

Introduction To Urology

By

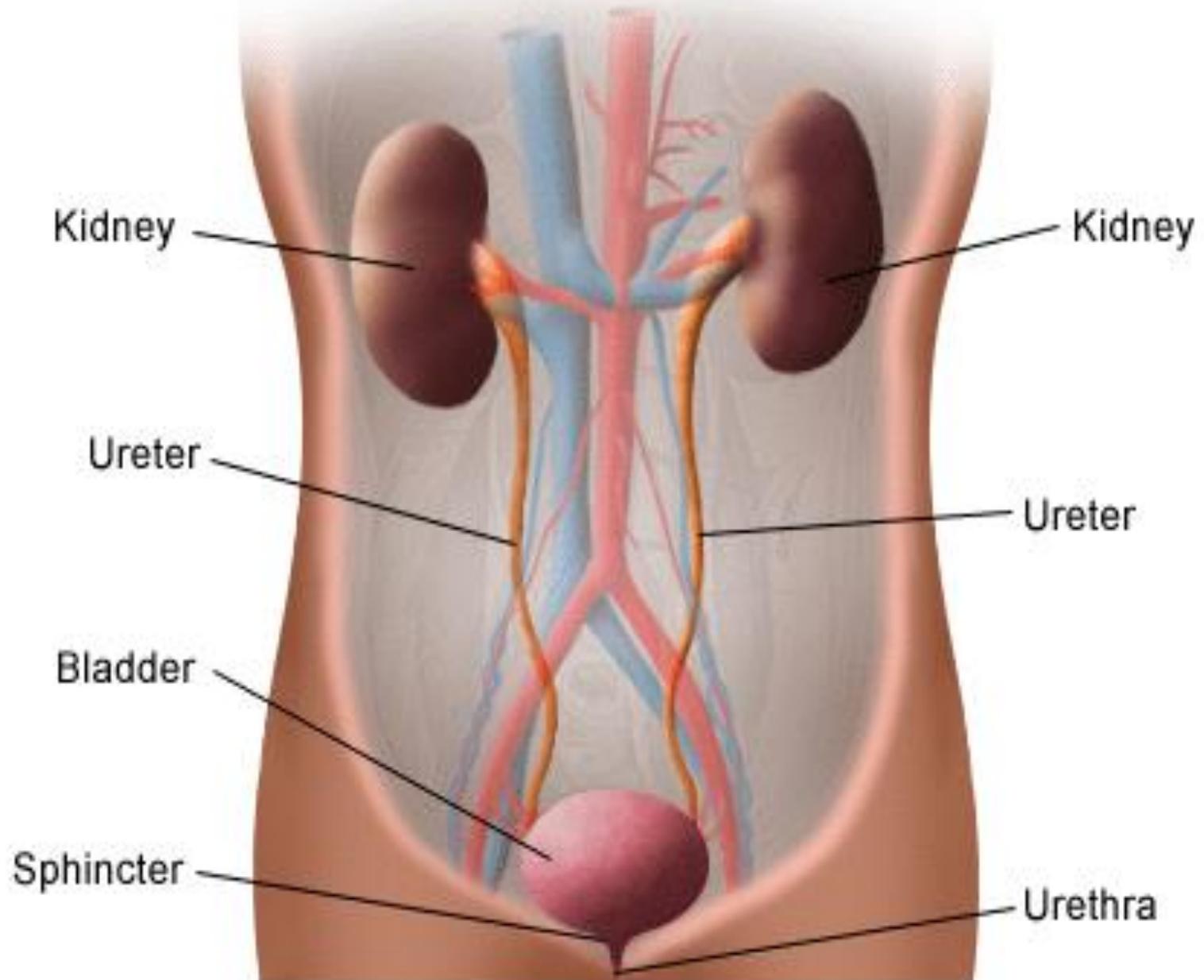
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What is Urology?

- The medical specialty concerned with the study, diagnosis, and treatment of diseases of the urinary tract in females and of the genitourinary tract in males.

Front View of Urinary Tract



Urinary tract surgeons

Urologists are the surgeons who operate on the

- Kidney
- Adrenal gland
- Ureter
- Bladder
- Prostate
- Urethra
- Penis
- Scrotum and testes

Symptoms of Disorders of the Genitourinary Tract

- In the workup of any patient, the history is of paramount importance.
- It is important to know not only whether the disease is acute or chronic but also whether it is recurrent.

SYSTEMIC MANIFESTATIONS

- Symptoms of fever and weight loss should be sought
- The presence of fever associated with other symptoms of urinary tract infection may be helpful in evaluating the site of the infection.
- Simple acute cystitis is essentially an a febrile disease.
- Acute pyelonephritis or prostatitis is apt to cause high temperatures (to 40°C).
- Infants and children who have acute pyelonephritis may have high temperatures without other localizing symptoms or signs.

