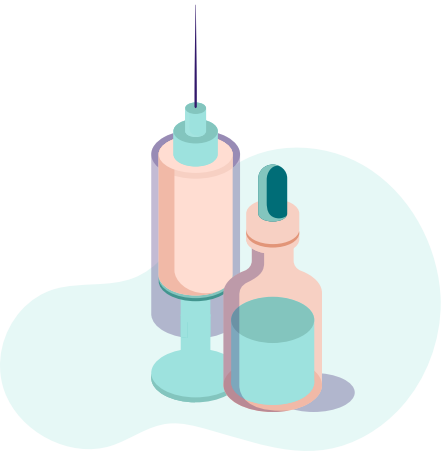
Table 23.2 **Childhood renal tumours**

Feature	Nephroblastoma	Neuroblastoma
Frequency	7 per million children	1 per 8000-10,000 children
Age	Between 3 and 5 years of age	<2 years of age
Origin	Kidney	Adrenal, also extra-adrenal
Symptoms	Hypertension in 25–60%	Uncommon
Abdominal lump	Unilateral, never crosses midline	May cross midline
Radiologically	No change in renal axis	Outward and downward displacement of kidney; calcification common
Metastases at presentation	Uncommon	Bony metastases common
Tumour markers	Serum LDH may be raised	VMA may be raised
Treatment	Surgery mainstay, adjuvant chemotherapy for metastases	Chemotherapy, radiotherapy and surgery

LDH, lactate dehydrogenase; VMA, vanillylmandelic acid.

Investigations and Markers:

- CT of the abdomen and chest **(Essential for diagnosis and staging)**
  - Differential diagnosis:
    - Adrenal neuroblastoma.
    - Hydronephrosis.
    - Cystic kidney disease.
- Confirmed by biopsy
- **Markers:** Serum LDH may be raised



Management:

- Chemotherapy followed by transabdominal nephrectomy with wide excision of the mass.
- Further chemotherapy with or without radiotherapy dependent upon the histopathological features

Adrenal Tumors

Pheochromocytoma ★

Very important, it isn't mentioned in the slides but you are expected to read about it.

- Arise from adrenal medulla (80%) and extra-adrenal paraganglionic tissue (20%)
- 10% are multiple and 10% are malignant
- Associated with neurofibromatosis, medullary carcinoma of the thyroid, duodenal ulcer, and renal artery stenosis.
- **Clinical Features:**

01
- 40 years is typical presentation

02
- Hypertension and paroxysmal hypertension may be precipitated by abdominal pressure, exercise, or postural changes.

03
- headache , palpitation, sweating, anxiety, chest and abdominal pain, pallor, dilated pupils, and tachycardia are prominent features.

Investigations:

- All young hypertensive patients aged 40 and under should be screened for a catecholamine secreting tumor.
- 24 hour urine samples analyzed for metadrenaline and normetadrenaline.
- CT or MRI may show the tumor
- Radiolabeled metaiodobenzylguanidine scanning may demonstrate the tumor

Management:

- Surgical removal of the tumour is the treatment of choice.
- The use of α- and β-blocking drugs has greatly reduced the risk of hypertensive crisis, tachycardia and arrhythmias during induction of anaesthesia or tumour handling.
- The patient should come to operation with blood pressure and pulse rate controlled. Adrenergic blockade also allows restoration of blood volume, so that sudden hypotension after removal of the tumour is unusual.
- To achieve blockade, an **α-adrenergic** receptor blocker such as phenoxybenzamine or doxazosin should be used,
- Once and only once **α-blockade** has been established, unopposed β effects, such as tachycardia, may become evident and are treated with a **β-blocker** such as propranolol.
    - **β-blockade** should not be instituted first, as this may allow unopposed α-agonist effects, which may make hypertension worse and precipitate heart failure.
- Preoperatively, short-acting α- and β-blocking agents and sodium nitroprusside (which acts directly on vessels independent of adrenergic receptors and gives additional control of hypertension) should be available.

Bladder Tumors

Pathology:

- Of all bladder carcinomas:

90% are transitional cell carcinoma (TCCs).

5% are squamous carcinoma

2% are adenocarcinomas

Urothelial cell carcinomas (transitional cell carcinomas)

- **vast majority**
- 3 times More common in men
- The bladder is more susceptible to urinary carcinogens (extensively dyes), as urine is stored in for relatively long periods of time.
  - Naphthylamines
  - Benzidine
- **Appearance:**
  - **Delicate papillary**
    - Superficial
    - Less aggressive
  - **Solid ulcerating**
    - More aggressive

Squamous carcinoma

- in urothelium that has undergone metaplasia due to chronic irritation
  - chronic inflammation.
  - irritation by a stone.
  - Schistosomiasis

Adenocarcinomas

- **Rare**
- Urachal remnant (in the dome of the bladder)
- local infiltration e.g., bowel cancer.

