Right iliac fossa pain

Right iliac fossa (RIF) pain is a common presentation and the underlying cause can be difficult to ascertain. The casualty officer or GP may be puzzled as to which speciality to refer such patients, being torn between the surgeon, the gynaecologist, the urologist or even the medical team on-call.

History

The site, onset, character, duration, radiation, aggravating and relieving factors all provide important pointers to the diagnosis. Associated symptoms including change in bowel habit, vomiting, anorexia, and urological and gynaecological symptoms, as well as a detailed past surgical and drug history is vital.

Examination

Dehydration, pallor, jaundice, anaemia, lymphadenopathy, foetor and pyrexia are some of the important signs. A tachycardia and hypotension may indicate shock. Examination of the cardiovascular system may reveal an arrhythmia, which could be responsible for mesenteric emboli. The chest is examined as abdominal pain can occur secondary to respiratory tract infection.

The patient is exposed from the nipples to mid-thigh and inspected for abdominal masses, scars, skin changes, distension, abnormal pulsation and asymmetry. Inspection of the abdomen while asking the patient to cough may elicit hernias or reveal signs of peritoneal inflammation. Tenderness (pain on palpation), guarding (involuntary abdominal wall muscle contraction) and rebound tenderness (where the patient experiences pain when pressure is released from the abdomen) are indicative of localized peritonitis. If there is unequivocal guarding it is wrong to attempt to elicit rebound tenderness as it adds nothing to the diagnosis or decision-making processes and is extremely painful.

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Rigidity is constant contraction of muscles of the abdominal wall implying generalized peritonitis (perforated viscus).

Auscultation is used to determine the nature of bowel sounds, which can indicate bowel obstruction (increased) or generalized peritonitis (absent). The examination is not complete without exploration of the inguinal areas looking for hernias and lymph nodes. In males the genitalia are also examined. A per rectum (PR) examination is essential but a vaginal examination is only performed if thought necessary.

The symptoms and signs can vary enormously depending upon the stage of presentation and on the patient's age, pain threshold, build, co-morbidity and medication, including steroids and chemotherapy.

Differential diagnosis

The RIF is one of nine areas that the abdomen is divided into (*Figure 1*). The causes of RIF pain are shown in *Tables 1* and *2*. As acute appendicitis is the most common abdominal emergency presenting with RIF pain this will be discussed in more detail.

Acute appendicitis

Incidence

Appendicectomy is the commonest general surgical operative emergency. The incidence is up to 1.5/1000 and 1.9/1000 in males and females respectively. It can occur at any age but is less common in the very young and in the elderly. In these patients it can sometimes prove very difficult to diagnose.

Aetiology

The aetiology of appendicitis remains uncertain, although a number of theories have been proposed. These include abnormalities in the diet, genetic factors, infectious agents and obstruction of the appendix lumen.

Pathology

During appendicitis the wall becomes inflamed and the lumen fills with pus, causing oedema and venous congestion. This may impair arterial inflow leading to thrombosis and gangrene. The devitalized wall is then colonized by organisms from the lumen, causing it to liquefy and perforate.

Clinical features

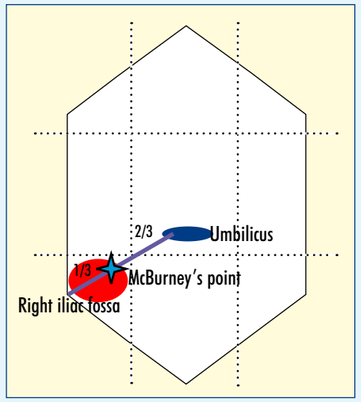
History

Only 50% of patients with acute appendicitis give a typical history. Classically, it presents initially with poorly localized, colicky central abdominal pain. As the inflammatory process continues over the next 12–24 hours, the pain becomes constant and shifts to the RIF. Patients often have increased pain on movement (peritonism) and have anorexia. Nausea, vomiting and change of bowel habit are also common.

Examination

Patients are usually mildly pyrexial. A high temperature (above 39°C) is unusual in acute appendicitis and may suggest a systemic viral illness or an appendix abscess. A dry tongue and an associated foetor are often present. Signs of peritoneal inflammation in the RIF can be absent in the early stages of the illness. In children it can be difficult to elicit tenderness, as they are not usually cooperative. This can be overcome by distracting the child's attention while palpating the abdomen or by asking the child to hop on the right leg. If this can be achieved, there is unlikely to be any significant peritoneal inflammation. The site of tenderness, which can sometimes be pointed to with a single finger, is classically described as McBurney's point (one third of the way between the anterior superior iliac spine and the umbilicus) (*Figure 1*). Palpation in the left iliac fossa causing pain on the right is referred to as crossed tenderness or Rovsing's sign. Guarding is often present. PR examination can be normal, but this is not routinely performed in children.