SYSTEMIC MANIFESTATIONS

- Weight loss is to be expected in the advanced stages of cancer, but it may be noticed also when renal insufficiency due to obstruction or infection supervenes.
- In children who have “failure to thrive” (low weight and less than average height for age), chronic obstruction, urinary tract infection, or both should be suspected.
- General malaise may be noted with tumors, chronic pyelonephritis, or renal failure.

LOCAL & REFERRED PAIN

- Two types of pain have their origins in the genitourinary organs: local and referred. The latter is especially common.
- Local pain is felt in or near the involved organ. Thus, the pain from a diseased kidney (T10–12, L1) is felt in the costovertebral angle and in the flank in the region of and below the 12th rib.
- Pain from an inflamed testicle is felt in the gonad itself.

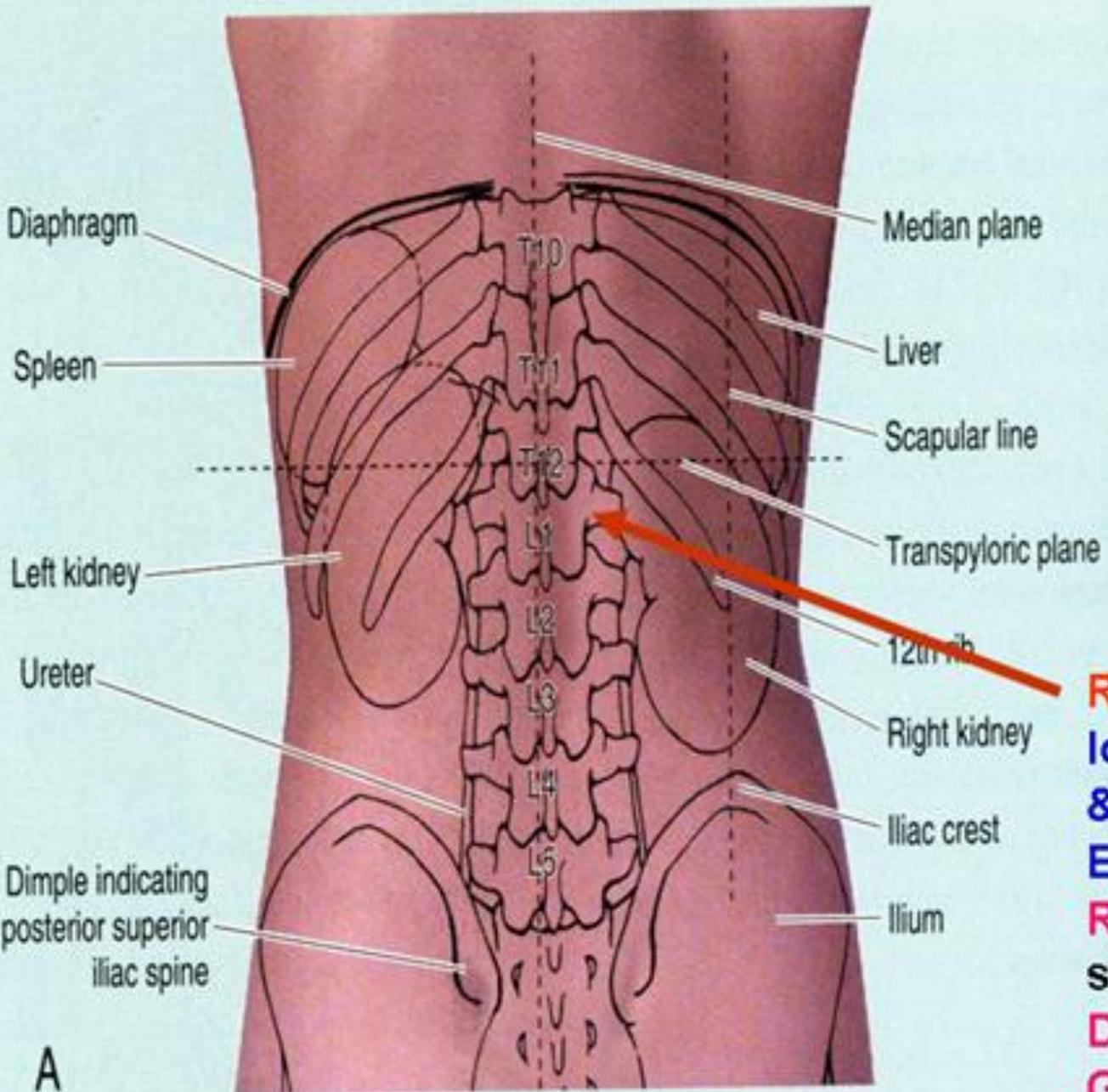
- Referred pain originates in a diseased organ but is felt at some distance from that organ.
- The ureteral colic caused by a stone in the upper ureter may be associated with severe pain in the ipsilateral testicle; this is explained by the common innervation of these 2 structures (T11–12).
- A stone in the lower ureter may cause pain referred to the scrotal wall .
- The burning pain with voiding that accompanies acute cystitis is felt in the distal urethra in females and in the glandular urethra in males (S2–3).

