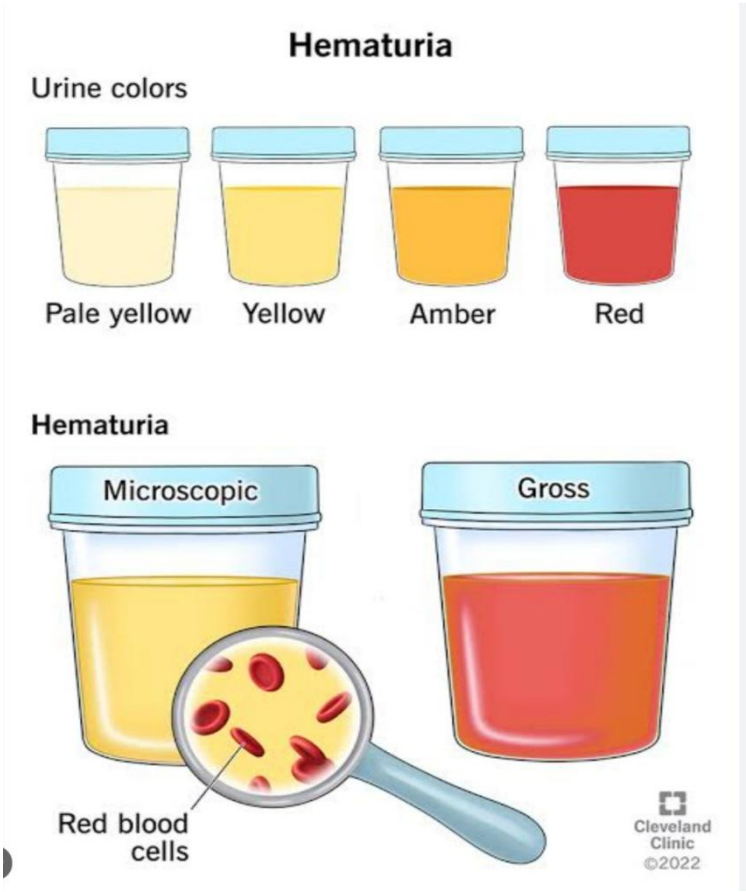
Evaluation of Hematuria

Definition

Hematuria is the presence of red blood cells (RBCs) in urine. It may be:

Microscopic hematuria: RBCs seen only on urine microscopy.

Macroscopic (gross) hematuria: Visible red or brown-colored urine.



Types Based on Timing

Initial hematuria: Suggests urethral origin.

Terminal hematuria: Typically from bladder neck or prostate.

Total hematuria: Likely from bladder, ureters, or kidneys.

Causes

Glomerular (Renal Origin):

Glomerulonephritis (IgA nephropathy, post-streptococcal)

Lupus nephritis

Alport syndrome

Non-Glomerular Renal:

Renal stones

Pyelonephritis

Renal tumors (e.g., RCC)

Ureteric/Bladder/Urethral:

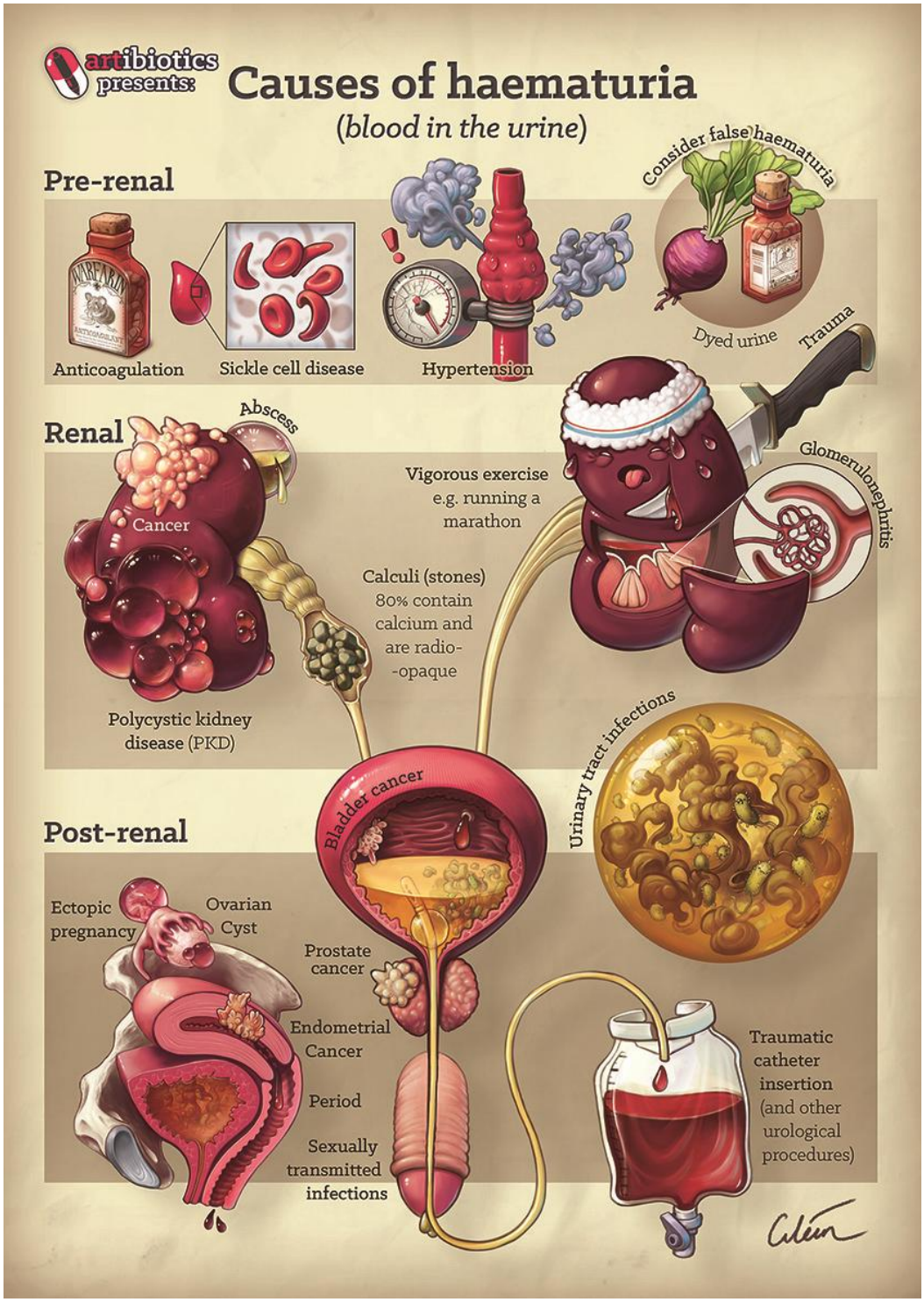
Urolithiasis

Urinary tract infections (UTI)

Bladder carcinoma

Trauma or catheterization

Benign prostatic hyperplasia (BPH)



Red Flag Features

Age >40 years

History of smoking

Weight loss, night sweats

Recurrent UTIs or visible hematuria

Associated pain or systemic symptoms

Evaluation Protocol

1. History & Physical Exam

Symptoms: Dysuria, flank pain, fever, systemic signs

Drug use (NSAIDs, anticoagulants)

Recent trauma or procedures

2. Urinalysis

RBCs, WBCs, casts, proteinuria

RBC morphology (dysmorphic → glomerular)

