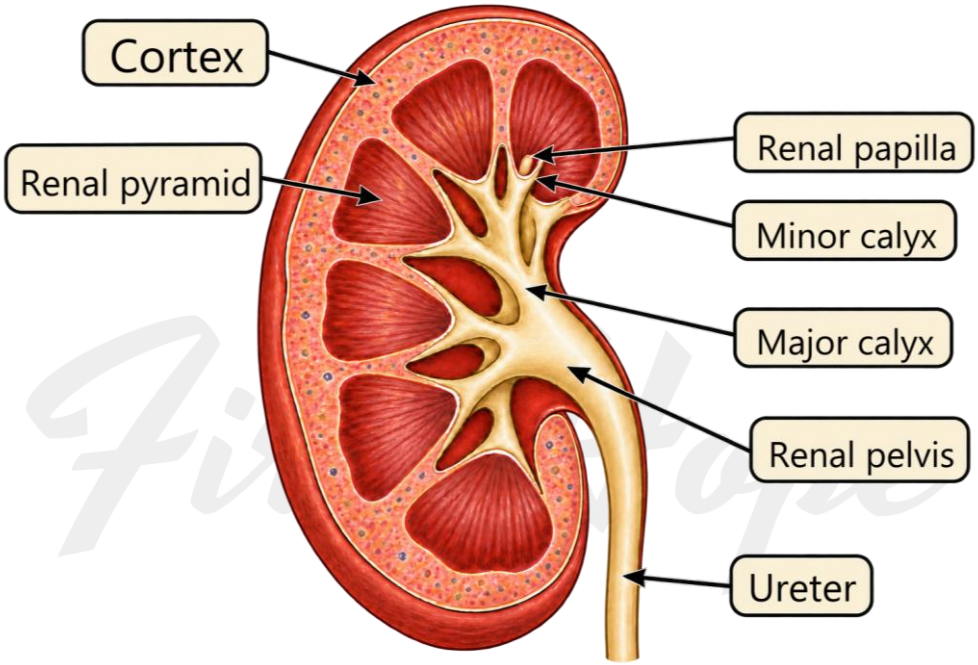
General Surgery - Topic 29 - Urinary System

Urinary System

Clinical Assessment and Applied Anatomy

- The kidneys filter blood, regulate fluid and electrolyte balance and drain urine through the collecting systems into the ureters.
- The bladder stores urine and empties through the urethra when bladder contraction and outlet relaxation are coordinated.
- A urinary complaint can arise from infection, obstruction, stones, malignancy, neurological disease or systemic illness.



The renal collecting system links the calyces and pelvis to the ureter

History and Examination

Symptoms and Relevant History

- Ask about pain, visible blood, dysuria, frequency, urgency, nocturia, incontinence and difficulty emptying the bladder.
- Distinguish voiding symptoms, such as weak stream and straining, from storage symptoms, such as urgency and frequency.
- Record fever, weight loss, stone history, previous instrumentation, smoking, medicines and occupational exposure.

Examination and Initial Tests

- Assess vital signs, hydration, blood pressure and signs of sepsis or renal failure.
- Examine the abdomen for a palpable kidney, flank tenderness or a distended bladder.
- Perform external genital, neurological and rectal examination when indicated, with consent and appropriate privacy.

Copyright by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

- Urinalysis, urine culture, renal function and ultrasound are selected according to the suspected problem.

Haematuria

- Haematuria means red blood cells in urine and may be visible or detected only by laboratory examination.

Causes and Clinical Clues

Common Causes

- The AUA/SUFU definition of microscopic haematuria is **at least 3 red blood cells per high-power field** in one properly collected urine specimen; dipstick positivity alone does not establish this diagnosis.
- Causes include urinary stones, infection, renal disease, trauma, prostatic disease and malignancy.

Clinical Clues and Red-urine Mimics

- Painless visible haematuria is an important warning feature for urinary-tract cancer.
- Pain with haematuria may suggest a stone or infection, but it does not exclude a tumour.
- Clots usually suggest a non-glomerular source and can obstruct the bladder outlet.
- Proteinuria, red-cell casts or dysmorphic red cells raise concern for glomerular disease.
- Red urine can also result from pigments, medicines or haemoglobin and myoglobin rather than intact red cells.

Investigation

Confirmation, Culture and Blood Tests

- Confirm an unexpected dipstick result with appropriate urine microscopy and assess possible menstrual contamination.
- Take a urine culture when infection is suspected and reassess persistent haematuria after treatment.
- Check blood count, renal function and relevant coagulation tests.

Risk-based Urological Investigation

- Visible haematuria and risk-associated microscopic haematuria require an appropriate urological evaluation.
- Cystoscopy examines the bladder, while upper-tract imaging is selected according to risk, renal function and contraindications.
- CT urography provides detailed assessment in suitable higher-risk patients.
- Ultrasound may be appropriate in lower-risk pathways or when CT is unsuitable, but it cannot exclude every urothelial lesion.

Copyright by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

- Urine cytology helps in selected patients with suspected high-grade urothelial disease and does not replace cystoscopy.
- Anticoagulant use does not remove the need to investigate an underlying urinary lesion.

Immediate Management

- Assess circulation and haemoglobin when bleeding is heavy.
- Clot retention requires urgent bladder drainage and evacuation by appropriately trained staff.
- A suitable large-bore three-way catheter and controlled irrigation may be needed after safe catheter placement.
- Persistent bleeding or failure to clear clots requires urgent urological review.
- Treat the cause and review anticoagulation through a balanced plan rather than stopping every medicine automatically.

Congenital Genitourinary Anomalies

Developmental Abnormalities and Their Consequences

1. Renal Agenesis, Ectopia and Fusion

A. Solitary and Ectopic Kidneys

- A single functioning kidney may be discovered incidentally and requires protection of long-term renal health.
- Renal ectopia reflects an abnormal kidney position and may coexist with obstruction or reflux.

