

# Introduction to urology

1

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# Urology

- ▶ Urology is the field of medicine that deals with disorders or conditions affecting :
  - ▶ Urinary tract.
  - ▶ Male reproductive tract.

- ▶ Urological admissions account for one third of surgical admissions.

# Urology subspecialty

1. Bladder dynamic (Functional bladder diseases)
2. Endo-urology and Stone diseases.
3. Paediatric.
4. Reconstructive
5. Andrology and Male infertility
6. Uro-oncology
7. Minimal invasive (Laparoscopic surgery)
8. Renal transplant

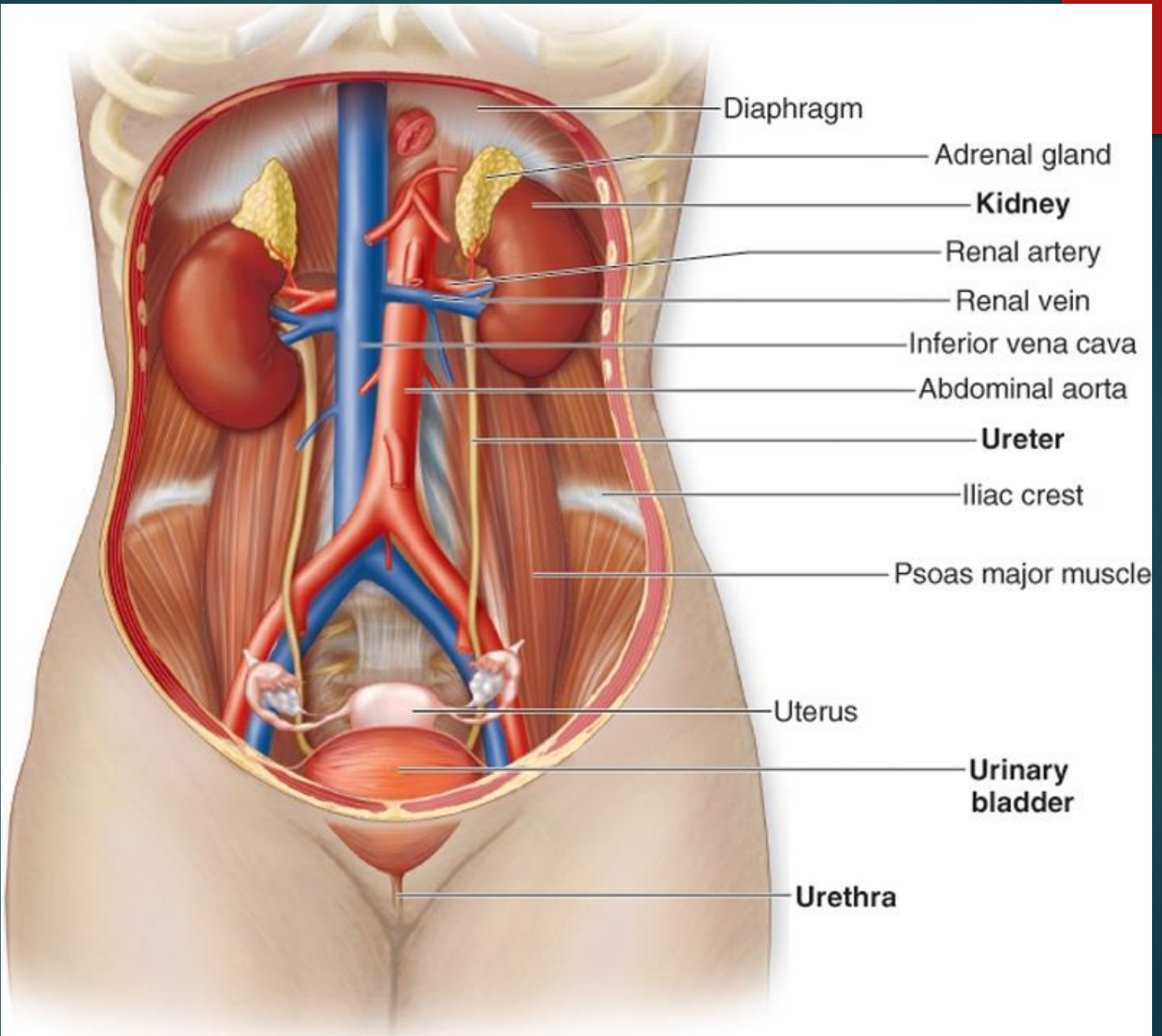
# Upper urinary tract

# Renal Anatomy

- ▶ The kidneys are retroperitoneal organs on each side of the vertebral column (T12-L3), at about the level of the twelfth rib.
- ▶ The left kidney is lightly higher in the abdomen than the right.