3. Urine Culture

Rule out UTI

4. Blood Tests

CBC, renal function (BUN, creatinine), coagulation profile

5. Imaging

Ultrasound KUB: Initial screening

CT Urography: Gold standard for urological hematuria

MRI/MR Urography: If CT is contraindicated

6. Cystoscopy

Essential in patients >40 years or with risk factors

Evaluates bladder and urethral causes

Additional Notes

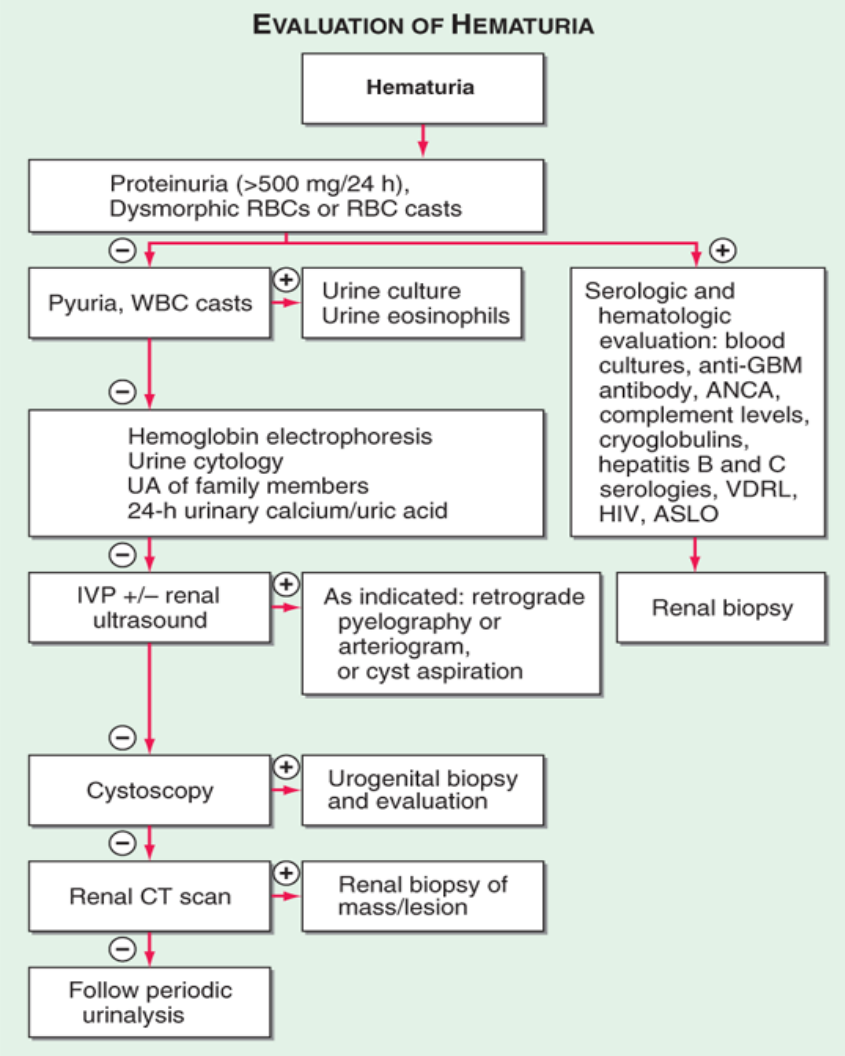
In children, common causes include trauma, infection, or hypercalciuria.

In elderly, malignancy must be ruled out first.

Isolated microscopic hematuria may warrant nephrology referral.

