URETERIC CALCULUS

A stone in the ureter usually comes from the kidney. Most are single small stones that are passed spontaneously.

Clinical features

- The presence of a stone passing down the ureter often causes intermittent attacks of ureteric colic.

Ureteric colic

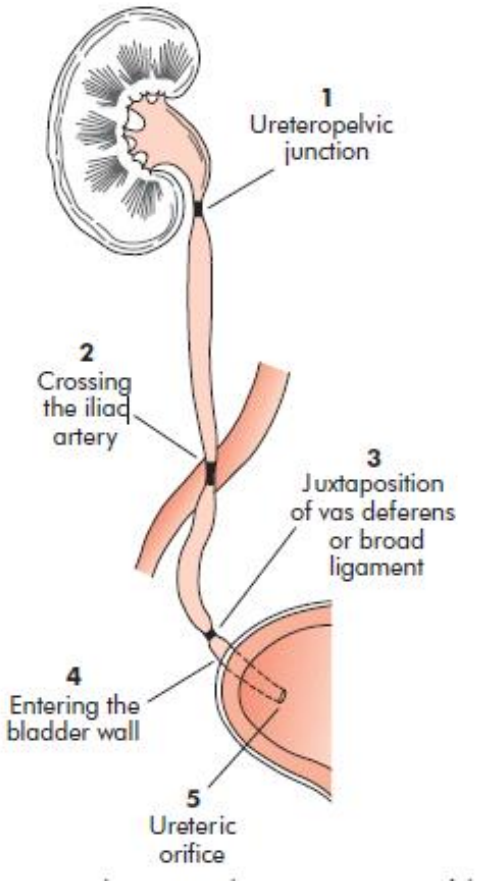
- As the stone progresses to the lower ureter, the waves of agonizing loin pain are typically referred more to the groin, external genitalia and the anterior surface of the thigh. The testis may be retracted by cremasteric spasm.
- When the stone is in the intramural ureter, the pain can be referred to the tip of the penis.

Impaction

- Most stones pass spontaneously from the ureter but there are five sites of narrowing where the stone may be arrested.
- When the stone becomes impacted, the attacks of colic give way to a more consistent dull pain, often felt in the iliac fossa. The pain may be increased by exercise and lessened by rest.
- Distension of the renal pelvis because of obstruction may cause pain and discomfort in the loin.
- The stone may become embedded as the adjacent ureteric wall becomes eroded and oedematous as a result of pressure ischaemia.
- Perforation of the ureter and extravasation of urine is a rare complication.
- Severe renal pain subsiding after a day or so suggests complete ureteric obstruction.
- If obstruction persists after 1–2 weeks, the calculus should be removed because prolonged distension of the kidney will eventually lead to atrophy of the renal parenchyma.

Haematuria

- Almost every attack of ureteric colic is associated with microscopic haematuria, which lasts for a day or so.
- More profuse bleeding is uncommon and should raise the suspicion that the colic is due to passage of a clot.



Normal anatomical narrowings (1–5) of the ureter

Abdominal examination

- There is tenderness and some rigidity over some part of the course of the ureter.
- The principal difficulty on the right side is to distinguish symptoms and signs of ureteric colic from those of acute appendicitis or acute cholecystitis.
- The presence of haematuria does not rule out appendicitis, because an inflamed appendix can give rise to a local ureteritis leaking some red cells into the urine.
- The patient with acute ureteric colic is usually in greater pain and less systemically ill.

Imaging

- Most urinary calculi are visible on a ***plain abdominal radiograph***.
- The stone may not be seen along the line of the ureter if it is small or if it is obscured by bowel contents or the shadows cast by nearby bones.
- ***Intravenous urography*** performed while the patient has pain can confirm the diagnosis showing dilatation of the ureter down to an obstructing calculus
- ***Spiral CT*** is increasingly used for this purpose.
- A radiolucent uric acid stone may be demonstrated as a filling defect in the contrast-filled system.

- ***Cystoscopy*** is not indicated routinely but may reveal oedema and petechiae of the urothelium around the ureteric orifice when the stone is nearby. The stone may be visible in the orifice as it passes into the bladder.
- ***Retrograde ureterography*** is performed as an immediate preliminary to an endoscopic operation to remove a calculus.

Treatment

Pain

- Non-steroidal anti-inflammatory drugs such as diclofenac and indomethacin have replaced opiates as the first line of treatment for renal colic.
- The value of smooth muscle relaxants such as propantheline (Pro-Banthine) is debatable.

Removal of the stone

- Expectant treatment is appropriate for small stones that are likely to pass naturally.
- This may take many months and, as long as the patient is not disabled by recurrent attacks of colic,
- progress can be followed by radiographs every 6–8 weeks.