# Upper urinary tract

- ▶ Kidney weighs 150 gm.
  
- ▶ kidneys have the following coverings:
  1. Fibrous capsule (Nerves Fibers)
  2. Perirenal fat
  3. Renal fascia
  4. Pararenal fat



Diaphragm

Adrenal gland

**Kidney**

Renal artery

Renal vein

Inferior vena cava

Abdominal aorta

**Ureter**

Iliac crest

Psoas major muscle

Uterus

**Urinary  
bladder**

**Urethra**



# Relevant anatomy

- ▶ The superior aspect of the kidneys is somewhat protected by the lower ribs.
- ▶ the lower poles are inferior to the 12th ribs.
- ▶ The parenchyma of the kidney has **a segmental arterial supply.**

# Numerous anatomical variations:

10

Pelvic kidneys.

Horseshoe kidneys;

Crossed renal ectopia

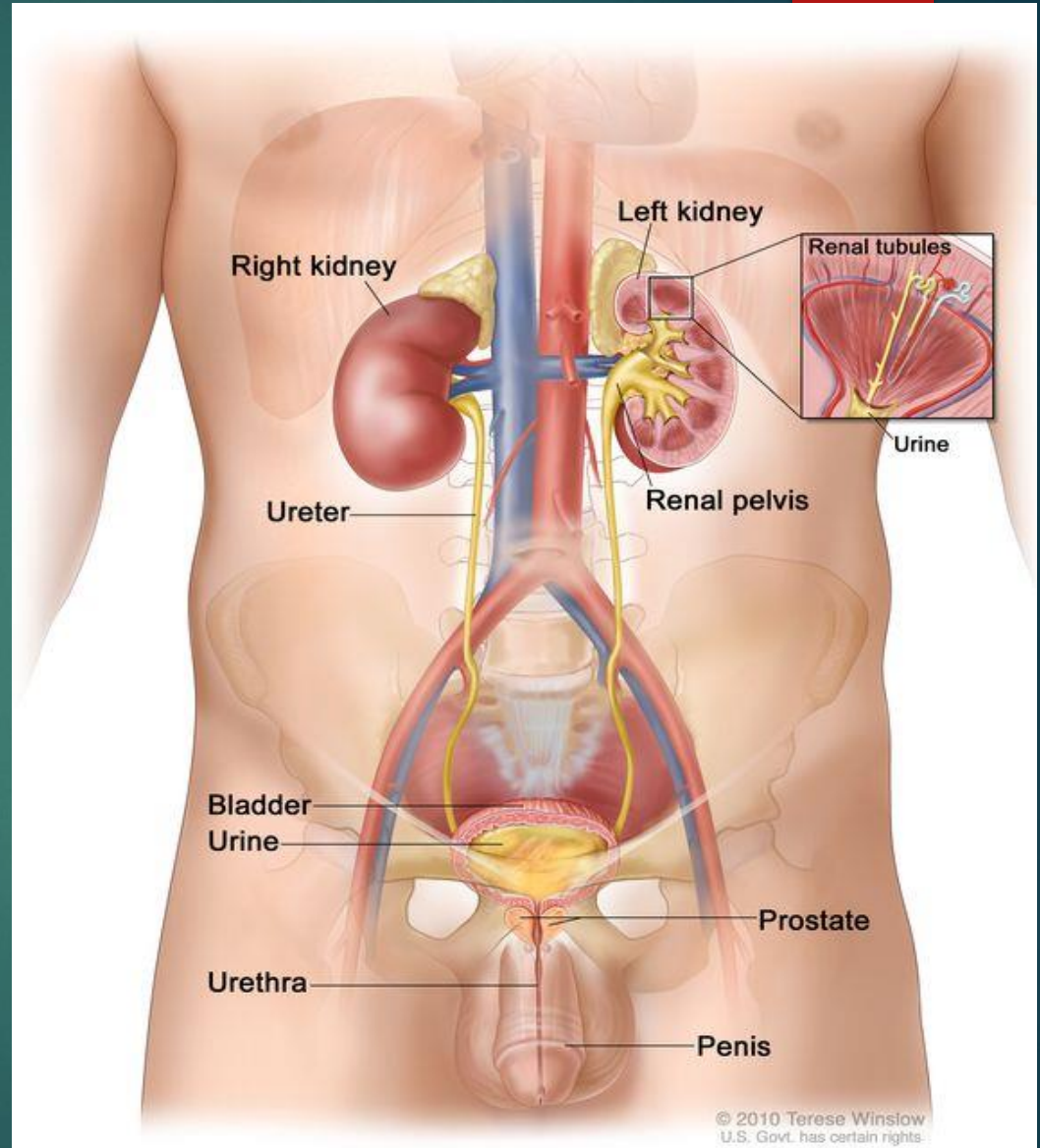
Multiple renal arteries or veins.

