

# 'Rule Out Appendicitis'

## Mimics Not To Miss!

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### Background

Acute appendicitis is one of the commonest acute surgical conditions worldwide; 50 000 appendicectomies are performed annually in the UK. Half of cases present with the classic history of fever with central abdominal pain migrating to the right iliac fossa (RIF). The remainder have a combination of non-specific features. The embryological development of the appendix leads to its variable anatomical position, contributing to atypical presentations of appendicitis, thus clouding clinical assessment.

In cases of diagnostic uncertainty, imaging is increasingly performed, which can confirm a diagnosis of appendicitis or one of its many mimics.

### Ureteric calculi

Although often characterized as loin to groin pain, ureteric stones are a common cause of right sided abdominal pain, often but not always associated with haematuria.

CT images show an obliterating right ureteric calculus with hydronephrosis.

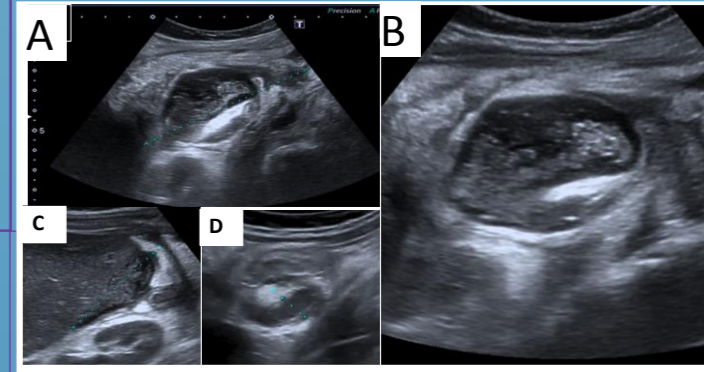


### Paediatric appendix mass

Ultrasound in a child with RIF pain (A, B) demonstrates a mixed echogenicity inflammatory RIF appendix mass, rather than classic uncomplicated appendicitis. The hypochoic centre suggests partial liquefaction and abscess formation.

The adjacent fat is inflamed. Image C shows a sub hepatic collection.

The presence of an appendix mass in children has significant implications for management in our centre, patients receive initial conservative treatment with IV antibiotics and follow-up imaging, rather than surgery. Post treatment ultrasound (D) shows resolution of the mass, but the appendix remains dilated.



### Appendix tumours

Appendix tumours can both mimic and cause appendicitis and occur in 1% of all appendectomies. Carcinoid is the most common appendix tumour, being relatively small and asymptomatic.

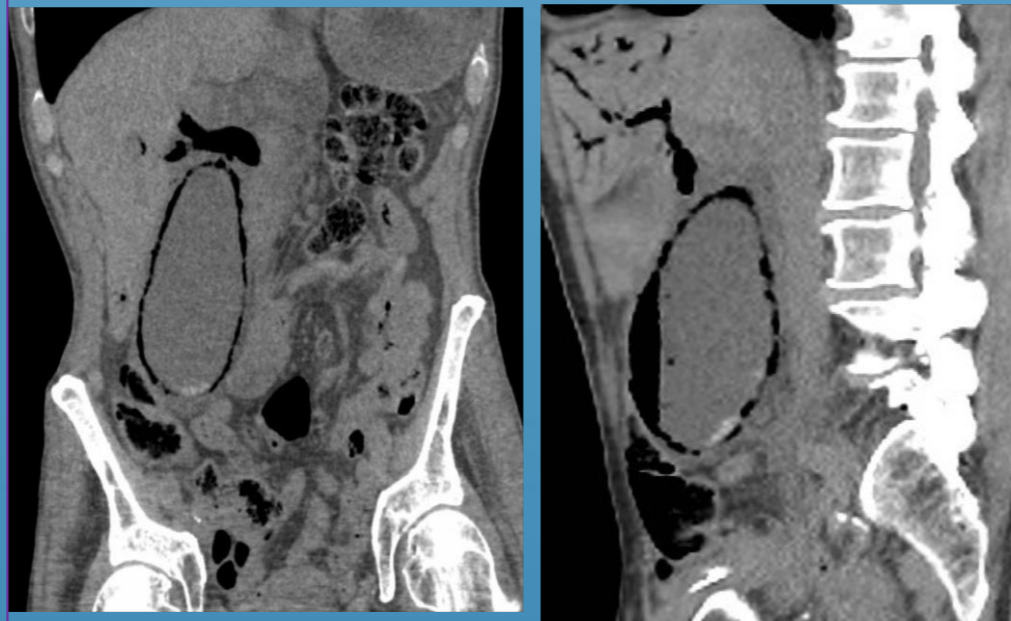
Axial CT demonstrates a cystic mass with curvilinear calcification at the periphery of its posterior wall with clusters of internal calcification. Localised ascites indicates previous rupture. Mucinous cystadenocarcinoma.



