

### Urinary symptoms and investigations

#### Systemic manifestations.

- fever (pyelonephritis , prostatitis, malignancy)
- weight loss (chronic infection ,renal insufficiency , malignancy) .
- leg edema ; in pelvic tumor or uremia.

#### Haematuria :

Presence of RBCs in the urine is always abnormal sign of the urinary tract .

It is either

- **microscopic h.** In which the amounts of the blood in urine are insufficient to change the colour of urine .
- **macroscopic h.** In which the urine stained dark from the blood and sometimes the patient pass clots.

Dark colour urine not always means haematuria some drugs and some eats can change the colour of urine .

types of h .

- **intermittent** or **persistent**

- **terminal h, total** or **initial h.**

Terminal h indicates bladder irritation like stone or infection like schistosomiasis .

- Total h. Indicates upper urinary tract source but initial h indicates lower ut causes like urethral polyp stricture.

- **Painful h** and **painless h.**

Pain with h indicates the site of the cause but painless h indicates renal or bladder tumor till prove other wise

All patient with h needs to be investigated and the.

**macroscopic h not means more serious than microscopic h**  
**Pain of urinary tract .**

**Renal pain ;**

Either due to stone, inflammation or obstruction and rarely tumor .It is characteristic of deep seated with loin tenderness, it is due to capsular distention.

**Ureteric pain ;**

Is usually colicky in nature with sharp exacerbation and referred to the groin , scrotum or labium as the stone moves distally in the ureter .

**Bladder pain;**

Is commonly felt as suprapubic discomfort worsening as the bladder fills.when it is due to cystitis typically has burning character,it may be referred to tip of the penis in men .

**Perineal pain;**

Is due to prostatic pathology.

**Testicular pain ;**

Either in the scrotum or to the kidney

**Back pain or bone pain ;**

Prostate ca can metastasize to pelvic bone causing pain .

**Reno-intestinal reflex ;**

GIT and urinary tract share nerves from celiac plexus , so patient w ureteric colic complaining of repeated vomiting due to pylorospasm.

**Symptoms related to the act of micturition ;**

- **frequency** ; increase of the no of the micturition .normally it is 4 to 5 per day .it is due to infection ,stones or small capacity bladder .the normal capacity of the bladder is 400 to 500 cc .

- **nocturea** ; increase the no of micturition at night ,it may indicate renal failure , diabetes.

- **nocturnal enuresis** ; bed wetting

Polyurea; Increase the amount of the urine per day .normal urine output is about 1 cc per kg per hr or 1500 to 2500 cc per day .

-**dysurea**; painful micturition it indicates bladder or urethral irritation .

- **hesitancy** ; difficulty in starting voiding (bladder outlet obstruction like BPH)

-**Post voiding dribbling** ;it is a sign of bladder outlet ob..

**Urgency** ; strong desire to void can cause urge incontinence.

**Retention** ; failure of voiding .

**Incontinence.** Uncontrolled voiding (total , stress ,urge )

**Oligurea**; decrease the amount of urine per day less than 400 cc.

**Anurea** ; the amount of urine less than 50 cc per day .

**Pneumaturia** ; passing of air with urine.

### **Investigation of urinary tract.**

By macroscopical and microscopical examination

a- **macroscopic exam** ,

1- **colour and appearance** ;

normally it is faint yellow (amber) or dark yellow in dehydration or red in haematuria and some drugs, or milky in chyluria.

The appearance is clear bright but when cloudy means pus or heavy crystals.

## 2- **specific gravity** .

normally is 1,003 to 1,030 .its measured by hydrometer , it measure the concentration power of the kidney .

increase in diabetes mellitus . And decrease in diabetes insipidus and chronic renal failure

## 3-**chemical test**

- **PH** . usually acidic

alkaline in types of foods ( protein) , old sample , certain micro organism ( urea splitting m.o ) like proteus .

- **protein**. Usually is nil.

- **glucose** . by oxidase – peroxidase test .it can be false positive in ingestion of large amount of aspirin , ascorbic acid , cephalosporin . some times in renal glycosuria when the kidney excretes glucose even when the blood sugar less than 180 glucose in urine may guide us to diseases like papillary necrosis , recurrent urinary tract infection , neurovesical dysfunction , or impotence .

-**Hb**. by dip strips

false positive in diluted urine ( lysed rbc)

false negative in the presence of ascorbic acid .