Ureteral duplications.

# Ureteral Anatomy

- ▶ Ureters are retroperitoneal tubes measuring each about 25 cm long and about 3 mm in diameter.
- ▶ Descend with an inclination medially on the posterior abdominal wall opposite the tips of the lumbar transverse processes. They continue following the contour of the pelvis.
- ▶ Pass obliquely in the wall of the bladder of 1 inch before they open at the sides of the trigone.

# Ureters



# Lower urinary tract

# Urinary Bladder

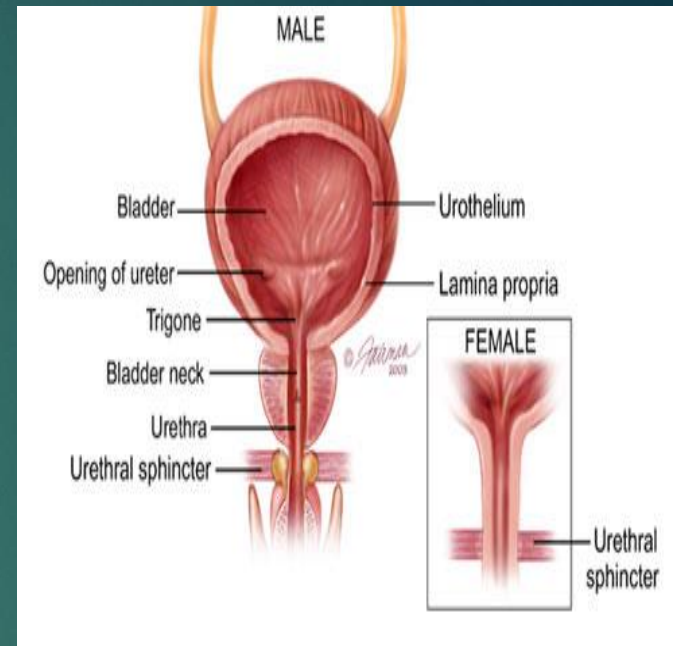
## Anatomy

- ▶ Bladder is located in the anterior pelvis.
- ▶ Enveloped by extraperitoneal fat.
- ▶ Separated from the pubic symphysis by an anterior prevesical space known as the space of Retzius.
- ▶ Dome of the bladder is covered by peritoneum.

