

- ❖ Renal colic is a very severe pain that can present suddenly and without warning.
- ❖ It is usually caused by stones in the kidney, renal pelvis or ureter. The pain is caused by dilatation, stretching and spasm of the ureter. In contrast, the slow stretching associated with chronic obstruction with some types of cancer is painless.
- ❖ In many cases no cause is found (stone pass).

### Epidemiology

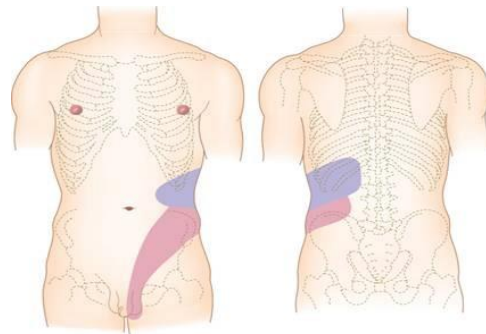
- The lifetime risk for stones is said to be about 10% for men with a male-to-female ratio of 2:1
- A family history of stones doubles the risk but most patients with renal colic do not have a family history.
- The peak age of onset is 20 to 40 and if stones present significantly outside this age group there is a greater chance of an underlying metabolic abnormality.
- The risk of stones is higher in higher socio-economic groups.

### Risk factors:

1. Excessive calcium in the urine(milk, red meat )
2. Excessive oxalate in the urine(tea, red meat, cola, chocolates ,nuts)
3. Excessive excretion of uric acid, with or without clinical gout(red meat)
4. Deficiency of citrate in the urine(red meat cause acidosis)
5. Cystinuria (an autosomal recessive)
6. Drugs, especially thiazide diuretics
7. People with urinary stasis due to anatomical abnormalities of the pelvi-calyceal system, e.g. medullary sponge kidney, PUJ obstruction, ureteric stricture, vesico-ureteric reflux, horseshoe kidney

## Presentation

- ❖ The classical features of renal colic are **sudden severe pain**.
- ❖ Pain starts in the loin about the level of the costo-vertebral angle (but sometimes lower) and **moves to the groin**, with tenderness of the loin or renal angle, sometimes with **haematuria**.
- ❖ If the stone is high and distends the renal capsule then pain will be in the flank but as it moves down pain will move anteriorly and down towards the groin.
- ❖ A stone that is moving is often more painful than a stone that is static.
- ❖ The **pain radiates** down to the testis, scrotum, labia.
- ❖ Whereas the pain of biliary or intestinal colic is **intermittent**, the pain of renal colic is more constant but there are often periods of relief or just a dull ache before it returns. The pain may change as the stone moves. The patient is often able to point to the place of maximal pain and this has a good correlation with the current site of the stone.
- ❖ There is usually associated **nausea** and often vomiting.
- ❖ There are often urinary symptoms that may be dysuria, frequency, oliguria and haematuria.
- ❖ There may be a **previous history of renal colic**.
- ❖ There may have been **recent dehydration**, including strenuous physical exercise or starting a **drug** that increases the risk.



## Examination

- The patient with colic of any type **twists around** in suffering. This is in contrast to the patient with peritoneal irritation who lies still.
- The patient is **apyrexial** in uncomplicated renal colic (pyrexia suggests infection and the body temperature is usually very high with pyelonephritis).
- Examination of the abdomen will usually reveal tenderness over the affected loin. Bowel sounds may be reduced. This is common with any severe pain.
- There may be severe pain in the testis but the testis should not be tender.
- **Blood pressure** may be high.
- Full and thorough abdominal examination is essential to check for other possible diagnoses, e.g. acute appendicitis, ectopic pregnancy, aortic aneurysm.

## Differential diagnosis:

- ⇒ This depends upon the position of the pain and the presence or absence of pyrexia.
1. **Biliary colic**: usually from gall stones. Pain may radiate to the shoulder. There may be some jaundice and dark urine.
  2. **Dissection of an aortic aneurysm**: beware the patient who presents with features of renal colic for the first time over the age of 60. This may be dissection of aortic aneurysm leading to ruptured aortic aneurysm.
  3. **Pyelonephritis**: very high temperature. Pain unlikely to radiate to groin. Infection may co-exist.
  4. **Acute pancreatitis**: pain radiates to back. There tends to be epigastric or left upper quadrant pain and tenderness. Paralytic ileus may set in. Vomiting occurs early in the condition.
  5. **Acute appendicitis**: tender and guarding over McBurney's point. Possibly absent if posterior appendix. Any peritonism will cause lying still, not writhing.
  6. **Perforated peptic ulcer**: rigid abdomen; patient lies still.
  7. **Epididymo-orchitis** or **torsion of testis**: very tender testis.
  8. **Back pain**: usually tender over vertebrae.
  9. **Drug addiction**: There are reports of people with fictitious stories of renal colic, designed to obtain an injection of pethidine. These patients tend to be abusive when offered anything other than pethidine.
  10. **Munchausen syndrome**

## Investigations

### 1. Urinalysis:

- The stone often causes some bleeding into the renal tract and this may produce a positive result for blood on stick testing (a negative test does not exclude the diagnosis).
  - If microscopy shows pyuria, this suggests infection.
  - Check urine Ph: pH above 7 suggests urea splitting organisms such as Proteus whilst a pH below 5 suggests uric acid stones.
2. MSU for microscopy, culture and sensitivities (if patient febrile or +ve urinalysis for bacteria).
  3. Blood for renal function, electrolytes, calcium, phosphate and urate
  4. Encourage the patient to try to catch the stone for analysis. This may mean urinating through a tea strainer, filter paper such as a coffee filter or a gauze.