## -**bacteria and leukocytes**.

By nitrite test for bacteria and the leukocyte esterase for WBC, Many bacteria that causing UTI can reduce nitrate to nitrite and when it is +ve it indicates presence of more than 100 000 organisms / ml ,

Esterase test depends on the presence of esterase in WBC when it is +ve it indicates more than 10 -12 WBC per hpf .

## B- MICROSCOPICAL EXAM.

### - **bacteria** ,

presence of several bacteria per hpf in urine specimen obtained by suprapubic aspiration ,or catheterization in women or in properly obtained clean –voided mid stream urine from a man can indicates infection with this bacteria and empirical treatment can be started .

### -**leukocytes**;

when it is more than 8 indicates infection .

Sterile pyuria ; there is pus with no bacteria in culture , it caused by TB, Ca ,papillary necrosis.

### **RBC** ;

If it is more than 3 per hpf indicates haematuria , althgh gross h is more alarming to the patient ,microscopic h in not less significant .

Infrequent causes of haematuria.

Strenuous exercise , vaginal bleeding, inflammation of organs near to the urinary tract like appendix and diverticulitis .

### **Casts**;

Casts are formed in the distal tubules and collecting ducts , leukocyte cast indicates pyelonephritis but it is not spesific , RBC cast indicates glomerulitis and vasculitis and it is pathognomonic .

## **Blood test:**

### **bl urea.**

It may be affected by drugs , diet,dehydration and GIT bleeding.

2/3 of renal function should be lost before significant increase in blood urea.

## **S. Creatinine:**

Creatinine is the end product of metabolism of creatine in skeletal muscle and normally excreted by kidneys. It remains normal until 50% of renal function has been lost.

The ratio of urea / creatinine is about 10 to 1. It increases in,

Dehydration -

Bilateral urinary obstruction -

It decreases, -

In advanced hepatic insufficiency -

In over hydration -

## **PSA .**

It is an extremely important prostate cancer marker . -

It is prostate specific but not cancer specific. It is  $< 4$  ng /ml. -

4 – 10 called gray zone -

$> 10$  indicates malignancy. -

## **Radiology of urinary tract .**

### **1- plain film of the abdomen (KUB)**

can show

- calcifications , stones ( 90% are radio opaque).

- soft tissue shadow

-extra renal pathology like O A changes.

### **2- IVU or EU .**

by intravenous injection of iodine containing substances and take X ray films at times 0 , 5 min and so on to show the kidney and collecting ducts .

modification of the procedure:

fluoroscopy

immediate film after bolus dose of the contrast .

delay film after 1 or more days .

### **3- retrograde pyelogram.** By inserting a ureteric catheter

4- **antegrade pyelogram** . by inserting the contrast percutaneously into the renal pelvis.

**5- voiding cystourethrogram;**  
for v-u reflux

**6-urethrogram**

**7- vasogram.**

**8- sonography.**

Sound frequency > 20 kHz is beyond the range of human hearing and called ultrasound. The frequency commonly used for medical practice is 3.5 to 10 MHz.

It is very beneficial for the assessment of the kidney, bladder, prostate, testis, epididymis, and penis.

**--- Doppler u/s** is useful for assessment of

- renal artery stenosis specially in transplanted kidney
- renal vein thrombosis.
- A - V
- Pseudoaneurysm
- and recently for vesico ureteric reflux.

Advantage of u/s :

- no patient discomfort
- non invasive
- no ionizing radiation
- widely available
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disadvantage of u/s

- tissue non specific
- lack of contrast media
- small field of view
- depends on operator skills and patient physique.

**C.T scan.**

Conventional and helical

Clinical applications; In any kidneys, ureters, bladder, prostate, testes, and follow up of renal transplantation.

Advantage of ct scan;

- wider field of view.
- differentiation of tissues cross section image.
- operator in dependent.

Disadvantages of ct scan;

- restriction of plane for direct imaging.
- tissue non specificity.
- Needs contrast.
- High dose of radiation.

MRI.

In kidneys , bladder , prostate , testis ,

And MRA (angiography) in renal vein thrombosis , renal cell ca invading the I v c and preparation of donor for kid transplant.

Advantages;

- direct imaging in any plane desired.
- large field of view.
- excellent soft tissue contrast.
- imaging with out exposure to ionizing radiation .
- operator in dependence.
- imaging of blood vessels and urinary tract with out contrast.

Disadvantage;

- long scanning time .
- image clarity is inferior to ct scan .

Contraindication

Absolute cntraindications;

- intracranial aneurismal clip.
- intra orbital metal fragments.
- any electrically or magnetically or mechanically activated implants like neurostimulators or cardiac pacemakers.

The relative contraindication is pregnancy.



