

## **Which patients with renal colic should be referred?**

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Dr Anil Xavier  
MB BS MRCP  
Specialist Registrar in Nephrology

Professor Alexander P Maxwell  
MD PhD FRCP  
Consultant Nephrologist

Regional Nephrology Unit, Belfast City Hospital, Belfast



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# Which patients with renal colic should be referred?

## AUTHORS

**Dr Anil Xavier**

MB BS MRCP  
Specialist Registrar in  
Nephrology

**Professor  
Alexander P  
Maxwell**

MD PhD FRCP  
Consultant Nephrologist

Regional Nephrology  
Unit, Belfast City Hospital,  
Belfast



A massive staghorn calculus removed during nephrectomy for chronic pyelonephritis in a poorly functioning kidney

## How does renal colic present?



**RENAL STONE DISEASE IS A COMMON, AND POTENTIALLY RECURRENT, CONDITION THAT AFFECTS**

5-15% of the population worldwide.<sup>1</sup> Symptomatic renal stone disease is at least twice as common in men as women.<sup>2</sup> The incidence has risen over two decades and 1-2 people per thousand present with an acute episode of pain caused by renal stones each year.<sup>2,3</sup> Annually there are more than 12,000 renal stone-related hospital admissions<sup>1</sup> and considerably more GP consultations for management of renal colic. Data from NHS Direct

## How should patients be assessed?

showed that 80% of patients with renal colic symptoms were advised to contact their GP as the first port of call.<sup>4</sup> The challenge for GPs is to identify which cases may be treated safely at home and which need immediate referral to hospital.

### PRESENTATION

Renal colic is classically sudden in onset, unilateral, and radiates from loin to groin (see table 1, right). The site of pain may suggest the position of obstruction, with renal pelvic or upper ureteric stones usually causing more flank pain and tenderness while lower

## How should patients be followed up?

ureteric stones cause pain radiating towards the ipsilateral testicle or labia. »

### Table 1

#### Key features in diagnosing renal colic

- Sudden onset, severe, unilateral loin to groin pain
- Associated nausea and vomiting
- Haematuria (visible or dipstick positive)
- Irritative lower urinary symptoms (dysuria and frequency)
- Restless patient

**FIGURE 1**  
A large cystine stone removed from an obstructed ureter. Specialist metabolic screening identified cystinuria as the cause of renal stone formation



The pain waxes and wanes, depending on the movement of the stone in the ureter, which causes ureteric spasm that can last from a few minutes to hours. Renal colic pain is usually severe and disabling. Indeed, women who have previously experienced both labour pains and renal colic usually state that kidney stone-related pain is more severe than the pain associated with childbirth.

Other common symptoms associated with renal colic include nausea and vomiting, haematuria and irritative lower urinary tract symptoms such as dysuria and frequency. Studies have shown that up to 90% of patients with ureteric lithiasis can have haematuria on presentation.<sup>5</sup> Another important aid to diagnosis is that usually patients with renal colic are very restless compared with patients with peritonitis who tend to lie still.

Fever accompanying renal colic symptoms is suggestive of additional complications such as urinary tract infection or pyonephrosis. A febrile patient with renal colic requires immediate hospital admission.

Symptoms suggestive of renal colic along with a positive dipstick for haematuria have a reported sensitivity of 84% and specificity of 99%<sup>6</sup> but it is important to consider other differential diagnoses for this clinical presentation including bowel pathologies (appendicitis,

diverticulitis, perforation), a major vascular event (leaking abdominal aortic aneurysm) or a gynaecological emergency (ectopic pregnancy).

### PAIN CONTROL

Once a preliminary diagnosis of renal colic has been made, speedy administration of analgesia becomes a priority with the options being NSAIDs and/or opioids depending on suitability (see table 2, below). If there is no improvement in symptoms within an hour with adequate analgesia consider urgent referral to hospital.

### NSAIDs

An NSAID is preferred over an opiate drug as an initial analgesic choice as the NSAID can help reduce smooth muscle tone and thus ureteric spasm. Diclofenac has the best evidence base for this class of analgesic. It is most effective given as an intramuscular injection (usual adult dose 75 mg) and the injection can be repeated once more at 30 minutes. Diclofenac can also be given rectally or orally (75 to 150 mg daily in divided doses) when renal colic pain is less severe and for ongoing analgesia. Other drugs in this group that have been tried include ketorolac and indometacin.