- TCCs should be regarded a 'field change' disease with a spectrum of aggression

Tumor above muscle layer → superficial
Tumor reached muscle → deep
→ Why? Different management approach

- 80% of TCCs are superficial and well differentiated:
  - Only 20% progress to muscle invasion (cardinal feature of bladder cancer).
  - Associated with good prognosis.
- 20% of TCCs are high-grade and muscle invasive.
  - 50% have muscle invasion at time of presentation.
  - Associated with poor prognosis.

Etiological factors: ★

01 **Occupational exposure**
20% of TCCs are believed to result from occupational factors. Those who work in industries and deal with dyes and rubbers are of highly susceptible

03 **Analgesic abuse e.g. Phenacetin**
Old medication that have been banned

05 **Pelvic irradiation**
for carcinoma of the cervix or colorectal

★ **Cigarette smoking**

02 **Chemical implicated**
aniline dyes, chlorinated hydrocarbons

04 **Schistosoma haematobium**
associated with increased risk of squamous carcinoma

06

Presentation:

★ **80%** present with **painless hematuria**.
either gross or microscopic .
- should be assumed a tumor until proven otherwise.
- In women it may be thought as part of occasional cystitis since symptoms are so common
- Mid stream urine → no growth → further investigations

- **Obstructive symptoms**
  - tumour at the lower end of a ureter
  - tumour in the ureteric orifice

- Also, presents with **treatment-resistant infection** or **bladder irritability** and **sterile pyuria**.

Bladder Tumors

Investigations Of Painless Hematuria

Urinalysis
First step

Ultrasound for bladder and kidneys

Cystoscopy
when you find a mass or erythema, you have to take a biopsy

Urine Cytology

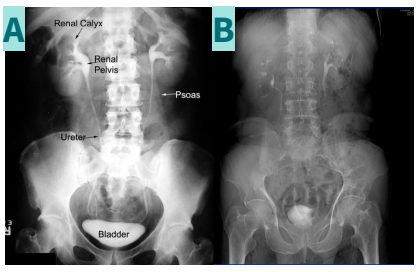
KUB kidney,ureter,and bladder X-ray

IVU- CT scan Intravenous urogram CT scan

➤ to exclude urinary tract calcification
because stone causes painless hematuria

➤ Considered if no pathology identified

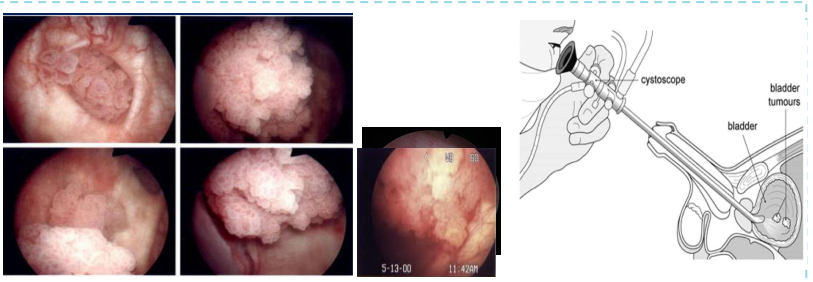
- **Investigations**
  - Visible hematuria -> local anaesthetic flexible cystoscopy & CT urogram (CTU).
  - If lesion is found within the bladder -> cystourethroscopy under general anaesthesia the bladder and tumour are examined bimanually to determine the depth & physical features of tumor -> transurethral resection of bladder tumour **(TURBT)** & biopsy.



IVP

Picture A: Normal bladder with smooth outline and no filling defect

Picture B: filling defect (apple core appearance)



Cystoscopy

Bladder Tumors

Pathological staging:

- Requires bladder muscle to be included in specimen.
- Staged according to **depth of tumor invasion**.

Tis In-situ disease.

Ta Epithelium only

T1 Lamina propria invasion.

T2 Superficial muscle invasion.

T3a Deep muscle invasion.

T3b Perivesical fat invasion.

T4 Prostate or contiguous muscle

Grade of tumor:

G1 Well differentiated.

G2 Moderately well differentiated

G3 Poorly differentiated.

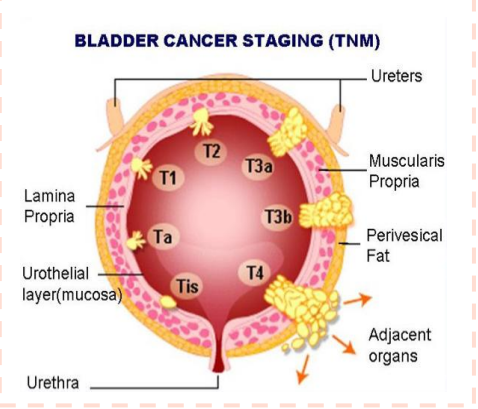
How are staging and grading done?:

Biopsy

- Confirm the diagnosis **(cell type)**
- Guide Choice of treatment
- Degree of differentiation **(grade)**
- Depth of penetration **(T in TNM stage)**
  ***prime clinical importance**

Clinical examination, urography & CT

- Regional and juxtaregional lymph nodes **(N)**
- Distant metastases **(M)**
- Upper tract tumor involvement



Bladder Tumors

Carcinoma in-situ characteristics

- An aggressive disease.
- The mucosa appears normal. With only generalized redness of the bladder.
- Often associated with positive cytology (proliferative tumor).
- 50% of patients progress to muscle invasion.