Figure 1. Diagram of the abdomen divided into nine areas, demonstrating McBurney's point (one third of the way along a line extending from the anterior superior iliac spine to the umbilicus).



The position of the appendix is very variable. This can alter its presentation. It most commonly lies in the retrocaecal position. If the appendix lies close to the psoas muscle the patient tends to lie with his/her hip flexed and hyperextension of the hip increases the abdominal pain (psoas stretch sign). It is not unusual for the appendix to be sitting high up in the right upper quadrant, mimicking acute cholecystitis or even acute pyelonephritis. This is more common in pregnancy where the caecum can become pushed up. Appendicitis can be extremely difficult to diagnose in pregnancy.

Table 1. Surgical causes of right iliac fossa pain

More common in adults	Appendicitis
	Appendix abscess
	Non-specific pain
	Inflammation of the ileum (Yersinia pseudotuberculosis)
	Carcinoid
	Inflammatory bowel disease
	Acute cholecystitis or ascending cholangitis
	Inguinal or femoral hernia strangulation or incarceration
	Ischaemic bowel
	Intestinal obstruction
	Torsion of the greater omentum
	Adhesions
	Pancreatitis
	Trauma or haematoma
	Peptic ulcer – perforation
	Gastroenteritis
	Lymphoma
	Human immunodeficiency virus
	Foreign body
More common in elderly	Caecal tumour
	Caecal perforation
	Acute diverticular disease – acute inflammation, abscess, haemorrhage, perforation, large bowel obstruction
	Caecal/sigmoid volvulus
	Abdominal aortic or iliac artery aneurysm
	Constipation
More common in children	Mesenteric adenitis
	Meckel's diverticulum (inflammation, perforation)
	Intussusception

Investigations

Urine

Urinalysis may be useful as renal calculi and urinary tract infection are in the differential. White cells in the urine do not exclude a diagnosis of acute appendicitis, especially when the inflamed organ rests against the urinary tract. A pregnancy test must be performed in all women of reproductive age.

Laboratory

A moderate leucocytosis is seen in 90% of patients with acute appendicitis. A C-reactive protein level can also be a guide to inflammation, although it is not specific (Pruekprasert et al, 2004). A serum amylase can help exclude acute pancreatitis (its presentation can also be variable). Laboratory tests generally play little role in diagnosis.

Imaging

Radiography

If a diagnosis of appendicitis has been made an abdominal X-ray is not necessary. If there is clinical suspicion of ureteric calculi a radiograph is necessary. Bowel obstruction can also be seen on plain film, as can free intraperitoneal air from a perforated viscus, although an erect chest radiograph or computed tomograph (CT) is more accurate. A faecolith may occasionally be seen on the radiograph, suggesting a possible cause for appendicitis. In the elderly where there is doubt of the diagnosis and the pain settles it may be useful to exclude a caecal lesion with a barium enema.

Ultrasound

Ultrasound is helpful in excluding other pathology, especially gynaecological, but is poor at showing an inflamed appendix.

Computed tomography

CT has been used to help diagnose appendicitis in difficult cases. Some workers in the USA have advocated its use in all cases of RIF pain (Sarkaria et al, 2004), but this is not routine practice in the UK.

Laparoscopy

Laparoscopic appendicectomy, a minimally invasive technique allowing visualization of the intra-abdominal cavity, has attracted increased interest. Studies have advocated laparoscopy for both diagnostic and therapeutic purposes, especially in young women (Pier et al, 1991).

Treatment

The treatment of acute appendicitis is an appendicectomy (*Figure 2*). This is to avoid the complications of perforation, which can include intra-abdominal sepsis, septicaemia, portal pyaemia, haemorrhage, paracaecal, pelvic and subphrenic abscesses, intestinal obstruction, faecal fistula and urinary retention. In young women there is an increased risk of infertility following perforation (Mueller et al, 1986). Once appendicitis has been diagnosed, broad-spectrum intravenous antibiotics covering both aerobic and anaerobic bacteria should be administered. The patient should be resuscitated and taken to theatre without delay.