NSAIDs should be avoided in patients with known contraindications such as a history of hypersensitivity to aspirin or other NSAIDs (including those in whom attacks of asthma, angioedema or urticaria have been precipitated by an NSAID) or persons with a coagulation defect. It is important to avoid repeated NSAID dosing in those with chronic kidney disease (eGFR <60 mL/min/1.73m<sup>2</sup>) or a solitary kidney. An NSAID should be used with caution in patients who are dehydrated or who have been prescribed drugs that block the renin-angiotensin axis such as ACE inhibitors (ACEi) or angiotensin receptor blockers (ARB). The risk of acute kidney injury is increased when an NSAID and ACEi or ARB are co-prescribed.

### Opiates

Opiates are certainly as effective as NSAIDs but are more likely to be associated with nausea.<sup>7</sup> Opiates are used primarily in those who have contraindications to NSAIDs but occasionally may need to be given in conjunction with NSAIDs to provide adequate analgesia.

Diamorphine or morphine are the most commonly used opiates for renal colic either intramuscularly or subcutaneously at doses varying from 2.5 mg to 10 mg, depending on age and response. The other commonly used, and effective, agent in this group is pethidine. It is important to administer an antiemetic as well, given that nausea is a frequent side effect of opiates.

If pain is less severe or NSAIDs are contraindicated, paracetamol in combination with a weaker opioid (codeine or tramadol) can be prescribed for ongoing pain relief.

Patients should also be advised to drink enough fluids to remain hydrated and pass dilute (colourless) urine.

### PRIMARY CARE

Patients with undiagnosed severe abdominal pain require urgent clinical assessment. A careful history and clinical examination including: temperature, pulse, blood pressure, abdominal findings and urine dipstick analysis (if possible) will help to exclude other emergencies such as peritonitis or septic shock.

If there is still diagnostic uncertainty it is safer to arrange immediate assessment in hospital.

About 90% of stones will pass spontaneously<sup>8</sup> and thus it is often appropriate to manage renal colic at home particularly if the patient has experienced several episodes before and can recognise when to call for reassessment if the pain is not settling or returns suddenly.

The ideal patients who may be managed in the community are those:

- less than 60 years of age
- with adequate social support
- contactable by telephone for clinical review
- willing to stay at home.

And, most importantly:

- have significant improvement or resolution in symptoms within an hour of being given appropriate analgesia.<sup>9</sup>

These patients can be provided with adequate oral or rectal analgesia for ongoing relief but should be advised to call again as an emergency if: the renal colic pain worsens or returns

**Table 2**

#### Key features of analgesia

|         |                                                                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NSAIDs  | <b>Acute relief:</b> diclofenac 75 mg IM. One further dose in 30 minutes if required<br><b>Ongoing pain relief:</b> diclofenac 75 mg - 150 mg/24 hr PO/PR for 3-4 days |
| Opioids | <b>Acute relief:</b> morphine/diamorphine 2.5 - 10 mg IM/SC<br><b>Ongoing pain relief:</b> paracetamol +/- codeine or paracetamol +/- tramadol for 3-4 days            |

# key points

## SELECTED BY

Dr Peter Saul

GP, Wrexham and associate GP Dean for North Wales

### Renal stone disease affects 5-15% of the population

worldwide. Around 1-2 people per thousand present with an acute episode of pain caused by renal stones each year. Renal colic is classically sudden in onset, unilateral, and radiates from loin to groin. The site of pain may suggest the position of obstruction, with renal pelvic or upper ureteric stones usually causing more flank pain and tenderness while lower ureteric stones cause pain radiating towards the ipsilateral testicle or labia. Other common symptoms include nausea and vomiting, haematuria and irritative LUTS. Fever accompanying renal colic symptoms is suggestive of additional complications such as UTI or pyelonephrosis. A febrile patient with renal colic requires immediate hospital admission.

### Symptoms suggestive of renal colic along with a

positive dipstick for haematuria have a reported sensitivity of 84% and specificity of 99% but it is important to consider other differential diagnoses.