01 02 03

04 05 06

- Immunotherapy - BCG

How does a vaccine kill cancer cells?
The PTEN protein normally acts as a tumor suppressor; impaired PTEN function appears to increase a cell's vulnerability to becoming cancerous and also to mycobacterial infection.
Just as macrophages are more vulnerable to TB infection & CD4+ cells for HIV.

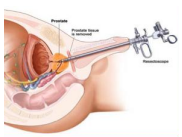
- If BCG fails patient may need radical cystectomy

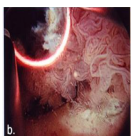
Should be considered in:
- Ongoing storage urinary symptoms. W/pain.
- Symptoms of Ongoing UTI with negative culture.
- High risk of progression to cancer if not treated.

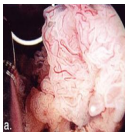
Management of bladder carcinomas:

Superficial TCC (Ta,T1)

- Requires transurethral resection of the tumor with sampling of detrusor muscle and regular cystoscopic follow-up.
  - how to remove the tumor? By trans urethral resection of bladder tumor (TURBT)
- intravesical chemotherapy with **mitomycin C** (reduces the risk of recurrence)
  - single intravesical dose
  - 6-week course
    - treat multiple low-grade bladder tumours
- Consider prophylactic chemotherapy if risk factor for recurrence or invasion (e.g. high grade)
- Consider immunotherapy
- BCG = attenuated strain of Mycobacterium bovis.
- Reduces risk of recurrence and progression
- 50-70% response rate recorded
- Occasionally associated with development of systemic mycobacterial infection



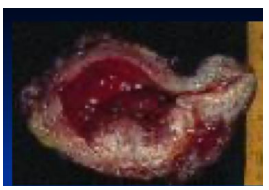


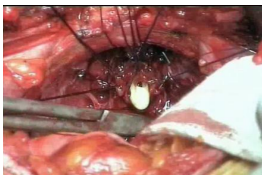


This is TURB

Invasive TCC (T2-T4)

- <70 years -> Radical cystectomy Removal of the bladder along with the prostate, (seminal vesicles or uterus & upper part of cervix), lymph nodes, distal part of ureter and anterior part of urethra.
- Older -> Radiotherapy -> if not treated -> 'salvage' cystectomy
- Invasive T4 fixed to the pelvis or surrounding organs -> palliative treatment
- Radical cystectomy has an operative mortality of about 5% .
- Cystectomy always necessitates urinary diversion.
- Urinary diversion achieved by:
  - Ileal conduit (more common)
  - Neo-bladder
- Local recurrence rates after surgery are approximately 15% and after radiotherapy alone 50% .
- Pre-operative radiotherapy is no better than surgery alone.
- Adjuvant chemotherapy may have a role.



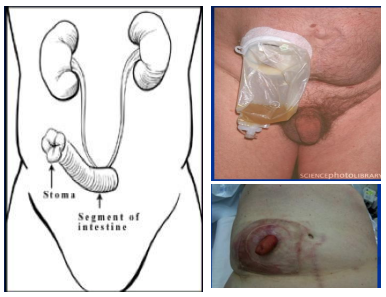


Bladder Tumors

Types of Urinary Diversion

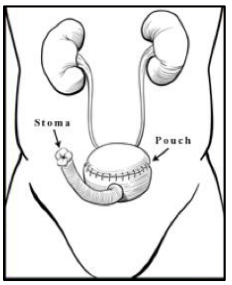
Ileal Conduit

- Incontinent diversion to skin.
  - In less favorable circumstances.
  - The ureters are anastomosed to drain the urine in the detached section of the ileum, which is brought out through an opening (stroma) in the abdominal wall. The urine is collected through a bag that attaches on the outside of the body. It's prefered because it has the least complication.



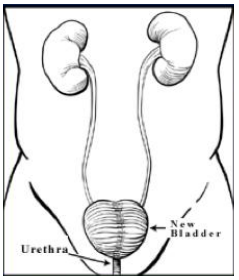
Continent Cutaneous Reservoir

- Continent diversion to skin.
  - connected to the body surface via a continent conduit (ileum or appendix).
  - the patient drains the urine at regular intervals with a catheter.