Visual Aids

Hematuria diagnostic algorithm



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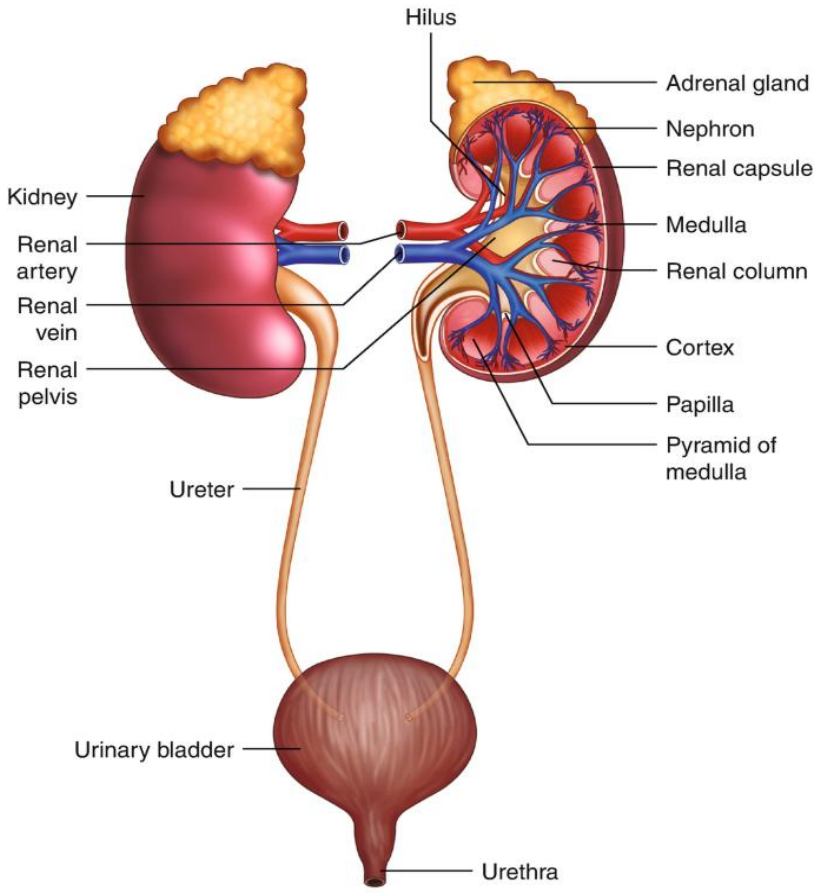
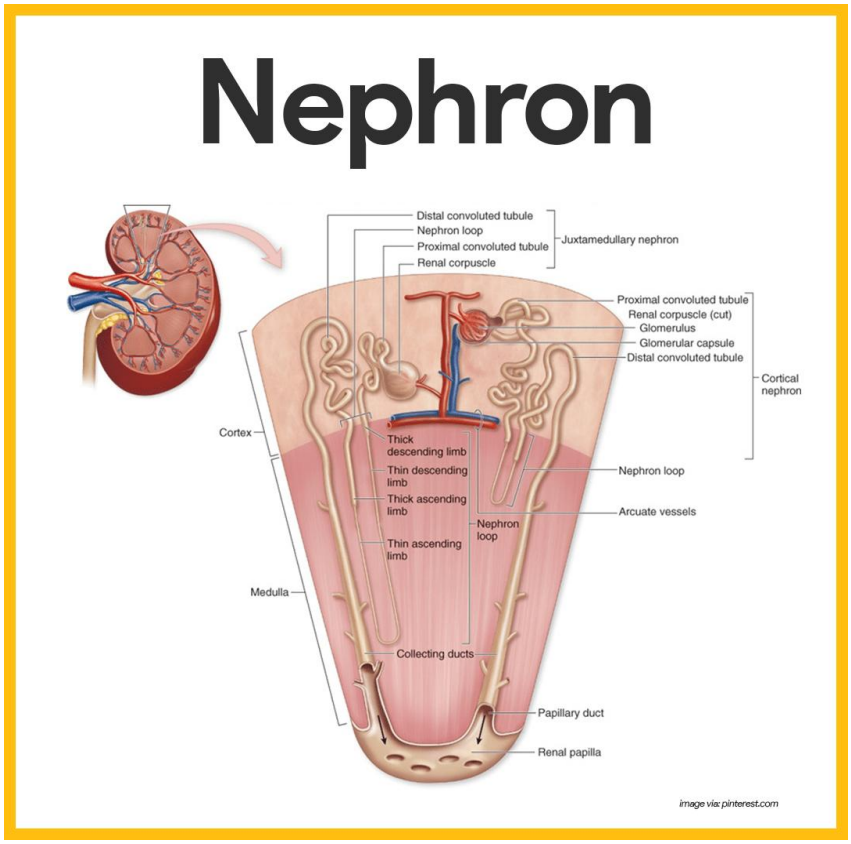
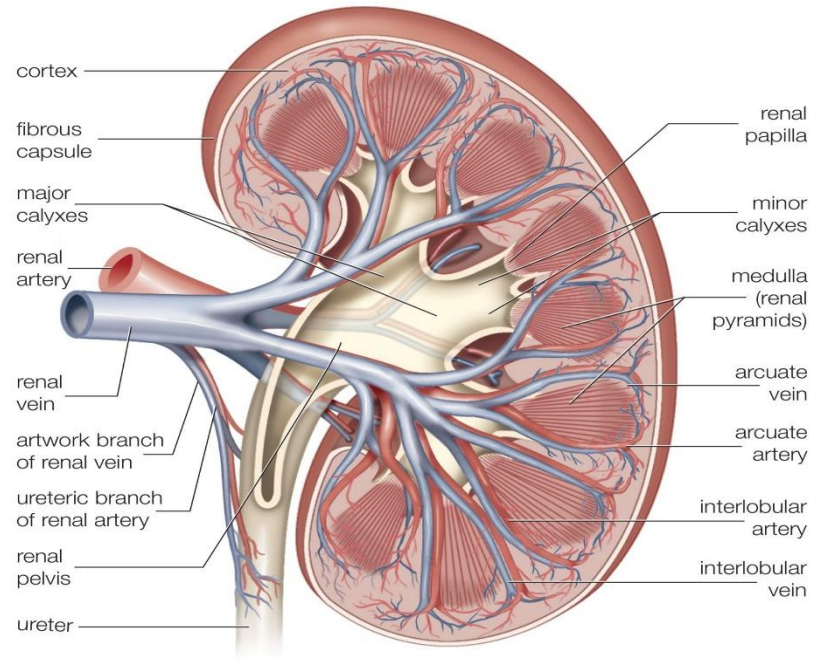
Urinary tract anatomical diagram