B. Horseshoe Kidney

- A horseshoe kidney usually has fusion of the lower poles and altered vascular and ureteric anatomy.
- Associated abnormal drainage can predispose to obstruction, infection or calculi, although some patients remain asymptomatic.

Assessment and Follow-Up of Renal Anomalies

- Ultrasound defines the basic anatomy, while further imaging assesses function or complications when needed.
- An incidental anomaly without obstruction or other complications does not automatically require surgery.

2. Pelvi-Ureteric Junction Obstruction

- Narrowing or abnormal drainage at the pelvi-ureteric junction causes dilatation of the renal pelvis and calyces.
- It may be detected antenatally or present with pain, infection, stones or declining renal function.

Copyright by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

- Ultrasound and a suitable diuretic renogram assess dilatation, drainage and differential renal function.
- Selected stable cases are monitored, while important obstruction or functional deterioration may require pyeloplasty.

3. Duplex Systems, Ureterocele and Reflux

A. Duplex Collecting System

- A duplex collecting system has two drainage systems within one kidney and may have partial or complete ureteric duplication.

B. Ureterocele

- A ureterocele is a cystic dilatation of the distal ureter that can obstruct drainage.

C. Ectopic Ureter

- An ectopic ureter may cause continuous wetting despite otherwise normal voiding in a girl.

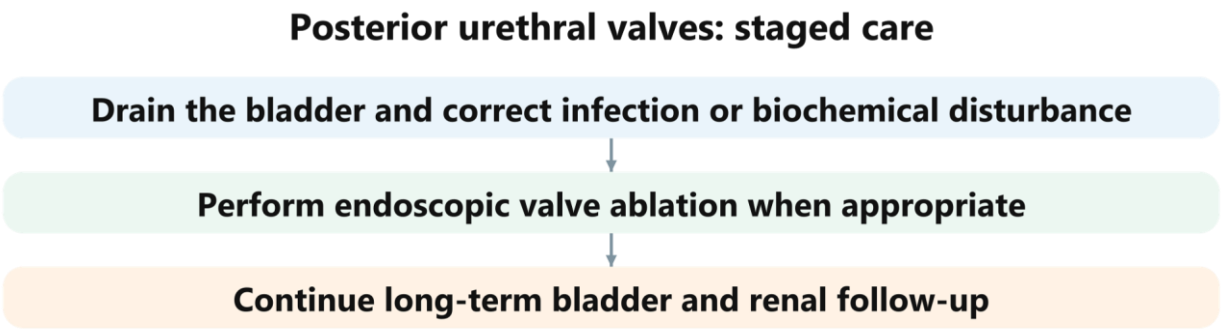
D. Vesicoureteric Reflux

- Vesicoureteric reflux permits urine to pass backwards from the bladder and can increase the risk of febrile infection and renal scarring.

Investigations and Individual Treatment

- Investigations and treatment depend on infections, anatomy, renal function and the risk of damage.
- Management can include surveillance, infection prevention and selected endoscopic or reconstructive surgery.

4. Posterior Urethral Valves



- Posterior urethral valves are congenital obstructing folds in the male posterior urethra.
- They can cause antenatal urinary dilatation, poor stream, a thick-walled bladder, infection and renal impairment.
- Initial treatment protects renal function through bladder drainage and correction of infection and biochemical disturbance.
- Endoscopic valve ablation is performed when appropriate, with long-term follow-up of bladder and kidney function.

Copyright by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

5. Hypospadias and Bladder Exstrophy

A. Hypospadias

- Hypospadias places the urethral opening on the ventral penile surface and may accompany chordee and an abnormal foreskin.
- Avoid circumcision before specialist assessment because preputial tissue may be useful for reconstruction.

B. Bladder Exstrophy

- Bladder exstrophy exposes the bladder through a lower abdominal-wall defect and needs early multidisciplinary care.
- Protect exposed tissue and refer promptly rather than attempting improvised closure.

Urinary Tract Infection

- Urinary tract infection is infection involving the urinary system, such as the bladder or kidneys.
- The site of infection and the presence of systemic illness guide assessment and care.

Localised and Systemic Infection

- A localised bladder infection commonly causes dysuria, urgency, frequency and suprapubic discomfort.
- Fever, rigors, flank pain or systemic illness suggests infection beyond the bladder, including pyelonephritis or urosepsis.
- Obstruction, stones, catheters, pregnancy, immunosuppression and impaired urinary emptying increase the risk of a difficult course.
- Do not assume that cloudy or foul-smelling urine alone proves a symptomatic infection.

Investigation and Treatment

Specimen Collection and Complication Assessment

- ➢ Collect a suitable urine specimen before antibiotics when this will not delay urgent treatment.
- ➢ Culture is particularly important in systemic infection, recurrent infection, pregnancy and treatment failure.
- ➢ Check renal function and investigate obstruction in a patient with systemic illness or a poor response.

Antibiotic Choice and Severe Infection

- ➢ Choose the antibiotic using illness severity, local resistance, allergies, renal function and previous culture results.

Copyright by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

FREE PREVIEW

Click here to visit our website

MBBS PREMIUM NOTES

Complete MBBS notes for every subject and year are available only in the FirstHope app.

Scan or click here

Click here to get the app >

Available on Google Play

Browse MBBS notes by year

firsthope.co.in/mbbs

Click here to explore MBBS >

Scan or click here

FirstHope Medical on Instagram

@firsthope.medical

Click here to follow

App and notes help

Find answers about access and downloads

Click here for help

YEAR 1 / YEAR 2 / YEAR 3 / YEAR 4