### Emphysematous cholecystitis

Gallbladder wall necrosis causing mural or luminal gas formation leading to a high risk of perforation, often associated with gallbladder calculi and diabetes.

CT images (below) in a male patient presenting with RIF pain. Appendicitis was suspected. Due to renal impairment, an uncontrasted CT was performed. The appendix was normal.



The gallbladder is distended and inflamed, with gas seen in its wall. Dependent high density foci represent small calculi. Branching gas in the liver is in continuity with the biliary tree and should not be mistaken for portal venous gas.

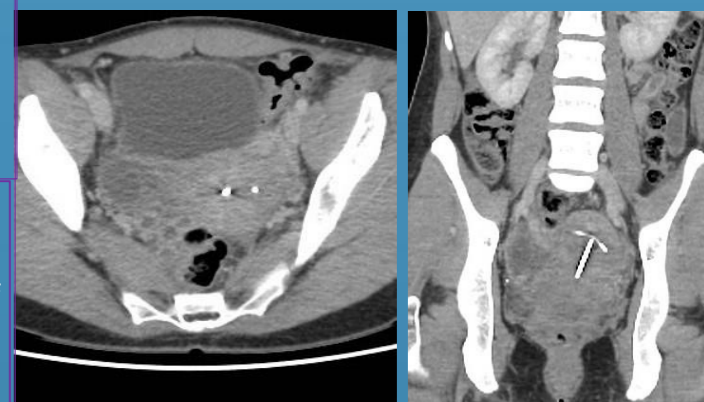
Histopathological analysis following cholecystectomy showed small gallstones, acute inflammation, serosal congestion and transmural necrosis, indicating an acute necrotising cholecystitis.

### Tubo-ovarian abscess

Tubo-ovarian abscess is a late complication of pelvic inflammatory disease and can lead to life-threatening sepsis.

Ultrasound can be limited by gas content. CT and MRI are helpful for further assessment.

CT images demonstrate a complex multiloculated inflammatory collection in the right adnexa, with adjacent free fluid, in keeping with tubo-ovarian micro abscesses. There is an association with IUCDs, which in this case was subsequently removed.

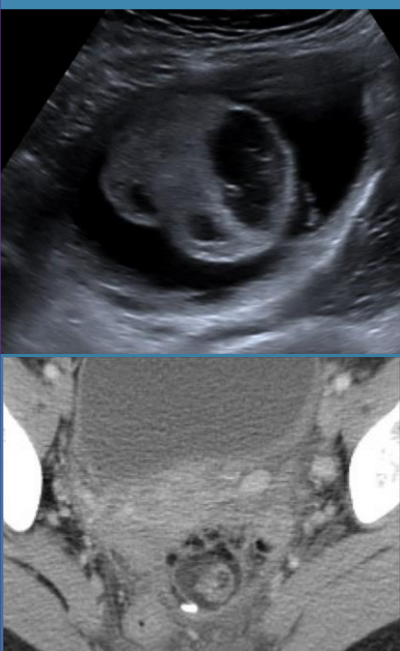


### Torted ovarian cyst

A young female patient presented with sudden onset RIF pain. The differential diagnoses included appendicitis, torted ovarian cyst, malignancy or ectopic pregnancy. A pregnancy test was negative. US showed an enlarged right ovary measuring 9cm with solid and cystic components. This was resected.

