

## Loin pain

Loin pain commonly originates from the kidney. Renal calculi are common and cause severe pain. However, other sources of pain need to be considered.

## Epidemiology

This will depend on the particular cause of the loin pain. Epidemiological factors worth bearing in mind are:

- [Renal stones](#) are relatively common and more common with a positive family history.
- First presentation of renal stones in the elderly or in children is uncommon (but should be considered).
- Renal stones are more prevalent in men than in women and there is racial variation<sup>[1]</sup>.
- [Pyelonephritis](#) and urinary infections are more common in women.
- [Abdominal aortic aneurysms](#) are common in elderly patients with risk factors.
- Back pain is very common in all age groups.

## Assessment of loin pain

### History

- Establish when the loin pain started.
- Ask whether the onset was sudden or gradual.
- Establish whether loin pain is continuous or intermittent.

- Ask the patient to describe the nature of the loin pain (for example, stabbing, burning, gripping). Note the body language and use of hands.
- Ask whether there is any nausea or vomiting.
- Ask whether there are aggravating or relieving factors and what effect movement and deep inspiration have.
- Ask whether there is any radiation of the pain.
- Establish whether there any urinary symptoms. Ask whether the urine looks normal. (Men, much more than women, notice their urine.)
- Establish whether there is a history of pyrexia, or even rigors.
- Ask whether the patient has had similar pain before.
- Always take a past medical, medication and brief family history.
- Ask about risk factors for those causes in the differential diagnosis (see below) where appropriate.

## Examination

This may be adapted according to the history but should give particular consideration to:

- General appearance and observations:
  - Assess pyrexia, dyspnoea, shock.
  - Note whether the patient lies still (acute abdomen) or writhes around (colic).
  - Note temperature; assess the pulse (rate and quality, etc) and blood pressure.
- Respiratory system examination (see the separate [Respiratory System History and Examination](#) article).
- Abdominal examination (see the separate [Abdominal Examination](#) article).
- Back examination (see the separate [Examination of the Spine](#) article).

# Loin pain differential diagnosis

History and examination should have narrowed the differential diagnosis considerably. See also the separate [Right Upper Quadrant Pain](#) and [Left Upper Quadrant Pain](#) articles.

## Renal causes

- **Renal colic:**
  - Loin pain is sudden in onset, and is very severe - the patient is often writhing around.
  - Pain may radiate to the groin and anteriorly.
  - Often there is tenderness over the renal angle.
  - Renal colic is rather more constant and persistent than biliary colic.
  - There is gross or microscopic haematuria in 85% (in the other 15%, *absence of gross or microscopic haematuria does not exclude renal colic*).
  - A stone that is moving may be more painful than one that is static.
- **Pyelonephritis:**
  - The patient with pyelonephritis is ill, often with a very high temperature and even rigors.
  - There may be symptoms of urinary tract infection and often there is vomiting.
  - Pain is a dull ache.
  - Expect leukocytosis and pyuria. The presence of pyuria, fever, leukocytosis, or bacteriuria suggests the possibility of a urinary infection and the potential for an infected obstructed renal unit or pyonephrosis. Such a condition is potentially life-threatening and should be treated as a surgical emergency.

- **Blood clots** can cause sudden ureteric obstruction and colic:
  - Causes include renal biopsy, or medical problems such as bleeding disorders, tumours of the kidney or renal pelvis, haemophilia, sickle cell disease, or glomerulonephritis.
  - An uncommon cause is the idiopathic loin pain haematuria syndrome in which there is loin pain, haematuria of varying degree and no apparent cause<sup>[2]</sup>.
- **Papillary necrosis:**
  - Acute obstruction of the ureter from the sloughed papilla occurs in papillary necrosis.
  - Women are affected more often than men.
  - Causes include analgesic abuse, cirrhosis, recurrent pyelonephritis, urinary tract obstruction, tuberculosis, sickle cell disease, renal transplant rejection and diabetes.
- **Kidney tumours:**
  - The loin pain is gradual in onset and there may be painless haematuria and possibly a mass.
  - The most common forms are clear cell carcinoma in adults and [Wilms' tumour](#) in children.
- **Pelvi-ureteric junction (PUJ) obstruction:**
  - It usually follows drinking large amounts of fluid, as the diuresis causes distension of the renal pelvis and colic.

- **Renal infarction:**
  - This is frequently misdiagnosed, initially as acute renal colic, pyelonephritis, or acute abdomen<sup>[3]</sup>.
  - Acute renal infarction affects both kidneys and both sexes equally.
  - The average age of affected patients is about 65.
  - Risk factors include age and risks for thromboembolism such as atrial fibrillation.
  - There is unilateral flank pain and haematuria.
  - Other common symptoms include fever, nausea and vomiting. LDH and WBC are usually elevated.
  - Diagnosis is usually made by CT scan.
  - Treatment is with intravenous heparin and/or intra-arterial thrombolysis.