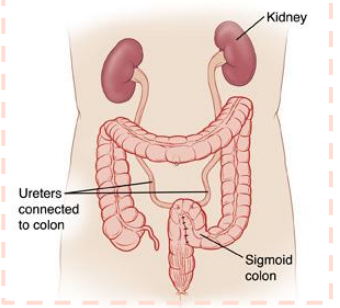
Orthotopic Neobladder

- Continent diversion to urethra.
  - construct a new bladder from colon or small bowel
  - Urethra can be retained



Ureterosigmoidostomy

- Ureters implanted into the sigmoid colon
  - In some countries where ostomy is not acceptable
  - Serious complications: renal infection and metabolic disturbances



Management of recurrences:

- Repeat diathermy or Resection
- If Frequent & excessive → cystectomy

Prostate Cancer

- **Commonest** malignancy of male urogenital tract.
- Rare before the age of **50 yrs**. a tumor of old people (in comparison to testicular tumors which is for the young)
- More men die with than from prostate cancer.
- Found at post-mortem in **50%** of men **>80 yrs**.
- **5-10%** of operation for benign disease reveal **unsuspected** prostate cancer.
- Very slow growing

Table 23.7 TNM classification of prostate cancer*

T (Tumour)

T_0	No evidence of primary tumour
T_X	Primary tumour cannot be assessed
T_1	Tumour clinically inapparent and not palpable
T_{1a}	Incidental finding following TURP in <5% prostate chips
T_{1b}	Incidental finding following TURP in >5% prostate chips
T_{1c}	Prostate cancer detected by prostate biopsy
T_2	Tumour confined within the prostate
T_{2a}	Palpable nodule involving half of one lobe
T_{2b}	Palpable nodule involving one lobe
T_{2c}	Palpable nodule involving both lobes
T_3	Tumour extends through the prostatic capsule
T_{3a}	Extracapsular extension of prostate cancer
T_{3b}	Prostate cancer involving the seminal vesicles
T_4	Tumour is fixed or invades adjacent structures other than seminal vesicles: external sphincter, rectum, levator muscles, and/or pelvic wall

N (Nodes)

N_0	No regional lymph node metastasis
N_X	Regional lymph nodes cannot be assessed
N_1	Regional lymph node metastasis

M (Metastases)

M_0	No distant metastasis detected
M_X	Distant metastasis cannot be assessed
M_{1a}	Metastasis to non-regional lymph nodes
M_{1b}	Skeletal metastasis present
M_{1c}	Metastasis to other sites

TURP, transurethral resection of the prostate.
*Sobin LH, Gospodariwicz M, Wittekind C (eds). TNM classification of malignant tumors. UICC International Union Against Cancer. 7th edn. Wiley-Blackwell, 2009 Dec; pp. 243–248.

Prostate Cancer

Pathology:

Type

01

Adenocarcinoma

★Most of the cases are adenocarcinomas

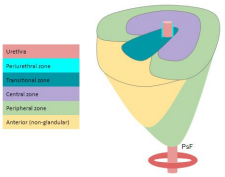
Location

02

Peripheral zone

★70%

BPH → central (transitional) zone.

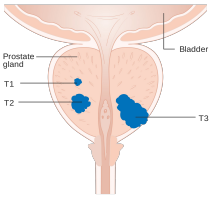


Grading

03

By Gleeson classification

- **Cells are graded 1–5** depending upon their level of differentiation
  - grade 1 = most differentiated
  - grade 5 = least differentiated or most anaplastic
- **Gleason score = most common type+ 2nd most common type**
  - range from 2 to 10
  - always expressed as an equation (e.g., 4+3¼7)



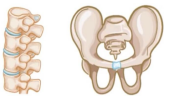
Spread

03

Common

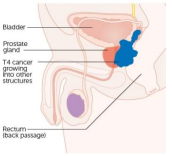
Lymphatic

Haematogenous



Axial skeleton

Capsule

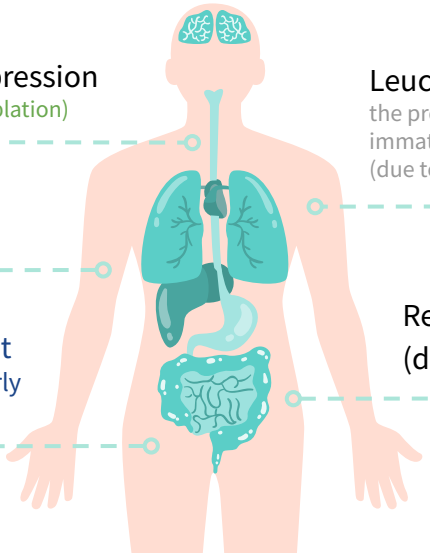


perineural spaces

bladder neck , pelvic wall

rectum

Clinical Features:



01 Cord compression (causing paraplation)

02 Bone pain

03 Leucoerythroblastic anaemia
the presence of nucleated erythrocytes and immature white cells in the peripheral blood.
(due to Replacement of the marrow with cancer cells).