# Urinary Bladder

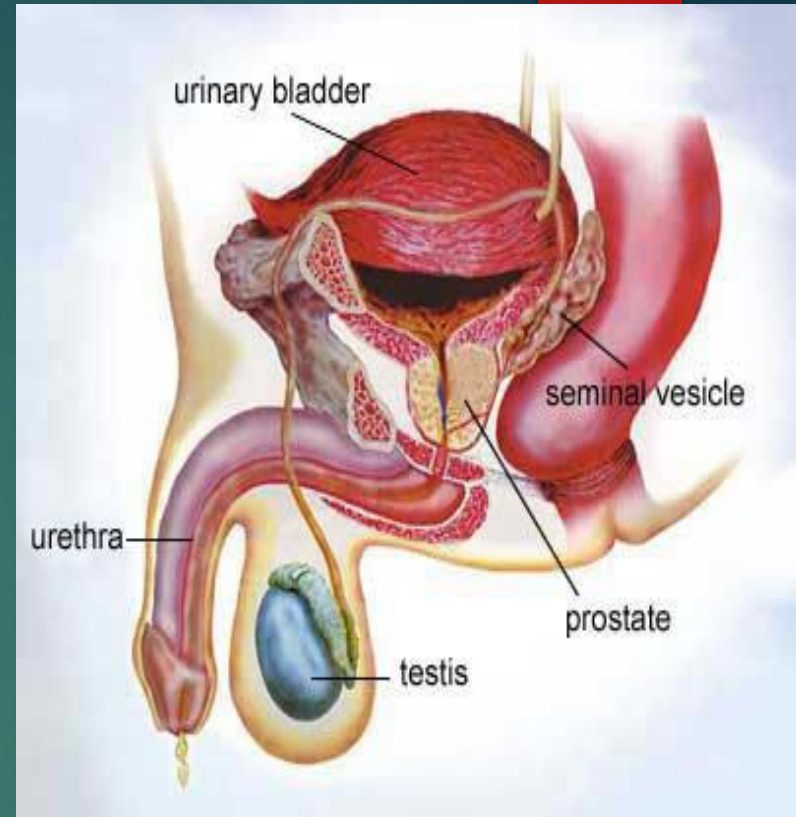
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- ▶ Bladder neck : Internal sphincter
- ▶ Fixed to neighboring structures by reflections of the pelvic fascia and by true ligaments of the pelvis
- ▶ Bladder Trigon: Two Ureteric orifices and bladder neck



# Prostate Gland

- ▶ ANATOMY
- ▶ FUNCTION:
- ▶ Male sexual gland





# Urethral Anatomy

## **Male urethra**

Canal for the discharge of urine and seminal fluid. It is 18-20 cm in length.

Divided to:

### **Posterior urethra:**

- Prostatic urethra
- Membranous urethra.

# Male urethra

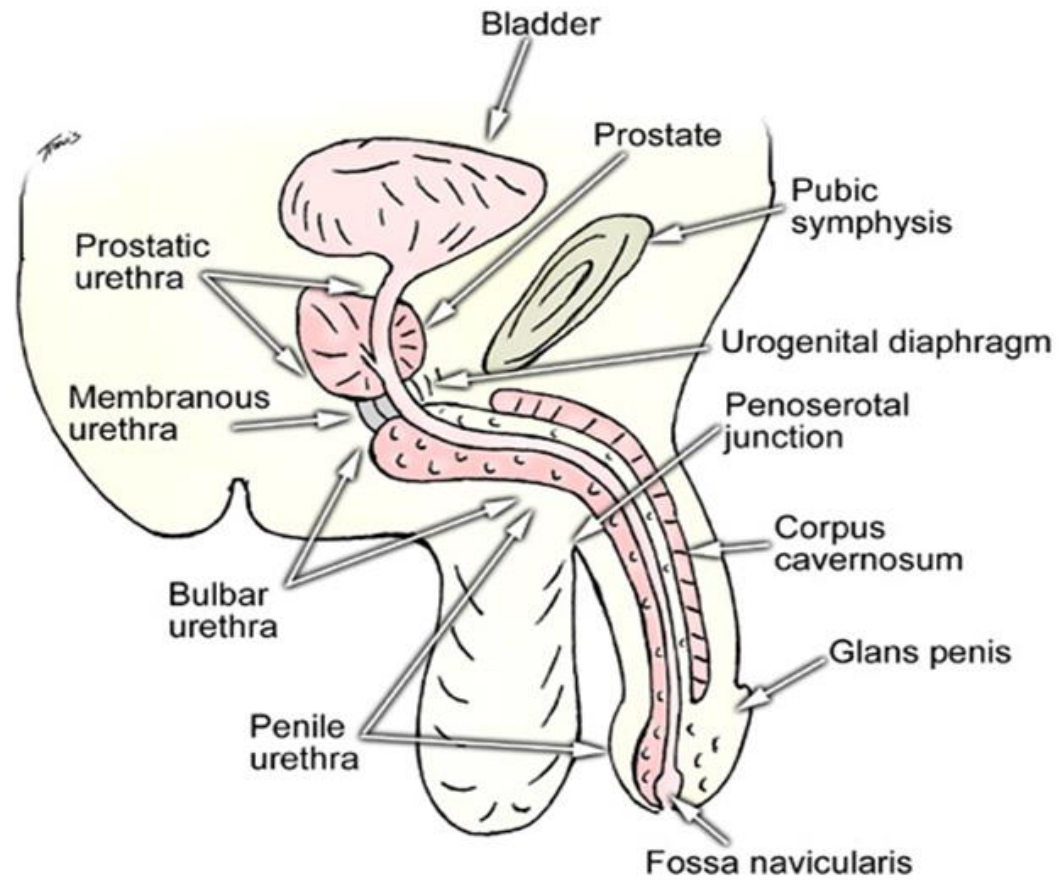
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Anterior Urethra.

