Appendicitis and lower gastrointestinal emergencies

Aliza Abeles

Jamie Murphy

Abstract

Appendicitis and lower gastrointestinal emergencies represent the majority of emergency presentations to acute general surgical on-call teams. Early recognition and resuscitation of the patient as well as prompt investigation allow appropriate management plans to be initiated in a timely manner. Those patients requiring operative intervention should be managed within a multidisciplinary team to achieve optimal outcomes. Current surgical approaches favour minimally invasive techniques, where appropriate, with decreased pain and shorter length of stay being major advantages.

Keywords Appendicitis; appendix mass; colonic obstruction; colorectal trauma; diverticulitis; haemorrhage; inflammatory bowel disease; mesenteric ischaemia; perforation; peritonitis; rectal foreign bodies

General principles

There are around 600,000 emergency admissions under the care of general surgeons each year with a mortality of 15% in those needing an emergency laparotomy.[1] Emergency presentations have poorer outcomes than elective admissions and there is a trend toward increased numbers of elderly patients, with concurrent co-morbidities, presenting as emergency admissions. It is therefore important to focus on preoperative care and resuscitation as well as postoperative care in the appropriate setting.

The main emphasis for initial management is early recognition, adequate resuscitation and speedy investigation (and/or urgent surgery). Patients should be assessed fully including: a complete history of the presenting illness, appropriate clinical examination, recognition of physiological observations and initial investigations. A recent redefinition of sepsis by the Sepsis-3 group is given as 'life threatening organ dysfunction caused by a dysregulated host response to infection'.[2] The quick Sepsis-related Organ Failure Assessment (qSOFA) can be used to easily and quickly assess organ dysfunction in sepsis (Box 1). The Surviving Sepsis Campaign Bundle recommends specific measures for patients presenting with sepsis. These include measuring the serum lactate level, obtaining blood cultures prior to antibiotic use, administering broad-spectrum antibiotics and giving 30 ml/kg crystalloid for hypotension or if lactate is more 4 mmol/litre within 3 hours of presentation.

Quick Sepsis-related Organ Failure Assessment (qSOFA) criteria

- Respiratory rate $\geq$22/minute
- Altered mentation
- Systolic blood pressure $\leq$100 mmHg

Box 1

Intravenous access is important as well as blood tests to detect infection, anaemia, dehydration and coagulopathies. Blood should be taken for group and save or cross-match as blood products may be required. A urinary catheter is important to help guide fluid resuscitation and often central venous access may be necessary to facilitate treatment and/or measure the response of the patient to resuscitation efforts. Early communication with high-dependency and intensive care units is important as patient may require invasive cardiac monitoring or organ support pre- or postoperatively.

Appendicitis

Aetiology

Most commonly appendicitis occurs in patients aged between 10 and 20 years and it is uncommon at the extremes of age. It is thought to arise secondary to luminal obstruction caused by faecoliths, lymphoid hyperplasia, neoplasm, parasites or foreign bodies.

Distension of the lumen from the obstruction causes compromise of the appendicular wall blood supply leading to ischaemia, bacterial overgrowth and translocation. This can result in perforation if left untreated or as a result of delayed presentation.

Presentation

A typical presentation would be:

- central abdominal pain migrating to the right iliac fossa
- anorexia
- nausea and vomiting
- low-grade pyrexia.

However, typical symptoms only occur in around half of patients and symptoms will differ depending on the position of the inflamed appendix (Figure 1). Patients may present with diarrhoea or dysuria as a result of pelvic or retrocaecal appendicitis.

Examination often reveals maximal tenderness over McBurney's point (one-third of the way between anterior superior iliac spine and umbilicus) with rebound/percussion tenderness and localized guarding in the right lower quadrant. Other signs which may be elicited include:

- Rovsing's sign – palpation of the left iliac fossa causing pain in the right iliac fossa
- psoas stretch sign – extension of the right thigh leads to psoas irritation and pain in the abdomen
- obturator sign – abdominal pain on internal rotation of the right thigh.