04 Renal failure
(due to bilateral ureteric obstruction)

05 Alteration in bowel habit
(the tumor extends posteriorly around the rectum)

Diagnosis:

Majority

Picked up by screening

Asymptomatic unless it's advance and late

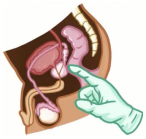
10%

Incidental findings at (TURP)

transurethral resection of the prostate

Remainder

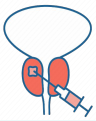
Present with the clinical features mentioned above



Rectal examination

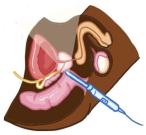
➢ Diagnosis can be confirmed with locally advanced tumors.

★ **Features**: hard nodule or loss of central sulcus.



Transrectal biopsy

★ Should be performed in men with elevated PSA or abnormal DRE.
confirms the diagnosis



Multi-parametric MRI

➢ May be useful in the **staging** of the disease.
➢ Evaluate for abnormal foci in men with a persistently elevated PSA with previous negative prostate biopsy.
➢ Assess pelvic lymphadenopathy and evidence of locally advanced disease.

Bone scanning

➢ Detect the presence of metastases.

Serum prostate specific antigen (PSA)

➢ Kallikrein-like protein produced by prostatic epithelial cells
➢ Can be significantly raised in BPH .
➢ Useful for monitoring response to treatment.
➢ **Normal :** <4 ng//ml ➢ **prostatic carcinoma :** >10 ng/ml
➢ < 10 ng/ml & asymptomatic → Unlikely to be abnormal or due to infections and BPH.
➢ **>100 ng/ml** almost always indicate bone metastases.
★ Routine screening after the age of 50, however with family history from the age of 40.
➢ It may be high in infections or BPH, but, it's sky high in prostatic cancer "usually"

Treatment:

Treatment depends on:

Age | **Stage of disease** | **General fitness.**

Treatment options are for:

- Local disease.
  - Less than 70 years old → the best option is radical prostatectomy.
  - Old patients above 75 years → if there were no symptoms consider observation without treatment, If there were symptoms and the patient can't tolerate surgery, radiotherapy is good option
  - Above the age of 80 → observation
- Locally advanced disease.
- Metastatic disease.

	local	Locally advanced	Metastatic
Observation	✓		
Radical Radiotherapy	✓	✓	
Radical Prostatectomy	✓		
Hormonal therapy		✓	✓

Hormonal therapy:

01

Produces good palliation

- until tumours escape from hormonal control.

02

Involves androgen depletion

- 80-90% of prostate cancers are androgen dependent for their growth.

03

Can be achieved by :

1. Bilateral orchidectomy (castration)
2. LHRH agonists **(Goseraline).**
3. Anti-androgens **(cyproterone acetate, flutamide, Biclutamide).**
4. Complete androgen blockade.

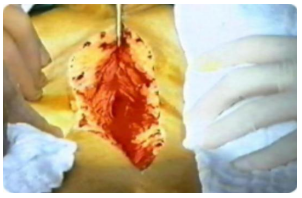
Prostate Cancer

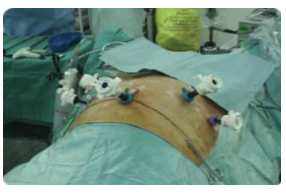
Organ-confined disease	**A small focus, well-differentiated (Gleason score 3+3=6)**	Close follow-up with DRE,PSA,MRI, repeat TRUS biopsy.

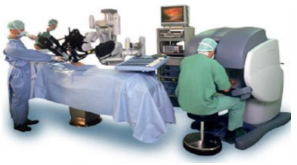
	Less well-differentiated Gleason score 7 or more	• **Radical prostatectomy**
		  ○ laparoscopic
		  ○ robotic
		  ○ traditional open route
		• **Radiotherapy**
		  ○ external beam radiotherapy (EBRT)
		  ○ intensity-modulated
		  ○ the insertion of radioactive seeds in the prostate (brachytherapy)
		• the choice of treatment tends to be based upon patient preference.

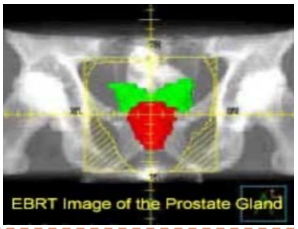
Locally advanced disease the cancer has invaded directly outside the prostate but has not metastasised		• **EBRT along with hormonal therapy is the standard** • In patients not able to tolerate EBRT ○ hormone therapy alone or conservative symptomatic treatment
Castrate-resistant prostate cancer (CRPC)		• Happens in a small number of patients who fail to respond to endocrine treatment • PSA levels are a useful marker of response, ideally falling to <0.01 ng/ml in well-controlled cases. • Chemotherapy with taxanes has shown improvement in both symptoms and survival • Newer hormonal agents such as enzalutamide (androgen receptor inhibitor) and abiraterone acetate (androgen biosynthesis inhibitor) provide some survival benefit

Skeletal metastases		• **Bone-protective agents** (i.e., denosumab and zoledronic acid)
		  ○ palliate bone pain
		  ○ prevent loss of bone mass
		  ○ reduce the risk of metastatic bone fractures
		• **Radiotherapy**
		  ○ effective treatment for localised bone pain.