Bulbar urethra pass into corpus spongiosum and ischial cavernosus-bulbospongiosus muscles

Penile urethra: Extends through the pendulous portion of the penis the

Fossa navicularis: Invested by the spongy tissue of the glans penis end with external urethral meatus.



- **Female Urethra**
- Canal for discharge of urine
- 4 cm in length.
- Corresponds to posterior urethra in male while anterior urethra corresponds to the labia minora

# URINARY SYMPTOMS

21

## 1- Loin pain :

- ▶ Renal causes : renal and ureteric stones (m.c) ,infection (pyelonephritis) , tumour , bleeding
- ▶ Non renal causes : Leaking aortic aneurysm , ectopic pregnancy ,appendicitis , cholecystitis , bowel obstruction , muscle spasm

-Acute pyelonephritis : clinical dx ( fever , loin pain , chills ,rigor, nausea , vomiting )

-

# URINARY SYMPTOMS

22

Renal and ureteric colic :

- Obstructing stone , caused by distention of renal capsule, very sever , spasmodic , lumbar region; radiates to abdomen, groin, testes, thigh .
- Associated with vomiting and sweating.

## 2-Suprapubic pain

urinary : UTI, ureteric stone, urinary retention, bladder rupture

non urinary : appendicitis, diverticulosis, ovarian cysts, constipation



## ► Hematuria

Presence of RBCs in the urine

- Macroscopic (gross)

Haematuria seen naked eye as red urine

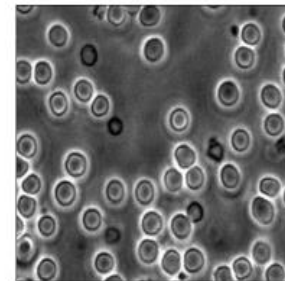
- Microscopic haematuria:

Need Microscope to see or dipstick testing.

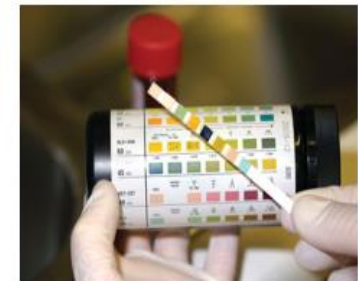
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Gross Hematuria



Urine Microscopy



Dipstick urinalysis







## 9.8 Causes of haematuria

### Painless

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Glomerulonephritis</li> <li>• Tumours of the kidney, ureter, bladder or prostate*</li> <li>• Tuberculosis*</li> <li>• Schistosomiasis*</li> <li>• Hypertensive nephrosclerosis</li> <li>• Interstitial nephritis (unless very acute/severe)</li> </ul> | <ul style="list-style-type: none"> <li>• Acute tubular necrosis</li> <li>• Renal ischaemia (renovascular disease)</li> <li>• Distance running or other severe exercise</li> <li>• Coagulation disorders, anticoagulant therapy</li> </ul> |
|---|---|

