Right Iliac Fossa Pain

Pain in the right iliac fossa (RIF) immediately raises the suspicion of appendicitis. Appendicitis can be varied in how it presents but there are also many other diagnoses to consider when a patient presents with RIF pain. Assessment of abdominal pain in children can be very difficult. Abdominal pain in pregnancy also causes problems because of distortion of the normal anatomy and stretching of structures by the gravid uterus.

The separate general articles Abdominal Pain, Acute Abdomen and Pelvic Pain have some overlap with this article. There are also separate articles entitled Appendicitis and Surgical Emergencies in Childhood.

Epidemiology

- RIF pain represents about 50% of all cases of acute abdominal pain.\(^1\)
- In surgery performed for suspected appendicitis, the pre-operative diagnosis is correct in only about 50% of cases.\(^1\)
- Appendicitis is more common in men. Appendicectomy is performed more often in women and women are more likely to have a normal appendix removed.

History

- Enquire about the pain:
  - Ask the patient to point to where it is. Note whether the patient uses a single finger or it is more diffuse. Visceral pain due to appendicitis may start around the umbilicus and move to the RIF.
  - Ask when it started.
  - Establish whether the onset was sudden or gradual.
  - Ask whether it is continuous or intermittent.
  - Ask the patient to describe the nature of the pain - stabbing, burning, gripping, etc.
  - Note whether there are aggravating or relieving factors - eg, food, position, medication.
  - Note whether there is radiation of the pain - eg, back/groin (renal colic), shoulder (diaphragmatic irritation secondary to visceral perforation).

  - Make a systematic enquiry:
    - Appetite - ask if there is any nausea or vomiting.
    - Ask whether there are any fever symptoms.
    - Weight - discuss whether this is stable. Ask whether there has been any weight loss (probably more relevant in chronic LIF pain when considering colorectal carcinoma.)
    - Bowels - ask when they were last open. Ask about ability to pass stool/flatus. Discuss whether there is any blood, mucus, or melaena, and the consistency of stool.
    - Determine the timing of last menstrual period; enquire about menstrual history, irregular vaginal bleeding and form of contraception.
    - Ask whether there is vaginal discharge.
    - Urine - establish whether there are any urinary symptoms present.

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  - Enquire about smoking and drinking history.
  - Note past medical history.
  - List any medication.

Examination

Further details can be found in the separate article Abdominal Examination.

- Note the general condition of the patient - eg, well, shocked, pyrexial.
- Note temperature, pulse rate and quality, blood pressure.
- With the patient adequately undressed and comfortable, systematically examine the abdomen - inspection, percussion (the abdomen may be tympanic in bowel obstruction), palpation, auscultation (absent bowel sounds indicate obstruction/volvulus). Establish whether it is an acute abdomen - note whether there is distension, guarding, rigidity or rebound tenderness. Note whether there is a palpable mass and, if so, whether it is pulsatile.
- Examine the testes and hernial orifices.
- A definitive diagnosis may well require a rectal and/or vaginal examination. Usually a GP will do this only if it affects the decision of whether or not to refer the patient acutely. If it will be performed by the admitting team, it may be omitted.

Differential diagnosis

RIF pain may be acute or chronic/subacute.
Causes of acute RIF pain

Gastrointestinal causes

- **Appendicitis**: if the appendix is retrocaecal there may be no guarding. In pregnancy the gravid uterus will push up the appendix and hence the site of tenderness. Carcinoid tumours may occasionally present as appendicitis.
- **Crohn's disease**: the most common site for Crohn's disease is the terminal ileum and here it may mimic appendicitis.
- **Mesenteric adenitis**: this primarily affects children. It is caused by a viral or bacterial infection. Adenoviruses, Epstein Barr virus, beta-haemolytic streptococcus, *Staphylococcus* spp., *Escherichia coli*, *Streptococcus viridans* and *Yersinia* spp. have all been implicated as well as *Mycobacterium tuberculosis* and *Giardia lamblia*. It may occur in adults but is mostly in those aged under 15. Patients may have a high temperature and there may also be other evidence of a viral infection - eg, enlarged submandibular lymph glands and leukocytosis. If laparotomy is performed, enlarged mesenteric lymph nodes will be apparent.
- **Diverticulitis**: diverticular disease affects the distal colon more than the proximal colon. However, diverticula and inflammation and/or abscesses may occur in the ascending colon. Perforation may also occur.
- **Meckel's diverticulitis**: a Meckel's diverticulum is a congenital anomaly that is present in about 2% of the population. Meckel's diverticulitis can mimic appendicitis.
- **Perforated peptic ulcer**: this usually produces upper quadrant pain but pain may be lower.
- **Right inguinal/femoral hernia**: an incarcerated right inguinal or femoral hernia may present as RIF pain. There will be tenderness and an irreducible swelling over the hernial orifice, and symptoms and signs of bowel obstruction. Cough impulse is lost if hernia is incarcerated. Requires urgent surgical referral.
- **Malignancy**: carcinoma of the caecum or ascending colon can present with bowel perforation.