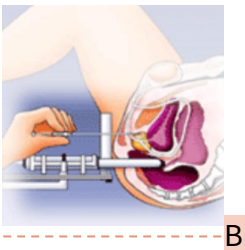

Open


Laparoscopic


Robotic




EBRT



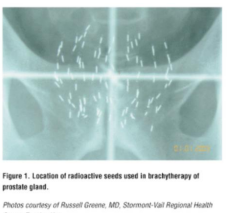


Figure 1. Location of radioactive seeds used in brachytherapy of prostate gland.
Photos courtesy of Russell Greene, MD, Stormont-Vail Regional Health Center, Topeka, Kan.

Brachytherapy

Two types of radiotherapy:

- From outside: External Beam Radiation Therapy (EBRT)
- From inside: Brachytherapy (better because it doesn't affect adjacent tissues as EBRT)

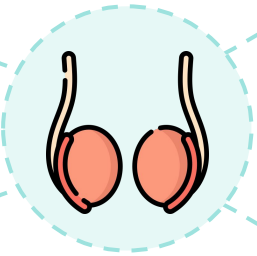
Testicular Tumors

01

- Commonest presentation is painless testicular swelling on the side of the tumor[1].

02

- Commonest malignancy in young men, Highest incidence in Caucasians in northern Europe and USA.
- Peak incidence for teratomas is 25 years and seminomas is 35 years.



03

- 5 year survival possible In those with disease localized to testis more than 95%.
- It's a rapid growing tumor, it only needs 3-4 weeks to duplicate it's size.

04

- Risk factors include **cryptorchidism** and **Klinefelter's syndrome** (47, XXY)
- Orchidopexy (a surgery to move a testicle that has not descended or moved down to its proper place in the scrotum)does not reduce this risk but it allow the testis to be moved into a position where it allows regular self-examination

Testicular tumors classification:

Occasionally,both types occur in the same testis.

Non-Seminomas(50%)

- Arise from primitive germinal cells.
- Classified according to the degree of differentiation.

Seminomas(50%)

- The most common testicular tumor
- Arise from seminiferous tubules
- Relatively low-grade
- Metastases occur mainly via the lymphatics and may involve the lungs

- **Teratomas**
- **Yolk sac tumors**
- **Embryonal**
- **Mixed Germ cell tumor**

Investigations:

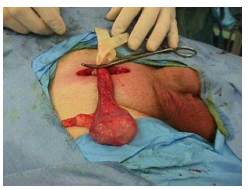
Imaging

- **Diagnosis** is confirmed by testicular ultrasound.
- **Stage** is confirmed by thoraco -abdominal CT scanning.[2]

Pathological diagnosis

Pathological diagnosis made by performing an inguinal orchiectomy.

No biopsy is taken beforehand from the testis due to the risk of tumor cells spillage and metastasis, thus they perform an inguinal incision and clamp the spermatic cord before taking biopsy, and then if it is a cancer the precede removing the whole testis.



Tumor markers

Tumor markers[3] are useful in staging and assessing response to treatment.

- Alpha-fetoprotein (alpha FP):
  - Produced by **yolk sac elements.**
  - Not produced by **seminomas.**
- Beta-human chorionic gonadotrophin (beta HCG):
  - Produced by **trophoblastic elements** .
  - Elevated in both **teratomas** and **seminoma.**
- (LDH) lactate dehydrogenase

1. A hydrocoele in a young man mandates investigation, as testicular tumours may be accompanied by blood-stained effusion in the tunica vaginalis. There may be pain and swelling suggesting inflammation. The patient may have wrongly received treatment for 'acute epididymitis'. Very rarely, patients with teratoma may complain of gynaecomastia. As a result of increased hcg (LH analogue) -> stimulate leydig cell -> increased secretion of testosterone & estrogen.
2. CT is used to follow the response of enlarged lymph nodes to treatment.
3. Measured As soon as a tumour is suspected, and before orchiectomy useful to increase the suspicion if there are +Ve. if they are normal that doesn't mean there's no cancer

Stage definition:

dr said you are not required to know the staging

- **I** — Disease confined to testis.
- **IM** — Rising post-orchidectomy tumour marker.
- **II** — Abdominal lymphadenopathy.
  - **A** < 2 cm
  - **B** =2-5 cm
  - **C** > 5 cm
- **III** — Supradiaphragmatic disease.