### An NSAID is preferred over an opiate drug as an initial

analgesic choice as the NSAID can help reduce smooth muscle tone and thus ureteric spasm. Diclofenac has the best evidence base for this class of analgesic. It is most effective as an intramuscular injection (usual adult dose 75 mg) and the injection can be repeated once more at 30 minutes. It is important not to give repeated doses of NSAIDs in those with chronic kidney disease or a solitary kidney. NSAIDs should be used with caution in patients who are dehydrated or those prescribed drugs that block the renin-angiotensin axis. Opiates are as effective as NSAIDs but are more likely to be associated with nausea.

### Patients with undiagnosed severe abdominal pain require

urgent assessment. A careful history and clinical examination including: temperature, pulse, BP, abdominal findings and urine dipstick analysis (if possible) will help to exclude other emergencies such as peritonitis or septic shock. About 90% of stones will pass spontaneously and thus it is often appropriate to manage renal colic at home. Patients with signs of peritonitis, systemic infection, septic shock as well as those whose diagnosis is unclear should be referred urgently to hospital for assessment. Patients who are systemically unwell with renal stones are more likely to have an infected and obstructed urinary tract system that needs urgent imaging and possible drainage.

### All patients who are managed at home should have

renal tract imaging within a week by fast track referral to radiology or as an urgent urology outpatient referral as per local guidelines to rule out an obstructed urinary system. Radiological investigation usually includes a plain X-ray (KUB) followed by an IVU or non-contrast helical CT.

### Patients with recurrent stones should be advised to

maintain a copious fluid intake (>2 L/day) to reduce the concentration of the urine. A reduction in salt intake (ideally <2g/day) and animal protein in the diet can help to reduce stone formation.

## Table 3

### Patients who should be considered for urgent referral to hospital

- Signs of fever, peritonitis or septic shock
- Diagnostic uncertainty
- Pain not relieved by appropriate analgesia
- Delayed menstruation (? ectopic pregnancy)
- Chronic kidney disease or solitary kidney
- Anuria
- Age over 60 (? leaking abdominal aortic aneurysm)

suddenly; they have recurrent vomiting or they develop a fever.

### URGENT REFERRAL

Patients with signs of peritonitis, systemic infection, septic shock as well as those whose diagnosis is unclear should be referred urgently to hospital for assessment. Patients who are systemically unwell with renal stones are more likely to have an infected and obstructed urinary tract system that needs urgent imaging and possible drainage. Patients who are at risk of sudden deterioration or who may need specialist input (see table 3, above) should also be considered for urgent referral to hospital.

### FOLLOW UP

All patients who are managed at home should have renal tract imaging within a week by fast track referral to radiology or as an urgent urology outpatient referral, as per local guidelines, to rule out an obstructed urinary system. Radiological investigation usually includes a plain X-ray (KUB) followed by an intravenous urogram (IVU) or non-contrast helical computerised tomography (CT).<sup>10</sup>

Smaller stones (<5 mm diameter) will usually pass spontaneously but larger stones will often require surgical management by a urologist. Techniques employed include extracorporeal shock wave lithotripsy, percutaneous nephrolithotomy, ureteroscopy or open surgery.

Further screening is recommended to identify risks for recurrent stone formation e.g. hypercalcaemia, metabolic acidosis or where stones have formed in the presence of urinary tract infection. Further evaluation is also recommended for children with renal stones or young age of onset of stone formation as a metabolic

problem is more likely to be present.

It is worthwhile identifying those patients who have non-calcium containing stones (urate or cystine), see figure 1, opposite, as specialist management can reduce recurrence.<sup>11</sup>

Patients with recurrent stones should be advised to maintain a copious fluid intake (>2 L/day) to reduce the concentration of the urine. A reduction in salt intake (ideally <2g/day) and animal protein in the diet (ideally 0.8 - 1.0g/kg/day)<sup>12</sup> can help to reduce stone formation. A substantial decrease in dietary salt intake can reduce urinary calcium excretion and this measure coupled with increased fluid intake helps to prevent recurrence of calcium-containing renal calculi.

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### Useful information

NHS Clinical Knowledge Summaries: Renal colic - acute management  
[www.cks.nhs.uk/renal\\_colic\\_acute](http://www.cks.nhs.uk/renal_colic_acute)

The Edinburgh Renal Unit website provides information for patients and clinicians on kidney stones  
[www.edren.org](http://www.edren.org)

British Association of Urological Surgeons guidelines for the acute management of first presentation of renal/ureteric lithiasis  
[www.baus.org.uk](http://www.baus.org.uk)