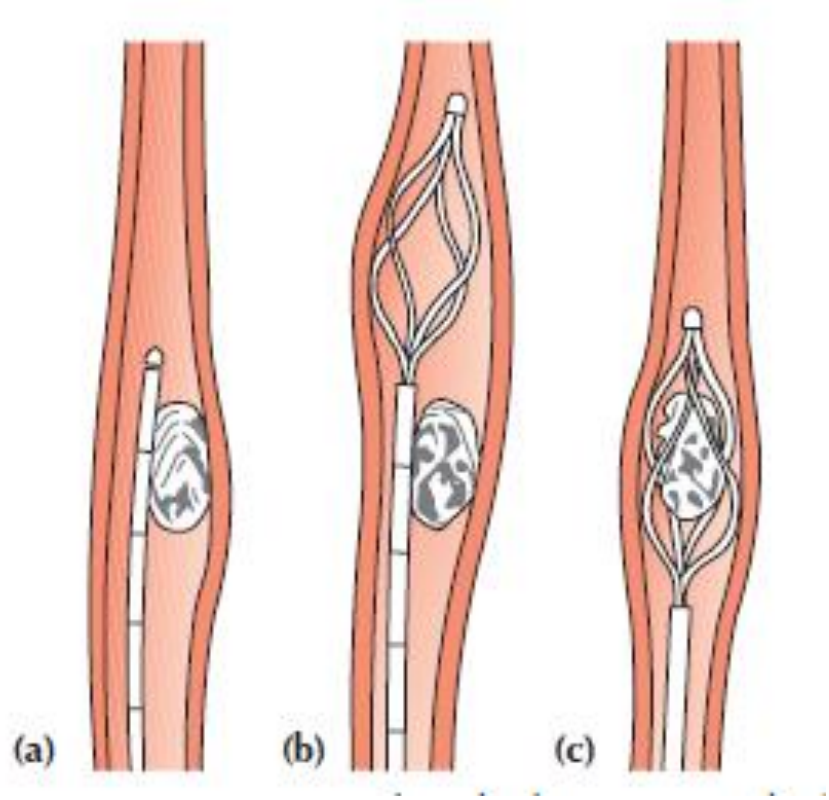
Endoscopic stone removal

Indications for surgical removal of a ureteric calculus:-

■ Repeated attacks of pain and the stone is not moving
■ Stone is enlarging
■ Complete obstruction of the kidney
■ Urine is infected
■ Stone is too large to pass
■ Stone is obstructing solitary kidney or there is bilateral obstruction

Dormia basket The use of wire baskets under image intensifier control has been replaced by ureteroscopic techniques but they may be useful when the necessary instruments and expertise are not available.

Ureteric meatotomy Stones often lodge in the intramural part of the ureter. Endoscopic incision using a diathermy knife can enlarge the opening and free the stone. The procedure may lead to urinary reflux but this rarely causes problems.



Dormia stone-catching basket in use: (a) basket introduced past stone; (b) opened; and (c) enclosing stone, ready for withdrawal.

Ureteroscopic stone removal

- A ureteroscope is a long thin endoscope passed transurethrally across the bladder into the ureter.
- The ureteroscope is used to remove stones that are impacted in the ureter.
- Stones that cannot be caught in baskets or endoscopic forceps under direct vision are fragmented using an electrohydraulic, percussive or laser lithotripter.

Push bang

- A stone in the middle or upper part of the ureter can often be flushed back into the kidney using a ureteric catheter.
- A **J-stent** secures the repositioned calculus in the kidney for subsequent treatment with ESWL.
- A flexible fibreoptic ureteroscope can be used for laser destruction of calculi in the renal collecting system or ureter and to retrieve small stones from the kidney.

Lithotripsy *in situ*

- A stone in a part of the ureter that can be identified by the imaging system of the lithotripter can be fragmented *in situ*.
- This form of treatment is not appropriate if there is complete obstruction or if the stone has been impacted for a long time.

Open surgery

Ureterolithotomy التفاصيل للأطلاع

- A radiograph confirms the position of the stone immediately before surgery.
- The incision must be appropriate for the position of the stone.
- Calculi in the upper third of the ureter are approached through a loin or upper quadrant transverse incision as used for a stone in the renal pelvis.
- Access to midureteric stones is through a muscle-cutting iliac fossa incision; lower ureteric stones are best reached through a Pfannenstiel incision.
- For stones close to the bladder, exposure is improved by ligating and dividing the superior vesical vascular pedicle.
- The ureter is exposed in the retroperitoneum and slings are applied above and below the calculus to stop it from escaping.
- The ureter is incised longitudinally, directly on to the stone, which is freed from adhesions by blunt dissection and removed with stone forceps.
- Soft catheters are passed upwards and downwards to ensure that the ureter is clear.
- The ureterotomy is closed with interrupted absorbable sutures and a drain left in place for a day or so to drain urine leakage.