Gynaecological causes

- **Pelvic inflammatory disease (PID)/salpingitis/pelvic abscess**: typically, vaginal discharge is present. More common if there are multiple sexual partners, a history of PID and if an intrauterine device is in situ.
- **Ectopic pregnancy** in the right Fallopian tube: pain rather than vaginal bleeding is the prominent feature. If in doubt, admit. When rupture occurs bleeding is profuse and two or three litres of blood can be lost in a short space of time, with consequent hypovolaemic shock.
- **Ovarian torsion**: this usually happens when an ovary is enlarged by a cyst. Diagnosis can be difficult. There may be adnexal tenderness. Ultrasound may show the abnormal ovary.
- **Threatened or complete miscarriage**: if a pregnancy test is positive and there is a history of bleeding, always refer for an ultrasound scan to exclude a miscarriage. If there is associated pain, an ectopic pregnancy needs excluding by immediate referral to secondary care.
- **Mittelschmerz (ovulation pain)**: this is a sudden onset of mid-cycle pain.
- **Fibroid degeneration**.
- **Pelvic tumour**.
Urological causes

- **Ureteric colic**: this can cause pain that may be intermittent and ‘shooting’. A stone may cause microscopic haematuria. 70% are visible on plain X-ray. Ultrasound is a good diagnostic technique.
- **Urinary tract infection (UTI)**: urinary frequency, dysuria, haematuria, urgency and smelly urine may raise this as a differential diagnosis.
- **Testicular torsion or epididymo-orchitis**: may produce pain that is referred to the lower abdomen on that side. The testis will be very tender.

Other causes

- **Infections**: tuberculosis, typhoid and *Yersinia* spp. can all produce ulceration of the ileum that can perforate. Herpes zoster infection in the T10, 11, or 12 dermatome can produce RIF pain. There is usually a characteristic rash. The skin is usually tender rather than a deeper pain.
- **Abdominal aortic aneurysm**: this can present with atypical symptoms resembling renal colic or diverticular disease rather than the classic back or flank pain. Do not forget this differential diagnosis. Look for a pulsatile abdominal mass. Approximately 30% of patients with a ruptured abdominal aortic aneurysm are misdiagnosed initially.[3]
- **Situs inversus**: here the differential diagnosis for RIF pain is as that for left iliac fossa (LIF) pain. Only half of those with dextrocardia have total situs inversus.

Causes of chronic RIF pain

Gastrointestinal causes

- **Irritable bowel syndrome**: should be a diagnosis of exclusion. The bowel may be loaded and tender.
- **Carcinoma of the caecum or ascending colon**: there is usually an associated change in bowel habit, weight loss and rectal bleeding.
- **Crohn’s disease and ulcerative colitis**: with inflammatory bowel disease, there will probably be associated diarrhoea with blood and mucus.

Gynaecological causes

- Pelvic/ovarian tumour.
- Endometriosis.

Other causes

- Right hip pathology: may cause referred pain in the RIF.
- **Familial Mediterranean fever**: this may cause recurrent abdominal pain, mostly in the first decade of life.

Investigations

These should be tailored to the patient’s symptoms and the examination findings. In the GP setting there are a number of bedside tests that can be done to aid diagnosis:

- Dip urine for pus cells, leukocytes and/or nitrites if UTI is suspected. Microscopic haematuria is usually present in ureteric colic. It can also occur in abdominal aortic aneurysm.[3]
- Perform a pregnancy test if an ectopic pregnancy or a miscarriage is suspected.

If the pain is non-acute and can be managed in the GP setting, further investigations may be requested:

- Blood tests may include FBC, renal function, LFTs.
- Vaginal swab tests can help to exclude pelvic infection.
- Ultrasound scanning can show an ovarian, or other, mass.
- Referral for further bowel investigations may be necessary - eg, referral under the two-week wait rule if bowel carcinoma is suspected.
- Further urological investigations may be needed - eg, cystourethroscopy.

If the patient has an acute abdomen and is referred immediately to hospital, further diagnostic tests may be carried out there:

- Blood tests: appendicitis may produce a mild leukocytosis unless it has progressed to general peritonitis. The usefulness of the WCC in diagnosing appendicitis has been examined in a number of studies. It appears that the clinical value of a WCC >10 x 10^9/L in appendicitis has poor sensitivity, specificity and positive predictive value.[4] This is more so in children than adults (although in adults these parameters improve slightly when the WCC >15 x 10^9/L), but implies that the WCC can not be relied upon in diagnosing appendicitis.[4]
- Ultrasound scanning as above.[5]
- CT scanning is good for the diagnosis of diverticulitis, nephrolithiasis, ureterolithiasis.[3] Helical CT has also been used to differentiate appendicitis and acute gynaecological conditions.[6]
- Plain abdominal X-ray may show dilated bowel loops in bowel obstruction, ileus and perforation. It may show renal tract calcification.
Erect CXR may show intraperitoneal air under the diaphragm if there is a ruptured viscus. Some departments use early laparoscopy as a routine diagnostic tool. It is minimally invasive and gives reliable results.

**Management**

- This depends on the diagnosis and is of the underlying disorder.
- An acute abdomen and/or a haemodynamically unstable patient will require immediate referral to hospital for further assessment. If abdominal aortic aneurysm or ectopic pregnancy is suspected, refer to secondary care immediately. Keep the patient nil by mouth. The threshold for referral for suspected appendicitis should be low, especially with children or young women.
- Airway, Breathing and Circulation (ABC) should be assessed and managed appropriately.
- Traditional teaching was that analgesia shouldn't be given to patients with an acute abdomen before they see a surgeon, as it can suppress physical signs. This has been subject to much debate and modern opinion is that it is unkind and unnecessary to withhold pain relief. The receiving doctor should be told that analgesia has been given. A Cochrane systematic review published in 2007 provided some evidence to support the notion that the use of opioid analgesics in patients with abdominal pain is helpful in terms of patient comfort and doesn't retard decisions to treat.
- Non-steroidal anti-inflammatory drugs (care if there is risk of peptic ulcer disease) or opioids (if there is severe pain) are good analgesics.

**Conclusion**

Appendicitis is a common condition but this and other causes of RIF pain can be difficult to diagnose. A GP should have a high index of suspicion, especially in girls and adolescent females because of the potential effect on fertility if an operation is delayed. Quite often, a GP will refer a patient to hospital, the patient will be admitted and observed, and discharged without operation. You should not feel that this was an inappropriate admission.

**Further reading & references**

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