Kidney Pain

- Typical renal pain is felt as a dull and constant ache in the costovertebral angle just lateral to the sacrospinalis muscle and just below the 12th rib.
- It may be expected in the renal diseases that cause sudden distention of the renal capsule. Acute pyelonephritis (with its sudden Oedema) and acute ureteral obstruction (with its sudden renal back pressure) both cause this typical pain.

Kidney Pain

- many urologic renal diseases are painless because their progression is so slow that sudden capsular distention does not occur. Such diseases include cancer, chronic pyelonephritis, staghorn calculus, tuberculosis, polycystic kidney, and hydronephrosis due to chronic ureteral obstruction.



RENAL ANGLE-Between lower border of 12th rib & lateral border of Erector Spinae MUSCLE-
RENAL COLIC PAIN starts from this angle **DOWN & FORWARDS** to **GROIN**

Ureteral Pain

- Ureteral pain is typically stimulated by acute obstruction (passage of a stone or a blood clot).
- there is back pain from renal capsular distention combined with severe colicky pain (due to renal pelvic and ureteral muscle spasm) that radiates from the costovertebral angle down toward the lower anterior abdominal quadrant, along the course of the ureter.
- In men, it may also be felt in the bladder, scrotum, or testicle.
- In women, it may radiate into the vulva.

Ureteral Pain

- The severity and colicky nature of this pain are caused by the hyperperistalsis and spasm of this smooth muscle organ as it attempts to rid itself of a foreign body or to overcome obstruction.
- If the stone is lodged in the upper ureter, the pain radiates to the testicle.
- With stones in the midportion of the ureter on the right side, the pain is referred to McBurney's point and may therefore simulate appendicitis

Ureteral Pain

- As the stone approaches the bladder, inflammation and edema of the ureteral orifice ensue, and symptoms of vesical irritability such as urinary frequency and urgency may occur.
- In mild ureteral obstruction, as seen in the congenital stenoses, there is usually no pain, either renal or ureteral.

Vesical Pain

- The overdistended bladder of the patient in acute urinary retention causes agonizing pain in the suprapubic area.
- constant suprapubic pain not related to the act of urination is usually not of urologic origin.
- The patient in chronic urinary retention due to bladder neck obstruction or neurogenic bladder may experience little or no suprapubic discomfort even though the bladder reaches the level of the umbilicus.

Prostatic Pain

- Direct pain from the prostate gland is not common.
- When the prostate is acutely inflamed, the patient may feel a vague discomfort or fullness in the perineal or rectal area (S2–4).
- Inflammation of the gland may cause dysuria, frequency, and urgency.

Testicular Pain

- Testicular pain due to trauma, infection, or torsion of the spermatic cord is very severe and is felt locally, although there may be some radiation of the discomfort along the spermatic cord into the lower abdomen.
- Uninfected hydrocele, spermatocele, and tumor of the testis do not commonly cause pain.
- A varicocele may cause a dull ache in the testicle that is increased after heavy exercise.

Epididymal Pain

- Acute infection of the epididymis is the only painful disease of this organ and is quite common.
- In the early stages of epididymitis, pain may first be felt in the groin or lower abdominal quadrant.

GASTROINTESTINAL SYMPTOMS OF UROLOGIC DISEASES

- Whether renal or ureteral disease is painful or not, gastrointestinal symptoms are often present.
- patient who is passing a stone down the ureter has typical renal and ureteral colic and, usually, hematuria and may experience severe nausea and vomiting as well as abdominal distention.
- Inadvertent overdistention of the renal pelvis (eg, with opaque material in order to obtain adequate retrograde urograms) may cause the patient to become nauseated, to vomit, and to complain of cramplike pain in the abdomen.