Differential diagnosis

- Mesenteric adenitis
- Gastroenteritis
- Terminal ileitis

Aliza Abeles *BSc MRCS is a Clinical Research Fellow at St Mary's Hospital, Imperial College London, UK. Conflicts of interest: none declared.*

Jamie Murphy *BChir PhD FRCS is a Consultant Colorectal Surgeon and Senior Lecturer at Imperial College Healthcare NHS Trust and Imperial College London, UK. Conflicts of interest: none declared.*

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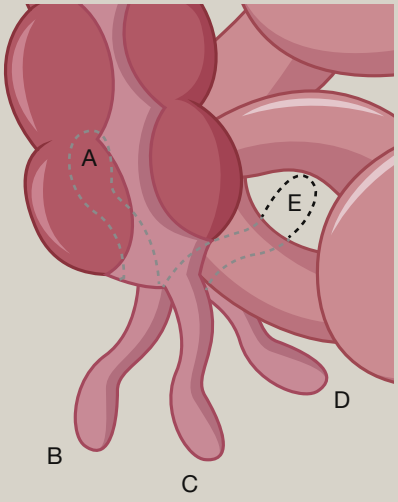
Different anatomical positions of appendix



A retrocaecal (64%), B paracolic (2%), C Pre-ileal (32%), D Pelvic (1%), E post-ileal (0.5%)

Figure 1

- Meckel's diverticulum
- Caecal carcinoma
- Renal stone
- Pyelonephritis
- Cholecystitis
- In women – ovarian cysts, ruptured ectopic pregnancy, pelvic inflammatory disease and mittelschmerz

Investigation

Urinalysis should be performed and may be positive for blood and protein if the appendix is close to the bladder or ureters. It is also important perform a urinary or serum β-human chorionic gonadotrophin (β-hCG) to rule out a possible ectopic pregnancy in women of childbearing age. Blood tests including a serum white cell count and C-reactive protein (CRP) may assist with the clinical diagnosis, while normal results are associated with a strong negative predictive value.

Clinical scoring systems may be used to determine the likelihood of appendicitis based on symptoms, signs and laboratory results. One such example is the Alvarado score (Table 1).

Ultrasound scans of the abdomen and pelvis are non-invasive but highly operator dependent. They can be helpful for assessing gynaecological pathologies as differential diagnoses in women.

A CT scan of the abdomen and pelvis is the most sensitive and specific radiological investigation. Although CT assessment is considered the gold standard diagnostic investigation, it is frequently unnecessary to determine the diagnosis. It is, however, important in older patients where there is a possible underlying caecal tumour causing obstruction of the appendix lumen.

Management

Appendicectomy is the treatment of choice in uncomplicated appendicitis.[3] The benefits of laparoscopic surgery may include decreased length of hospital stay, wound infection and pain.[4] Laparoscopy is also useful where there is diagnostic uncertainty, and if there is no firm diagnosis at laparoscopy the appendix should be removed, as there may ultimately be microscopic rather than macroscopic evidence of appendicitis. Conversion to an open procedure should occur if there is an inability to safely progress. If an open procedure is performed, then the appendix must be removed, even if it looks normal, to prevent confusion in the future due to the presence of an appendicectomy scar. Antibiotics are given prophylactically to reduce postoperative wound infections and a course of antibiotics is recommended for patients with gangrenous or perforated appendicitis.

A palpable appendix mass/abscess is usually treated with intravenous antibiotics and percutaneous drainage where possible. This is successful in more than 90% of cases with recurrence in less than 10%, usually occurring within the first 6 months. An interval appendicectomy can then be considered to minimize the risk of recurrence.[5]

Alvarado scoring system

	Mnemonic (MANTRELS)	Score		
Symptoms	Migrating pain to RIF	1		
	Anorexia	1	Score	Likelihood of appendicitis
	Nausea or vomiting	1	<4	Unlikely
Signs	Tenderness RIF	2	5–6	Possible
	Rebound tenderness	1	7–8	Probable
	Temperature above 37.3°C	1	9–10	Very probable
Laboratory results	Leucocytosis	2		
	Neutrophilia	1		
Total score		10		

Table 1

Diverticulitis

Aetiology

It is important to distinguish between diverticulosis and diverticulitis. Diverticulosis is common in developed countries with an increasing incidence. The prevalence increases with age, with 10% of people are thought to have this condition at 40 years and 60–80% at 80 years of age. Although there is no clear cause a low-fibre diet is thought to prolong colonic transit and increase intraluminal pressures, which then predisposes to mucosal herniation. Diverticulosis is frequently associated with no symptoms and only 10% of people are likely to develop complications. Diverticulitis is an infection of a diverticulum thought to be caused by occlusion with faecal material, which results in bacterial proliferation.

Presentation

A patient with diverticulitis may present with the following symptoms:

- acute onset left lower abdominal pain

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