

Renal Colic

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Background

About renal colic

- *Many ureteric stones will pass spontaneously within 4 weeks of the onset of symptoms, but this is dependent on stone diameter:*
 - *< 4 mm – 90% will pass*
 - *4 to 6 mm – 50% will pass*
 - *> 6 mm – 10% will pass*
- *50% of patients with severe loin pain radiating to groin will not have a kidney stone visible on imaging.*
- *Haematuria is present in only 85% of patients with renal colic.*
- *80% of stones contain calcium.*
- *Stones containing calcium recur:*
 - *15% at 1 year*
 - *40% at 5 years, and*
 - *50% at 10 years.*

Red flags

- Severe renal or ureteric colic
- Ureteric stone in single or transplanted kidney
- Ureteric obstruction
- Infected kidney

Assessment

1. Take a history – the description of the pain helps distinguish renal colic from abdominal inflammatory processes and includes:
 - past renal stones.
 - loin to groin pain described as severe, sudden, and random.
 - peaks and troughs.
 - the patient continually moving, but unable to get comfortable (whereas patients with peritonitis lie still).
 - often associated with nausea, with or without vomiting.
2. Perform an examination:
 - Classically patients look uncomfortable, pale, and diaphoretic, but presentation varies.
 - Check loin tenderness.
 - Rule out **medically urgent differential diagnoses**.

Medically urgent differential diagnoses

- *Abdominal aortic aneurysm (AAA)*
 - *Testicular torsion*
 - *Pyelonephritis*
 - *Peritonitis, including appendicitis and diverticulitis*
 - *Gynaecological emergencies e.g., ectopic pregnancy*
- Take temperature.

3. Arrange investigations:
 - FBE – the white cell count is often mildly elevated (e.g., < 15) even when there is no infection – electrolytes, urea, creatinine and eGFR, serum calcium, serum uric acid.
 - Urine for microscopy and culture, dipstick, and pregnancy test. Haematuria is present in only 85% of patients with renal colic.
 - Non-contrast CT of kidney, ureter, bladder (KUB), and if ureteric stone confirmed, KUB X-ray.
 - Ultrasound – can be a useful examination in patients who cannot be X-rayed e.g., pregnant women.
 - If recurrent stones, arrange full metabolic work-up including:
 1. stone analysis
 2. 24 hour urine collection (volume, pH, calcium, urate, oxalate).

Management

Acute episode

1. Arrange [immediate urology referral or admission](#) if any **red flags**.

Red flags

- Severe renal or ureteric colic
 - Ureteric stone in single or transplanted kidney
 - Ureteric obstruction
 - Infected kidney
2. If [medically urgent differential diagnoses](#), arrange [emergency department assessment](#).
 3. Renal colic can usually be managed without hospital admission. See the patient again the following day to check symptoms, results, and discuss referral.
 4. Consider analgesia as required:
 - Regular paracetamol
 - Severe pain – **IV morphine** and **NSAIDs**

NSAIDs

Considerations:

- *Oral route is preferred and is as effective as parenteral or rectal routes.*
- *If not tolerating oral medications, consider rectal route.*
- *Use NSAIDs with caution in:*
 - *the elderly.*
 - *the presence of renal disease or peptic ulcer disease.*

Oral:

- *Ibuprofen 200 to 400 mg orally, 3 times a day, or*
- *Diclofenac 25 to 50 mg orally, 3 times a day, or*
- *Indomethacin 25 mg orally, 3 times a day.*

Rectal:

- *Indomethacin suppository 100 mg rectally twice daily. This is very effective if the patient is nauseated.*

IV Morphine

Considerations:

- *Titrated doses of IV morphine are often indicated to achieve rapid pain relief.*
- *Patients who receive IV morphine must be closely monitored for at least 2 hours, including a sedation score (e.g., Glasgow coma scale), respiratory rate, and oxygen saturation.*
- *Resuscitation facilities must be available.*
- *Most patients who require IV parenteral morphine in the community should be transferred to hospital by ambulance for further management.*

Doses:

- *Morphine 2.5 to 5.0 mg IV – titrate to effect with further incremental doses following assessment at 5 to 10 minute intervals.*
- *If elderly patients or cardiorespiratory compromise, consider an initial dose of 2.0 mg and incremental doses of 0.5 mg to 1.0 mg.*
- *If IV administration not possible, consider **subcutaneous morphine**.*
 - *Subcutaneous morphine*
 - *Morphine 2.5 to 10 mg SCI as a single dose.*
 - *Peak analgesia takes 30 minutes.*
 - *User lower dose range in elderly.*
 - *Monitor as IV morphine for at least 2 hours or until transfer to hospital by ambulance.*
 - *Include:*
 - *sedation score, e.g. Glasgow coma score*
 - *respiratory rate, and*
 - *oxygen saturation.*
 - *This route is inferior to IV as peak analgesia is delayed.*
 - *The patient must be closely monitored (as for IV morphine).*

Note: Intramuscular (IM) administration is not recommended.

- Less severe pain – [NSAIDs](#) or **oral opiates**

Oral opiates

- *Prescription choices:*
 - *Codeine 30 to 60 mg plus paracetamol up to 4 times a day.*
 - *Tramadol immediate release 50 to 100 mg up to 4 times a day.*
 - *Oxycodone immediate release 5 mg orally – if the first dose is tolerated but there is an inadequate response, a further 5 mg may be given after 30 minutes.*
 - *If failure to respond, consider morphine.*
 - *If pain is not controlled adequately with the above, refer directly to the [emergency department](#).*
5. Arrange [urgent urology referral](#) if:
- proven calculus in ureter.
 - symptomatic renal calculi.
 - asymptomatic renal calculi ≥ 6 mm.

6. Advise moderate fluid intake to avoid dehydration. Excessive fluid intake does not increase the likelihood of stone passage.
7. Strain urine and keep stone for analysis.
8. Tamsulosin may assist the passage of distal (lower third of ureter) ureteric calculi in patients who do not require immediate surgical intervention:
 - 400 micrograms daily for 4 weeks
 - Non-PBS script, cost at time of writing > \$35
9. If the patient cannot produce a stone that corresponds with the one seen on initial imaging within 4 weeks, arrange **follow-up imaging** and [routine urology referral](#).

Follow-up imaging

Demonstrate the passage of the stone and exclude the possibility that it is causing painless obstruction:

- *If stone is easily seen on original kidneys, ureters, and bladder (KUB) X-ray, only repeat KUB X-ray.*
 - *If stone is not seen on original KUB X-ray, but could be seen on original CT, request CT urinary tract (non contrast).*
10. Consider specialised urological interventions e.g:
 - lithotripsy (external shock wave)
 - percutaneous nephrolithotomy
 - endoscopic removal – ureteroscopy or pyeloscopy (either option may include laser for fragmentation)
 - cystoscopy and insertion ureteric stent, followed by delayed treatment of stone.

Prevention

Advise patient to:

- avoid dehydration by drinking 2 L of water a day. This is the single most important factor in reducing stone recurrence.
- reduce consumption of:
 - tea, coffee, or soft drinks, if drinking excessively.
 - dietary salt.

Recurrent stones

Arrange:

- [urology](#) or nephrology assessment and pre-appointment imaging.
- dietitian assessment – low sodium, high citrate, low animal protein.

Referral

Stone removal, stenting, or drainage may be required.

- Arrange [immediate urology referral or admission](#) if any [red flags](#).
- If [medically urgent differential diagnoses](#), arrange [emergency department assessment](#).
- Arrange [urgent urology referral](#) if:
 - proven calculus in ureter.
 - symptomatic renal calculi.
 - asymptomatic renal calculi ≥ 6 mm.
- For asymptomatic, incidental stones, arrange:
 - [routine urology referral](#) within 4 weeks.

- [follow-up imaging](#) – must be done within 24 hours of the review appointment to exclude ongoing painless obstruction.
- If recurrent stones, arrange:
 - [urology](#) or nephrology assessment and pre-appointment imaging.
 - dietitian assessment – low sodium, high citrate, low animal protein.

Information

For health professionals

Australian Family Physician – [Urolithiasis: Ten Things Every General Practitioner Should Know](#)

For patients

Better Health Channel – [Kidney Stones](#)

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