### Associated with pain

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Urinary tract infection</li> <li>• Renal stones with obstruction</li> </ul> | <ul style="list-style-type: none"> <li>• Loin pain-haematuria syndrome</li> </ul> |
|--|---|

### May be either

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Urinary tract infection</li> <li>• Reflux nephropathy and renal scarring</li> </ul> | <ul style="list-style-type: none"> <li>• Adult polycystic kidney disease</li> <li>• Renal stones without obstruction</li> </ul> |
|--|---|

\*Painless provided there is no acute obstruction of the urinary tract.

## Timing of Hematuria :

- **Total** : Above bladder neck ( bladder , ureters and kidneys)

- **Terminal** : Prostatic urethra and neck of bladder

- **Initial** : Anterior urethra



# Lower Urinary Tract Symptoms (LUTS)

## 1. *Filling (Storage) or irritative symptoms :*

- Frequency : Increase in number of urination
- - Urgency : Sudden, strong non-resistible desire to pass urine
- Dysuria : Painful urination
- Nocturia

## *Voiding or obstructive symptoms :*

- Poor stream (unimproved by straining)
- Hesitancy :difficulty in the initiation of urination
- Terminal dribbling and post voiding dribbling
- Incomplete voiding.
- Intermittency and interrupted voiding.
  
- Urinary retention : inability to pass urine

- Nocturnal enuresis: Bed Wetting

# Urinary Incontinence

▶ Involuntary leakage of urine:

1- Urge Urinary Incontinence: Involuntary leakage of urine preceded by sudden desire to void (urgency)

2- Stress Urinary Incontinence: Urine leakage associated with increased abdominal pressure (laughing, sneezing, coughing, climbing stairs ..etc), more in women, seen in men after prostate cancer surgery.

3- Mixed incontinence : A combination of stress and urge incontinence.

## *Urinary Incontinence*

4- Overflow incontinence: increased residual or chronic urinary retention leads to urinary leakage from bladder overdistention.

5- Functional incontinence : loss of urine related to deficits of cognition and mobility (eg, delirium, psychiatric disorders, impaired mobility)

6- Continuous incontinence :continuous urine flow associated with fistulas ( vesicovaginal , urethrovaginal)

## **Scrotal swelling**

- ▶ **Painful** : Torsion of testis, epididymitis, orchitis .
- ▶ **Painless** : Testicular cancer, varicocele, hematocele, hydrocele

- ▶ Torsion of testis
  - Sudden onset of unilateral scrotal pain
  - Age : 10-20 yrs ,
  - Acute pain that's not relieved by lying still
  - Nausea and vomiting
  - No associated Urinary Symptoms
  
- ▶ Epididymo-orchitis : Inflammatory process
  - Insidious onset , dull ache pain.
  - Fever , chills and Rigor.
  - Dysuria, Frequency and Urgency



# Radiological tests

# Ultrasonography

## ► **Advantages**

1. Noninvasive, informative, cheap, available
2. Performed in real time.
3. Help Define anatomy of the injury.

## ► **Disadvantages**

1. Optimal study results related to anatomy
2. Require experienced doctor: Operator dependent
3. Bladder injuries may be missed.

# Computed Tomography 'CT Scan'

## ▶ **Advantages:**

1. Functional and anatomic assessment of the kidneys and urinary tract
2. Diagnosis of urinary injuries, stones, and tumours

## ▶ **Disadvantages:**

1. Require IV contrast to maximize information about functionality, hematoma, tumor and, bleeding.
2. Pt must be stable enough.
3. Full urinary assessment is dependent on the timing of contrast and scanning in order to view the bladder and ureters.

# Other radiological tests

1 – MRI

2- CYSTOGRAM

3- RETROGRADE URETHROGRAM

4- MCUG

5- ANGIOGRAM

6- IVU

**Thank you**