Management:

- Be aware when you have a patient with testicular cancer, you have to diagnose early and treat early. Any delay in diagnosis and treatment may compromise the outcome.
- **Radical orchiectomy** with division of the spermatic cord (at the level of the deep inguinal ring)

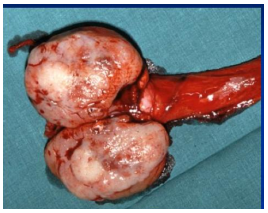
Seminomas

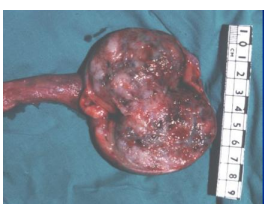
- **Radiosensitive**[1].
- The overall cure rate for all stage **90%.**
- Stage I and II disease treated by inguinal orchidectomy plus
  - Radiotherapy to ipsilateral abdominal and pelvic nodes ('Dog leg').
  - Surveillance close surveillance will avoid unnecessary radiotherapy in 80%.
- Stage IIC and above treated with chemotherapy .

VS

Non-Seminomas[2]

- **not radiosensitive**.
- Stage I is treated by orchidectomy and surveillance for 2 years (by measuring tumor markers) Vs RPLVD(Retroperitoneal lymph node dissection) Vs Chemo.
- (RPLVD) to prevent recurrence, or for residual or recurrent nodal masses.
- Chemotherapy (BEP = Bleomycin, Etopiside, Cisplatin) given to:
  - Stage I patients who relapse.
  - Metastatic disease at presentation .





1. First orchiectomy and then radiotherapy to control the disease, and chemotherapy in advanced cases.
2. First orchiectomy and surveillance, RPLVD if lymph nodes are affected, and chemotherapy in advanced cases.

Summary

Recall

Q1: What is the differential diagnosis of scrotal mass?

1. Cancer. 2. Torsion. 3. Epididymitis. 4. Hydrocele. 5. Spermatocele.
6. varicocele. 7. inguinal hernia. 8. testicular appendage. 9. swollen testicle after trauma.
10. Non-Testicular tumor (paratesticular tumor) : e.g. rhabdomyosarcoma, leiomyosarcoma, liposarcoma

Q2: What are the causes of hematuria?

1. Bladder cancer. 2. Trauma. 3. UTI. 4. cystitis from chemotherapy or radiation.
5. Stones. 6. kidney lesion. 7. BPH.

Q3: What is the most common cause of severe gross hematuria without trauma or chemotherapy/radiation?

Bladder cancer

Q4: What is the differential diagnosis for bladder outlet obstruction?

1. BPH. 2. Stone. 3. foreign body. 4. urethral stricture. 5. urethral valve.

Q5: What is the differential diagnosis for ureteral obstruction?

1. Stone. 2. tumor. 3. iatrogenic (suture). 4. stricture.
5. gravid uterus. 6. radiation injury. 7. retroperitoneal fibrosis

Q6: What is the differential diagnosis for kidney tumor?

1. Renal cell carcinoma. 2. sarcoma. 3. adenoma
4. angiomyolipoma. 5. hemangiopericytoma. 6. oncocytoma.

Q7: what is Renal cell carcinoma (RCC)?

- Most common solid renal tumor (90%
- originates from proximal renal tubular epithelium

Q8: What is the epidemiology of RCC?

- Primarily a tumor of adults (40-60 y.o)
- 3:1 male:female ratio
- 5% of cancers overall in adults

Q9: What are the risk factors for RCC?

Male sex, tobacco, von Hippel–Lindau syndrome, polycystic kidney

Q10: What are the symptoms of RCC?

1. Pain (40%). 2. hematuria (35%). 3. weight loss (35%) 4. flank mass (25%). 5. HTN (20%).

Q11: What is the classic TRIAD of renal cell carcinoma?

1. Flank pain. 2. Hematuria. 3. Palpable mass
(Triad occurs in only 10-15% of cases.)

Q12: How are most cases diagnosed these days?

Found incidentally on an imaging study (CT scan, MRI, US) for another reason.

Q13: What radiologic tests are performed?

IVP, Abdominal CT scan with contrast.

Q14: What is the metastatic workup?

CXR, IVP, CT scan, LFTs, calcium

Q15: What are the sites of metastases?

Lung, liver, brain, bone
tumor thrombus entering renal vein or IVC is common

Q16: What is the unique route of spread?

Tumor thrombus into IVC lumen.

Q17: What is the treatment of RCC?

Radical nephrectomy (excision of the kidney and adrenal, including Gerota's fascia) for stages I-IV

Q18: What gland is removed with a radical nephrectomy?