## 5. Imaging of the urinary tract :

A. Traditionally starts with a KUB x-ray. This is larger than the plain abdominal x-ray as it takes in both kidneys, ureters and bladder. Around 75% of stones are of calcium and so will be radio-opaque.

### B. Abd. USS

⇒ **False negative** (i.e., obstruction present, no hydronephrosis):

1. Acute onset of obstruction.
  2. In the presence of an intrarenal collecting system.
  3. Dehydration.
  4. misdiagnosis of dilatation of the calyces as renal cortical cysts.
- in acute ureteric colic, ultrasonography fails to detect hydronephrosis in up to 35 % of patients with proven acute obstruction on CT).

⇒ **False positive** (i.e., hydronephrosis, no obstruction):

1. Capacious extrarenal pelvis.
2. parapelvic cysts.
3. VUR.
4. high urine flow.

C. Helical CT is now regarded as the gold standard for the investigation of urinary stones. Current guidance is that the best technique is unenhanced helical CT and CT is now the first line investigation in some hospitals, in order to avoid accumulation of radiation which occurs if CT is performed only after an initial x-ray.

## Management

A. Medical assessment is advisable (Exclude other Dx.)

### B. Initial treatment

⇒ Relief of pain must be an early priority.

#### 1. **Intramuscular NSAID:**

- MOA (Mechanism of Action):
  - a. Less likely to cause nausea and vomiting.
  - b. Anti-inflammatory and Analgesia.
  - c. Decrease GFR & intrarenal pelvic pressure.
- Example:
  - a. IM ketorolac(60mg/2ml)
  - b. IM diclofenac(75mg/ 3 ml)

2. **Opioid** morphine OR pethidine or tramadol if NSAID is inadequate or contraindicated

3. **Antiemetic** may be required if there is severe nausea and vomiting, dehydration or an opioid is given. Avoid metoclopramide in young people in view of the risk of extrapyramidal side effects.

#### 4. Steroid:

- MOA: Decrease ureteric oedema around stone lead to: pain relieve and facilitates' stone passage.
- Dexamethasone amp (8 mg/ 2ml).

#### 5. If Intramuscular NSAID or Opioid inadequate:

- a. **IV acetaminophen: paracetamol vial 1g.**
- b. IV Nefopam amp infusion (20mg/2ml).

#### 6. IV fluid: G5%.

### C. Indications for hospital admission:

1. People who fail to respond to analgesia after 1 hour should be admitted to hospital.
2. An abrupt recurrence of severe pain
3. Retractable Pain (persisting for more than 24 hours not respond to oral medication)
4. Symptoms of systemic illness or infection; fever may suggest an infected obstructed kidney, which is a surgical emergency
5. Inability to take adequate fluids due to nausea and vomiting
6. Anuria
7. Known non-functioning kidney, Known solitary kidney.
8. Renal impairment.
9. Pregnancy
10. Poor social support
11. Inability to arrange early referral
12. Need for assessment.

### D. Conservative management: medical expulsive therapy (MET)

#### ⇒ Patients managed at home:

1. **Good hydration:** Patients Should drink a lot of fluids.
2. **Void urine into a container** to catch any identifiable calculus.
3. **Analgesia:**
  - a) **Paracetamol** is safe and effective for mild to moderate pain; codeine can be added if more pain relief is required.
4. **Oral NSAID:** diclofenac potassium 50mg BID.
5. **α-blocker** like Tamsulosin cap 0.4mg at night (relax ureter enhance ureteric stone expulsion).
6. Patients should ideally receive **an appointment** for radiology within 3 weeks of the onset of symptoms.
7. An **urgent urology outpatient appointment** should be arranged for if renal imaging shows a problem requiring intervention.



## E. Intervention options:

### 1. Emergency drainage:

- Achieved by placement of a nephrostomy catheter or ureteric stent.
- A JJ stent (called JJ stents because the top and bottom have a curled end to prevent migration of the stent) is sometimes used to relieve any urinary tract obstruction caused by the stone and to aid removal of the stone.

### ❖ Urgent intervention is required for:

1. Obstructed and infected upper urinary tract
2. Impending renal deterioration
3. Intractable pain or vomiting
4. Anuria
5. Obstruction of a solitary or transplanted kidney.

### 2. Elective:

1. ESWL (Extracorporeal shock wave lithotripsy).
2. Ureterscopy and ureterolithotripsy for ureteric stone.
3. Percutaneous nephrolithotomy (PCNL) is used for stones not suitable for ESWL (includes cystine stones, stones greater than 2 cm, and staghorn calculi).

## Complications of ureteric stone:

1. **Deterioration of renal function:** Complete blockage of the urinary flow from a kidney decreases GFR and, if it persists, may cause irreversible renal damage (after 3 weeks).
2. **Sepsis:** life threatening (Infection + obstruction).
3. **Ureteric stricture.**

## Prognosis

- ❖ Most symptomatic renal stones are small (less than 5 mm) pass spontaneously.
- ❖ Stones larger than 1 cm in diameter usually require intervention (urgent intervention is required if complete obstruction or infection is present).
- ❖ A stone that has not passed within 1–2 months is unlikely to pass spontaneously.

THANK YOU  
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