

Bladder stones



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Definition

- A **primary bladder stone**
 - Develops in sterile urine
 - Often originates in the kidney
- A **secondary bladder stone**
 - Occurs in the presence of infection
 - Outflow obstruction
 - Impaired bladder emptying
 - A foreign body



Epidermiology

- Men are affected eight times more frequently than women
- Until the twentieth century, bladder stone was a prevalent disorder among poor children and adolescents
- As a result of improved diet, especially an increased protein:carbohydrate ratio, primary vesical calculus is rare



Composition

- Most vesical calculi are mixed stones.

Oxalate calculus

- Primary calculus
- Grows slowly
- Moderate size and solitary
- Surface is uneven

Calcium oxalate

- Usually dark brown or black (incorporation of blood pigment)



Uric acid calculi

- Round or oval and smooth
- Vary in colour from yellow to brown
- Occur in patients with gout , ileostomies or bladder outflow obstruction

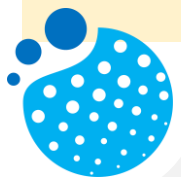
Cystine calculus

- Occurs only in the presence of cystinuria
- Radio-opaque (high sulfur content)



Triple phosphate calculus

- Composed of ammonium, magnesium and calcium phosphates
- Occurs in urine infected with urea-splitting organisms
- Tends to grow rapidly
- Can occur on a nucleus of one of the other types of calculus
- Can occur on a foreign body (rarely)
- Dirty white in colour
- Chalky consistency



Aetiology

Bladder outlet obstruction - the most common cause

Prostatic enlargement



Elevation of the
bladder neck



Post void residual
urine volume cause
stasis



Crystal nucleation
and accretion



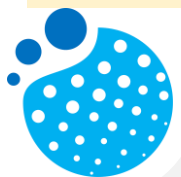
Urinary tract
infections



Calculi



- Bladder inflammation secondary to external beam radiation (ie, radiation cystitis) or schistosomiasis
- Congenital or acquired vesical diverticula
- Sliding inguinal hernias containing the urinary bladder
- Cloacal malformations
- Vaginal reconstructions
- Ureteral reimplantations
- Bladder neck surgery
- Foreign bodies in the bladder



Clinical features

- May be asymptomatic and found incidentally
- Sensation of incomplete bladder emptying
- Pain (strangury)
 - End of micturition
 - Referred to the tip of the penis or the labia majora
 - Worsened by movement
- Haematuria
 - Passage of a few drops of bright-red blood at the end of micturition
 - Interruption of the urinary stream
 - Urinary infection

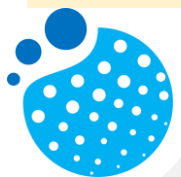


Diagnosis

- X-ray kidneys, ureters, and bladder (KUB)
Radiopaque stones
- Intravenous pyelography (IVP), KUB -
Radiopaque stones as a filling defect in the bladder
- Bladder ultrasonography - Differentiate a calculus from tumor or clot
- Non contrast CT



- Cystoscopy - most commonly used test for confirming the presence of bladder stones and planning treatment
 1. Visualize the stones
 2. Assess their number, size, and
 3. Examination of the urethra, prostate, bladder wall, and ureteral orifices
 4. Allows identification of strictures, prostatic obstruction, bladder diverticula, and bladder tumors



Treatment

- Removal of the stone
- Treatment of the underlying abnormality

Pharmacologic Stone Dissolution

- Urinary alkalization for the dissolution of uric acid stones
- Renacidin can be used to dissolve phosphate or struvite calculi
- Used in conjunction with indwelling irrigating catheters
- Monitored closely for signs of sepsis or hypermagnesemia



Surgical treatment

- Transurethral cystolitholapaxy
- Percutaneous suprapubic cystolitholapaxy
- Open suprapubic cystotomy

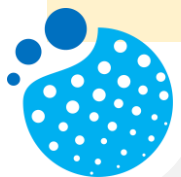


Litholapaxy

- Visualize the stone
- Energy source is used to fragment it
- Removed through the cystoscope

Contraindications

1. Urethral stricture that cannot be dilated sufficiently
2. Patient is aged below 10 years
3. Contracted bladder
4. Very large stone



Percutaneous suprapubic litholapaxy

- Insert a needle into the bladder
- Pass a guidewire
- Alken metal dilators - pass over the guidewire to dilate the track
- Amplatz sheath is inserted
- Largebore nephroscope



Open suprapubic cystotomy

- Stones are not fragmented
- They are removed intact

Used with,

- Larger and harder stones
- Cases where open prostatectomy or bladder diverticulectomy is indicated



Advantages

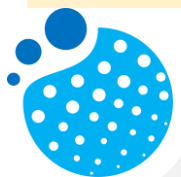
- Rapidity
- Easy removal of several calculi in a single procedure
- Extract calculi that are adherent to bladder mucosa
- Ability to remove large stones

Disadvantages

Postoperative pain

Longer hospital stay

Longer bladder catheterization times



Complications

- Bladder dysfunction
- Urinary tract infection
- Squamous metaplasia
- Bladder cancer