### Other local loin pain causes

- **Dissecting abdominal aortic aneurysm** may cause loin pain similar to renal colic. The aneurysm can be adjacent to the ureter and cause haematuria from irritation or trauma. Consider when an older patient presents with apparent renal colic for the first time.
- **Herpes zoster** causes a burning loin pain in a band corresponding to a dermatome. The pain may precede the rash. When the rash appears, diagnosis is easy. The skin is tender.
- **Muscular pain** produces an aching discomfort that is exacerbated by lifting and bending. The affected area is likely to be tender. There may be a history of injury. Examination of the back should show the cause.

- **Injury:**
  - Injury to the lower thoracic or upper lumbar nerve roots will cause radiculitis. Radiculitis should be suspected in patients with normal findings on urinalysis and normal findings on imaging studies of the urinary system.
  - Injury to the 10th, 11th, or 12th ribs has the distribution of renal colic but is usually sharp or stabbing. The pain is often acute and can radiate anteriorly and inferiorly, just like renal colic. Movement exacerbates the pain.
  - Fracture of a transverse process in the thoracic or lumbar vertebrae can also produce this pain.
- **Retroperitoneal fibrosis** produces pain that is dull and insidious in onset but becomes progressively more severe. There is fibrous overgrowth of the retroperitoneal organs from the midline. When it involves the ureters it causes hydronephrosis and even renal failure. It is usually idiopathic but it has been associated with the use of methysergide for migraine and some malignancies. Males are affected twice as often as females, and patients are usually aged 40–60 years. Pain is usually located first in the lower flank and abdominal regions. Testicular pain and periumbilical pain develop later.

### **Pulmonary causes**

A sharp stabbing pain can originate from the lung or pleura. The pain is typically pleuritic. Possible causes include tuberculosis, pneumonia and pulmonary embolism.

### **Less common causes of loin pain**

- Crohn's disease.
- Diverticulitis.
- Appendicitis.
- Myocardial infarction.
- [Renal vein thrombosis](#).
- Glomerulonephritis.

- Berger's disease.
- Acute nephritis.
- Polycystic kidney disease.
- Cholecystitis.
- Adrenal tumours (and haemorrhage).
- Colon cancer.
- Splenic infarction.

Beware that patients can present with a fictitious story suggestive of renal colic as a ruse to obtain an injection of pethidine. The patient will usually be insistent that only pethidine works and will be very dissatisfied if given intramuscular diclofenac instead.

## Investigations

### Urine examination

- Microscopy may show haematuria with stones, pyuria with infection and casts in disease of the kidneys. Gross or microscopic haematuria is present in about 85% of renal colic, so 15% will have neither microscopic nor macroscopic haematuria.
- If urine pH <6.0, suspect a uric acid stone. If pH >8.0, infection with a urea-splitting organism such as *Proteus* spp., *Pseudomonas* spp. or *Klebsiella* spp. is likely.
- Urinary crystals of calcium oxalate, uric acid, or cystine may sometimes be found on urinalysis.
- Mild leukocytosis often occurs in renal colic but WBC >15,000/cu mm suggests infection, even if afebrile.

### Imaging<sup>[4]</sup>

- For most adults, low-dose non-contrast CT (computerised tomography) should be offered first-line. If a woman is pregnant, offer ultrasound instead of CT.

- For children and young people, offer ultrasound first-line. Low-dose non-contrast CT may be considered if there is still uncertainty about the diagnosis after an ultrasound scan.
- Helical CT can be very useful<sup>[5]</sup>. Ureteric stones can be difficult to demonstrate by ultrasound; helical CT may be the investigation of choice<sup>[6]</sup>.
- Intravenous pyelogram (IVP) is no longer considered a first-line option for the initial diagnosis of renal or ureteric colic.
- Retrograde pyelogram accurately shows the anatomy of the ureter and renal pelvis, as well as making a definitive diagnosis of any ureteric calculus. Any stone, even if radiolucent, becomes clearly visible, as well as any kinks in the ureter, strictures, or tortuosities that may be missed on other studies. Retrograde pyelograms can be safely performed in patients allergic to intravenous contrast media and in patients with renal failure because no contrast medium ever enters the bloodstream<sup>[7]</sup>.

## Loin pain management

This depends upon the working diagnosis.

Oral fluids should be encouraged to facilitate the passage of stones and to reduce any risk of permanent damage to renal function. Many stones in the renal tract will pass spontaneously but large ones may require removal. Of ureteral stones, 95% of those 2–4 mm in diameter pass spontaneously but passage may take as long as 40 days. Intervention may be required in 50% of ureteral calculi greater than 5 mm. Those larger than 7 mm are unlikely to pass spontaneously. Open surgery to remove stones is becoming less common as other techniques are employed<sup>[8]</sup>.

Obstruction with infection is often treated initially by percutaneous nephrostomy.

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## Further reading

- [Laparoscopic nephrolithotomy and pyelolithotomy](#); NICE Interventional Procedure Guidance, March 2007



- [Grech AK](#); Loin Pain Haematuria Syndrome – A Narrative Review of Pain Management Strategies. Korean J Pain. 2016 Apr;29(2):78–85. doi: 10.3344/kjp.2016.29.2.78. Epub 2016 Apr 1.

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