GASTROINTESTINAL SYMPTOMS OF UROLOGIC DISEASES

- Cause of the Mimicry:
- A. RENOINTESTINAL REFLEXES
- Renointestinal reflexes account for most of the confusion.
- They arise because of the common autonomic and sensory innervations of the two systems.
- Afferent stimuli from the renal capsule or musculature of the pelvis may, by reflex action, cause pylorospasm (symptoms of peptic ulcer) or other changes in tone of the smooth muscles of the enteric tract and its adnexa.

Cause of the Mimicry:

- **B. ORGAN RELATIONSHIPS**

- The right kidney is closely related to the hepatic flexure of the colon, the duodenum, the head of the pancreas, the common bile duct, the liver, and the gallbladder.
- The left kidney lies just behind the splenic flexure of the colon and is closely related to the stomach, pancreas, and spleen.

Cause of the Mimicry:

- C. PERITONEAL IRRITATION:
- The anterior surfaces of the kidneys are covered by peritoneum. Renal inflammation, therefore, causes peritoneal irritation, which can lead to muscle rigidity and rebound tenderness.

SYMPTOMS RELATED TO THE ACT OF URINATION

- Many conditions cause symptoms of “cystitis.” These include infections of the bladder, vesical inflammation due to chemical or x-radiation reactions, interstitial cystitis, prostatitis, psychoneurosis, torsion or rupture of an ovarian cyst, and foreign bodies in the bladder.
- The normal capacity of the bladder is about **400 mL**.
- **Frequency** may be caused by residual urine, which decreases the functional capacity of the organ.

SYMPTOMS RELATED TO THE ACT OF URINATION

- When the mucosa, submucosa, and even the muscularis become inflamed (eg, infection, foreign body, stones, tumor), the capacity of the bladder decreases sharply.
- This decrease is due to 2 factors: the pain resulting from even mild stretching of the bladder and the loss of bladder compliance resulting from inflammatory edema.

SYMPTOMS RELATED TO THE ACT OF URINATION

- Diseases that cause fibrosis of the bladder are accompanied by frequency of urination. Examples of such diseases are tuberculosis, radiation cystitis, interstitial cystitis, and schistosomiasis. The presence of stones or foreign bodies causes vesical irritability, but secondary infection is almost always present.
- **Nocturia** may be a symptom of renal disease related to a decrease in the functioning renal parenchyma with loss of concentrating power.

SYMPTOMS RELATED TO THE ACT OF URINATION

- Nocturia can occur in the absence of disease in persons who drink excessive amounts of fluid in the late evening. Coffee and alcoholic beverages, because of their specific diuretic effect.
- **Dysuria** :Painful urination is usually related to acute inflammation of the bladder, urethra, or prostate.
- Dysuria often is the first symptom suggesting urinary infection and is often associated with urinary frequency and urgency.

SYMPTOMS RELATED TO THE ACT OF URINATION

- **Enuresis** : means bedwetting at night. It is physiologic during the first 2 or 3 years of life but becomes troublesome, particularly to parents, after that age.
- It may be functional or secondary to delayed neuromuscular maturation of the urethrovesical component, but it may present as a symptom of organic disease (eg, infection, distal urethral stenosis in girls, posterior urethral valves in boys, neurogenic bladder).

Symptoms of Bladder Outlet Obstruction

- **A. HESITANCY:** is prolonged and the patient often strains to force urine through the obstruction. Prostate obstruction and urethral stricture are common causes of this symptom.
- **B. LOSS OF FORCE AND DECREASE OF CALIBER OF THE STREAM:** Progressive loss of force and caliber of the urinary stream is noted as urethral resistance increases despite the generation of increased intravesical pressure.

Symptoms of Bladder Outlet Obstruction

- **C. TERMINAL DRIBBLING:** Terminal dribbling becomes more and more noticeable as obstruction progresses and is a most distressing symptom.
- **D. URGENCY :** A strong, sudden desire to urinate is caused by hyperactivity and irritability of the bladder, resulting from obstruction, inflammation, or neuropathic bladder disease.
- **E. ACUTE URINARY RETENTION:** Sudden inability to urinate.

Symptoms of Bladder Outlet Obstruction

- **F. CHRONIC URINARY RETENTION:** Chronic urinary retention may cause little discomfort to the patient even though there is great hesitancy in starting the stream and marked reduction of its force and caliber.
- **G. INTERRUPTION OF THE URINARY STREAM:** Interruption may be abrupt and accompanied by severe pain radiating down the urethra. This type of reaction strongly suggests the complication of vesical calculus.

Symptoms of Bladder Outlet Obstruction

- **H. SENSE OF RESIDUAL URINE:** The patient often feels that urine is still in the bladder even after urination has been completed.
- **I. CYSTITIS:** Recurring episodes of acute cystitis suggest the presence of residual urine.