Hilus
Adrenal gland
Nephron
Renal capsule
Kidney
Medulla
Renal artery
Renal column
Renal vein
Cortex
Renal pelvis
Papilla
Pyramid of medulla
Ureter
Urinary bladder
Urethra





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Line of Treatment of Hematuria (Cause-Based)

1. Glomerular Causes

Examples: IgA nephropathy, post-infectious GN, lupus nephritis

Treatment:

Control blood pressure (ACE inhibitors/ARBs)

Immunosuppressive therapy (e.g., corticosteroids, cyclophosphamide) in autoimmune cases

Nephrology referral

Monitor renal function and proteinuria

2. Urinary Tract Infection (UTI)

Treatment:

Empirical antibiotics (e.g., nitrofurantoin, ciprofloxacin) adjusted per culture

Adequate hydration

Treat underlying risk factors (e.g., diabetes, stones)

3. Urolithiasis (Renal or Ureteric Calculi)

Treatment:

Analgesics (NSAIDs), hydration

Alpha-blockers (e.g., tamsulosin) for stone passage

Lithotripsy or surgical removal if obstructive or large stones

Prevent recurrence with metabolic evaluation and dietary changes

4. Bladder or Renal Tumors

Treatment:

Bladder cancer: TURBT (transurethral resection), intravesical therapy, radical cystectomy in advanced cases

Renal cell carcinoma: Partial or radical nephrectomy

Oncology referral for chemo/radiotherapy if indicated

5. Benign Prostatic Hyperplasia (BPH)

Treatment:

Alpha-blockers (e.g., tamsulosin), 5-alpha reductase inhibitors (e.g., finasteride)