CT in another patient shows a pelvic lesion containing fat, soft tissue and calcification. Adjacent hyperdense free fluid indicates haemorrhage.

Both cases were histologically proven torted ovarian dermoid cysts.



### Purpose

Radiologists need to be aware of the many mimics of appendicitis, particularly when the appendix is normal on imaging. We have showcased a few clinically significant mimics of appendicitis with the aim to increase confidence in image interpretation.

These cases highlight the crucial role of imaging in identifying a wide range of alternative causes for these clinical symptoms, and the importance of satisfaction of search.

### Meckel's diverticulum

Meckel's diverticulum is an outpouching of the lower part of the small intestine. A nuclear medicine scan is often used to ultimately diagnose this condition.



Coronal CT demonstrated inflammatory fat stranding associated with a Meckel's diverticulum, in keeping with diverticulitis.

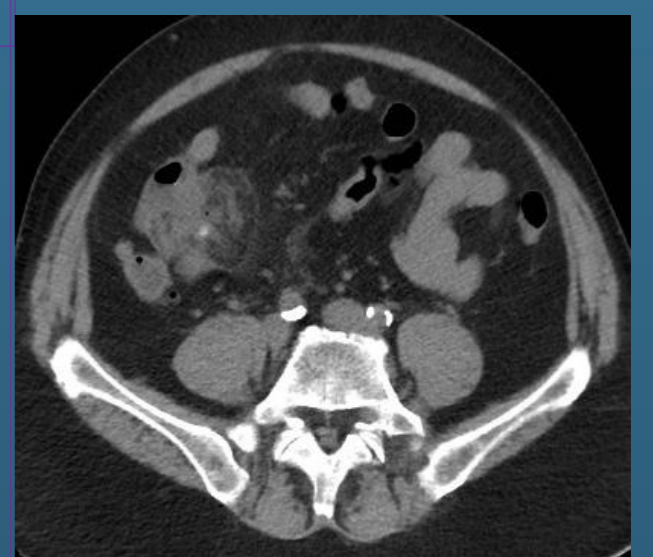
### Diverticular disease

Diverticular disease is characterised by small out-pouches of bowel (diverticula) which develop in the lining of the intestine. Diverticulitis of the right hemicolon, can mimic appendicitis.

CT shows diverticula with segmental bowel wall thickening and inflammatory fat stranding in keeping with acute diverticulitis.



More rarely, diverticular can involve the small bowel, as in this case of terminal ileal diverticulitis.



### Epiploic appendagitis

Epiploic appendagitis is inflammation of an appendix epiploica - peritoneal fat-containing saccular projections along the surface of the colon and rectum, which are supplied by nutrient arteries.

It is important to recognise this self-limiting condition to avoid unnecessary further investigation or surgery, which often causes severe pain.

CT images show characteristic focal rounded inflammation of fat with a central vessel. There may be inflammation of the associated colonic wall, mimicking a lesion.



### Cause of migrating pain

Appendicitis begins as generalised abdominal pain due to the vague localisation of intestinal nerves.

As the appendix becomes more inflamed, it irritates the peritoneum, which has a greater ability to localise pain.

### Teaching Points

- Interrogate every scan with 'Right iliac fossa pain? Appendicitis' for potential mimics!
- Think of gastrointestinal, genitourinary, gynaecological and other causes!
- Always look for the appendix on imaging, including non-contrast CT – even if the history is non-specific!
- Be aware of appendiceal masses in children and highlight this in your report!

#### References