Incontinence

- is any involuntary leakage of urine It can be a common and distressing problem, which may have a profound impact on quality of life.
- There are many reasons for incontinence. The history often gives a clue to its cause.
- **A. TRUE INCONTINENCE:**
- The patient may lose urine without warning; this may be a constant or periodic symptom.
- The more obvious causes include previous radical prostatectomy, exstrophy of the bladder, epispadias, vesicovaginal fistula, and ectopic ureteral orifice.

Incontinence

- **B. STRESS INCONTINENCE:** When slight weakness of the sphincteric mechanisms is present, urine may be lost in association with physical strain (eg, coughing, laughing, rising from a chair).
- This is common in multiparous women who have weakened muscle support of the bladder neck and urethra and in men who have undergone radical prostatectomy.

Incontinence

- **C. URGE INCONTINENCE:** Urge incontinence is the strong, sudden need to urinate due to bladder spasms or contractions.
- Urge incontinence not infrequently occurs with acute cystitis, particularly in women, since women seem to have relatively poor anatomic sphincters.
- Urge incontinence is a common symptom of an upper motor neuron lesion.

Incontinence

- **D. OVERFLOW INCONTINENCE:** the involuntary release of urine from an overly full urinary bladder, often in the absence of any urge to urinate.
- Paradoxic incontinence is loss of urine due to chronic urinary retention or secondary to a flaccid bladder.
- The intravesical pressure finally equals the urethral resistance; urine then constantly dribbles forth.

- **Oliguria** is the low output of urine.
- Oliguria is defined as a urine output that is less than 1 mL/kg/h in infants.
- less than 0.5 mL/kg/h in children.
- and less than 400 mL or 500 mL per 24h in adults this equals 17 or 21 mL/hour.
- **Anuria** means non passage of urine.
- defined as passage of less than 50 milliliter of urine in a day.

- **Chyluria**: The passage of lymphatic fluid or chyle is noted by the patient as passage of milky white urine.
- This represents a lymphatic–urinary system fistula.
- the cause is obstruction of the renal lymphatics, which results in forniceal rupture and leakage.
- Filariasis, trauma, tuberculosis, and retroperitoneal tumors have caused the problem.

Hematuria

- microscopic hematuria is three or more red blood cells per high-power microscopic field in urinary sediment from two of three properly collected urinalysis specimens.
- Blood in the urine (hematuria) can originate from any site along the urinary tract and, whether gross or microscopic, may be a sign of serious underlying disease, including malignancy.

Hematuria

- It is important to know whether urination is painful or not, whether the hematuria is associated with symptoms of vesical irritability, and whether blood is seen in all or only a portion of the urinary stream.
- **A. BLOODY URINE IN RELATION TO SYMPTOMS & DISEASES:**
- Hematuria associated with renal colic suggests a ureteral stone, although a clot from a bleeding renal tumor can cause the same type of pain.

Hematuria

- Hematuria is not uncommonly associated with nonspecific, tuberculous, or schistosomal infection of the bladder.
- Dilated veins may develop at the bladder neck secondary to enlargement of the prostate. These may rupture when the patient strains to urinate, resulting in gross or microscopic hematuria.
- **Hematuria without other symptoms (silent hematuria) must be regarded as a symptom of tumor of the bladder or kidney until proved otherwise.**

Hematuria

- Less common causes of silent hematuria are staghorn calculus, polycystic kidneys, benign prostatic hyperplasia, solitary renal cyst, sickle cell disease, and hydronephrosis.
- Painless bleeding is common with acute glomerulonephritis.
- **B. TIME OF HEMATURIA:**
- Learning whether the hematuria is partial (initial, terminal) or total (present throughout urination) is often of help in identifying the site of bleeding.

Hematuria

- **Initial hematuria suggests an anterior urethral lesion (eg, urethritis, stricture, meatal stenosis in young boys).**
- **Terminal hematuria usually arises from the posterior urethra, bladder neck, or trigone.**
- **Among the common causes are posterior urethritis and polyps and tumors of the vesical neck.**
- **Total hematuria has its source at or above the level of the bladder (eg, stone, tumor, tuberculosis, nephritis).**

OTHER OBJECTIVE MANIFESTATIONS

- **Urethral Discharge:** Urethral discharge in men is one of the most common urologic complaints. The causative organism is usually *Neisseria gonorrhoeae* or *Chlamydia trachomatis*.
- **Hematospermia:** the presence of blood in semen, is most often a benign and idiopathic symptom, but can sometimes result from medical problems such as a urethral stricture, infection of the prostate, or a congenital bleeding disorder, and can occur transiently after surgical procedures such as a prostate biopsy.