TURP (Transurethral Resection of Prostate) if obstructive symptoms are severe

Rule out coexisting malignancy with PSA and DRE

6. Trauma or Iatrogenic Causes

Treatment:

Conservative management if stable

Catheterization or surgical repair in severe injuries

Discontinue causative drugs (e.g., anticoagulants) under guidance

7. Drug-Induced Hematuria

Common drugs: Anticoagulants, cyclophosphamide

Treatment:

Stop or adjust offending drug

Manage coagulopathy if present

Monitor closely for recurrence

8. Idiopathic or Persistent Microscopic Hematuria

Approach:

Regular follow-up with urinalysis, renal function tests

Refer to nephrologist or urologist if persistent >6 months or with abnormal findings

Role of Nephrologist and Urologist in Hematuria

Nephrologist

Consulted when hematuria is suspected to originate from glomerular or medical renal disease.

Key responsibilities:

Evaluation of microscopic hematuria with proteinuria or RBC casts

Management of glomerulonephritis, lupus nephritis, Alport syndrome

Monitoring and preserving renal function

Advising renal biopsy when indicated

Long-term follow-up for chronic kidney disease (CKD) patients

Indicators for nephrology referral:

Dysmorphic RBCs on microscopy

Elevated creatinine or abnormal renal function

Persistent proteinuria

Hypertension with hematuria

Urologist

Involved when hematuria arises from the urinary tract (ureters, bladder, urethra, prostate) or in macroscopic hematuria with no glomerular features.

Key responsibilities:

Evaluation of gross hematuria

Performing cystoscopy and imaging interpretation (CT urography)

Management of stones, tumors, trauma, BPH

Surgical interventions: TURBT, nephrectomy, prostate surgeries

Treating iatrogenic or anatomical causes

Indicators for urology referral:

Age >40 years with visible hematuria

Suspicion of malignancy (e.g., smoker, weight loss)

Bladder or prostate pathology on imaging

Refractory or recurrent hematuria

Dietary Advice in Hematuria Patients

General Recommendations:

Hydration:

Drink at least 2–3 liters/day to flush the urinary tract.

Helps prevent stone formation and dilutes irritating substances.

Limit salt intake:

High sodium increases calcium excretion, worsening stone risk and hypertension.

Avoid irritants:

Reduce caffeine, alcohol, spicy foods, and carbonated drinks if symptoms like burning or urgency are present.

Based on Common Causes:

1. For Urolithiasis (Kidney Stones):

Increase citrate-rich foods: Lemons, oranges (alkalinize urine)

Limit oxalate-rich foods: Spinach, nuts, chocolate, tea

Moderate calcium intake: Avoid excess supplements but ensure normal dietary calcium

Limit animal proteins: Reduce red meat, organ meats, fish (especially in uric acid stones)

2. For Glomerular Disease (e.g., Nephritis):

Low-sodium, low-protein diet if proteinuria or renal dysfunction is present

Avoid potassium-rich foods if kidney function is impaired

Emphasize anti-inflammatory foods (e.g., fruits, vegetables, whole grains)

3. For UTI-Related Hematuria:

Drink plenty of fluids

Include cranberry juice or supplements (may reduce recurrence in women)

Avoid bladder irritants (coffee, spicy food, acidic fruits)

4. For BPH and Prostate Issues:

Consume plant-based foods: tomatoes (lycopene), soy, green tea

Avoid heavy meats, dairy, and saturated fats

Limit alcohol and caffeine, which can worsen urinary symptoms

TABLE 83.15 Common causes of haematuria.