Table 2. Non-surgical causes of right iliac fossa pain

Gynaecological	Ruptured ectopic pregnancy
	Ovarian cyst rupture, haemorrhage or torsion
	Acute salpingitis
	Mid-cycle pain – Mittelschmerz pain
	Endometriosis
	Ovarian vein thrombosis
Genitourinary	Urinary tract infection or cystitis
	Ureteric calculi
	Pyelonephritis
	Testicular torsion
Medical	Pneumonia
	Diabetes mellitus
	Nerve root entrapment
	Herpes zoster
	Coxsackie B virus
	Acute porphyria
	Henoch–Schonlein purpura

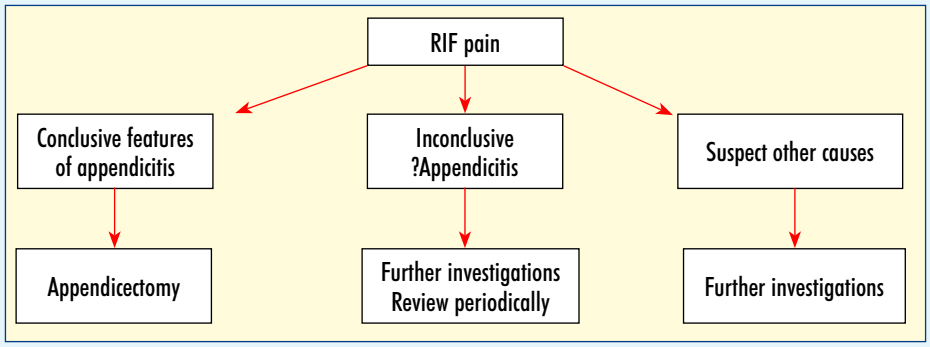


Figure 2. Pathway for managing right iliac fossa (RIF) pain.

If an appendix abscess develops this can be managed conservatively with antibiotics and drained under radiological guidance, with an interval appendicectomy several weeks later.

Occasionally, early appendicitis can resolve spontaneously. Under special circumstances, e.g. at sea, a conservative approach can be adopted until the patient can be transferred to hospital.

Other common causes of RIF pain

Ruptured ectopic pregnancy

This condition can be fatal and it is important to realize that some patients may not remember their last menstrual cycle. Pain may be referred to the shoulder tip on lying flat. The diagnosis is supported with a pregnancy test and confirmed with ultrasound or intraoperatively.

Gastroenteritis

This presents with vague abdominal pain associated with diarrhoea. Abdominal tenderness is less well localized and the patient will usually improve, whereas with appendicitis they most commonly deteriorate.

Renal calculi

Renal calculi present with more severe sharp colicky pain and minimal RIF tenderness. Although microscopic haematuria can be present in both conditions it is usually more marked with ureteric colic. Renal calculi can be confirmed with an intravenous urogram or CT.

Mesenteric adenitis

This is an enlargement of the mesenteric lymph nodes caused by adenovirus, which particularly affects young children. There is usually a history of an upper respiratory infection and cervical lymphadenopathy.

Sigmoid diverticulitis

A long sigmoid loop can lie on the right side of the abdomen and a CT is useful to aid this diagnosis. If diverticulitis is suspected a trial of conservative treatment, with antibiotics and intravenous fluids, is appropriate, with explorative laparotomy if there is no improvement.

Urinary tract infection

This can be evident from the history or from the urine dipstick. It does not eliminate a diagnosis of appendicitis.

Meckel's diverticulitis

A remnant of the vitelline duct, Meckel's diverticulitis is the commonest congenital anomaly of the small bowel. It can present in a very similar manner to appendicitis and is usually confirmed intraoperatively. In all cases of normal appendicectomy the small bowel is inspected for a possible Meckel's diverticulum.

Caecal tumour

This is more common in older patients. In patients over the age of 60 years with suspected appendicitis, it is more appropriate to perform a lower mid-line laparotomy as this allows better access to perform a right hemicolectomy, if necessary.

Regional ileitis

Ten per cent of Crohn's patients present with an acute illness mimicking acute appendicitis and a correct diagnosis is often not made until operation.

Pelvic inflammatory disease

This presents with lower abdominal pain often associated with a vaginal discharge and a high temperature. There is often tenderness in both iliac fossae. Cervical excitation is usually a feature.

Ruptured ovarian follicle

Mid-cycle rupture of a follicular cyst (Mittelschmerz) can produce lower abdominal pain. It usually subsides within hours but can be confirmed with ultrasound or occasionally only found intraoperatively. In all cases of normal appendicectomy the ovaries are inspected for possible cysts.

Torsion of ovarian cyst

Patients may or may not have a history of ovarian cysts. They usually present with severe, sharp, constant pain in the iliac fossa, associated with nausea. The diagnosis is confirmed with ultrasound.

Testicular torsion

Usually presents as sudden, severe pain in the scrotum (worse on movement), but may be referred to the loin or groin. **BJHM**

Conflict of interest: none.

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KEY POINTS

- Right iliac fossa pain is a common complaint with several causes, some of which are potentially fatal.
- Correct diagnosis involves a careful history and good clinical examination and appropriate investigations.
- Prompt supportive measures need to be instigated, with early referral to the appropriate specialist for definitive management.