Adrenal gland

Summary

Recall

Q19: What is the unique treatment for metastatic spread?
- α-interferon 2.
- LAK cells (Lymphokine-Activated Killer) and IL-2 (interleukin-2)

Q20: What is a syndrome of RCC and liver disease?
Stauffer's syndrome

Q21: What is the concern in an adult with new-onset left varicocele?
Left RCC
—the left gonadal vein drains into the left renal vein

Q22: What is the incidence of prostate cancer?
- Most common GU cancer (>100,000 new cases per year in the United States)
- most common carcinoma in U.S. men.
- second most common cause of death in U.S. men.

Q23: What is the epidemiology?
- "Disease of elderly men"
- present in 33% of men 70-79 y.o
- in 66% of men 80-89 y.o at autopsy
- African American patients have a 50% higher incidence than do White patients.

Q24: What is the histology?
Adenocarcinoma (95%)

Q25: What are the symptoms?
Often asymptomatic; usually presents as a nodule found on routine rectal examination. in 70% of cases cancer begins in the periphery of the gland and moves centrally; thus, obstructive symptoms occur late

Q26: What percentage of patients have metastasis at diagnosis?
40% of patients have metastatic disease at presentation, with symptoms of bone pain and weight loss.

Q27: What are the common sites of metastasis?
Osteoblastic bony lesions, lung, liver, adrenal

Q28: What provides lymphatic drainage?
Obturator and hypogastric nodes

Q29: What is the significance of Batson's plexus?
Spinal cord venous plexus; route of isolated skull/brain metastasis.

Q30: What are the steps in early detection?
- Prostate-specific antigen (PSA)—most sensitive and specific marker.
- Digital rectal examination (DRE)

Q31: When should men get a PSA-level check?
Controversial:
1. All men >50 years old.
2. >40 years old if first-degree family history or African American patient.

Q32: What percentage of patients with prostate cancer will have an elevated PSA?
≈60%

Q33: What is the imaging test for prostate cancer?
Trans **R**ectal **U**ltra **S**ound (**TRUS**)

Q34: How is the diagnosis made?
Transrectal biopsy

Q35: What is the Gleason score?
Histologic grades 2-10:
Low score = well differentiated
High score = poorly differentiated

Summary

Recall

Q36: What are the indications for transrectal biopsy with normal rectal examination?
PSA >10 or abnormal transrectal ultrasound

Q37: What does a "radical prostatectomy" remove?
- Prostate gland
- Seminal vesicles
- Ampullae of the vasa deferentia

Q38: What is "androgen ablation" therapy?
- Bilateral orchiectomy
- or **L**uteinizing **H**ormone–**R**eleasing **H**ormone (**LHRH**) agonists

Q39: What are the generalized treatment options according to stage:

Stage I?	Radical prostatectomy
Stage II?	Radical prostatectomy ± lymph node dissection
Stage III?	Radiation therapy, ± androgen ablation
Stage IV?	Androgen ablation, radiation therapy

Q40: What is the medical treatment for systemic metastatic disease?
Androgen ablation

Q41: What is the option for treatment in the early-stage prostate cancer patient >70 years old with comorbidity?
XRT

Quiz

MCQ

Q1: A 58-year-old man is found to have high serum prostate–specific antigen (PSA) concentration with a normal prostate examination. A biopsy of the prostate confirms low-grade carcinoma. The patient wishes to avoid therapy involving any risk for impotence. Which of the following is the most appropriate management of this patient?

A) Observation
B) Chemotherapy
C) Prostatectomy
D) Radiation therapy
E) Hormonal therapy

Q2: A 45-year-old woman presents with a 7-cm renal cell carcinoma with radiologic evidence of abdominal lymph node involvement with no distant metastases. Which of the following is the most appropriate management of this patient?

A) Radical nephrectomy
B) Radiation
C) Chemotherapy
D) Radiation followed by nephrectomy
E) Chemotherapy followed by nephrectomy

Q3: Renal cell carcinoma (adenocarcinoma of the kidney):

A) characteristically radiosensitive
B) rarely metastasizes
C) commonly occurs in von Hippel Lindau (VHL) disease
D) the commonest urological malignancy
E) usually presents with blood in the urine

Q4:Which of the following is the recommended treatment for stage A (superficial and submucosal) transitional cell carcinoma of the bladder?

A)local excision and intravesicular chemotherapy
B)Topical chemotherapy
C)Radiation therapy

Q5:Which of the following is the most accurate method in obtaining a diagnosis of testicular cancer?

A)percutaneous biopsy of the testis
B)Serum alpha-fetoprotein levels
C)Inguinal orchiectomy

Q6:What is the treatment of choice in pheochromocytoma?

A)Radio and chemotherapy
B)Surgical removal
C)Alpha and Beta blockers

Answers

Q1	A	Q4	A
Q2	A	Q5	C
Q3	C	Q6	B

Extra Questions

Good Luck!

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Feedback