Site	Cause
Kidney	• Cancer (renal cell, urothelial, squamous cell, adenocarcinoma) • Stones • Infection • Trauma • Cystic diseases (e.g. medullary sponge kidney, polycystic kidney disease) • Vascular disorder (e.g. vascular malformations, renal vein thrombosis) • Nephrological causes (IgA nephropathy, glomerulonephritis, vasculitis, Henoch–Schönlein purpura) • Papillary necrosis
Ureter	• Cancer (urothelial) • Stones • Infection • Trauma • Benign diseases (PUJ obstruction, stricture)
Bladder	• Cancer (urothelial, squamous cell, adenocarcinoma) • Stones • Infection (bacterial, TB, schistosomiasis) • Trauma • Chronic inflammatory conditions (IC, radiation cystitis, ketamine cystitis, cyclophosphamide cystitis)
Prostate	• Cancer • Benign prostatic enlargement • Infection
Medical	• Bleeding disorders (e.g. sickle cell, thrombophilia) • Anticoagulation therapy
Iatrogenic	• Urethral instrumentation • Nephrostomy

HAEMATURIA

❖ ***Types***

- *Gross* (visible to unaided eye).
- *Microscopic* (>5 RBC's/HPF).

- ♦ *Early* (initial) haematuria: Urethral origin, distal to external sphincter
- ♦ *Terminal* haematuria: Bladder neck or prostate origin
- ♦ *Diffuse* (total) haematuria: Source is in the bladder or upper urinary tract
- ♦ *False haematuria:* Discolouration of urine from pigments such as food colouring and myoglobin.
- ♦ *Silent haematuria* is due to tumours of kidney or bladder unless proved otherwise.

BOX Causes

- ♦ Renal injury
- ♦ Urinary stones
- ♦ Wilm's tumour
- ♦ Tuberculosis
- ♦ Renal cell carcinoma
- ♦ Cystitis
- ♦ Bladder tumour
- ♦ Urinary bilharziasis
- ♦ BPH, carcinoma prostate
- ♦ Renal infarct
- ♦ Glomerulonephritis
- ♦ Blood dyscrasias

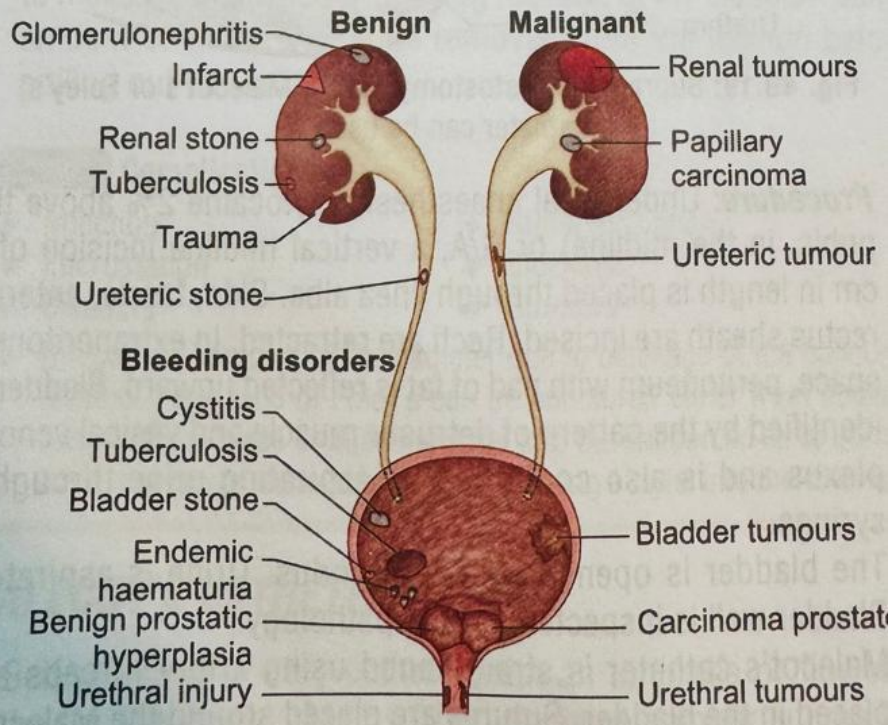

Fig. 49.21: Causes of haematuria.