

Evaluation of the acute abdomen

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Abstract

Evaluation of the acute abdomen in infants and children can be challenging. The symptoms are often non-specific and the majority of conditions are self-limiting. However, it is important to identify the serious life-threatening causes of the acute abdomen and to refer these patients to the appropriate speciality to expedite definitive treatment. We review a structured approach to assessment and define the management of some of the more serious acute abdominal conditions seen in children such as intussusception, appendicitis and malrotation/volvulus.

Keywords abdominal trauma; acute abdominal pain in children; appendicitis; bilious vomiting; intestinal malrotation; intussusception; peritonitis

Introduction

There is a multiplicity of causes of acute abdominal pain during childhood although for the purposes of this article those presenting predominantly during the neonatal period will be excluded. Although common sense tells us that most children with acute abdominal pain will have self-limiting conditions, it is important to identify those where there is a more serious surgical or medical emergency. The history of the complaint is the beginning of the diagnostic process and certain conditions are much more common in a particular age-group e.g. intussusception. Still, accurate diagnosis can be challenging in the young non-verbal child or those with learning difficulties.

History and symptoms

The timeline of symptoms should be ascertained with particular attention to onset, progression, location and the characteristics of other associated features e.g. fever, vomiting, stooling (constipation, diarrhoea), urinary symptoms and gynaecological history in pubertal girls. History of accidental/non-accidental trauma, previous surgery or existing medical conditions should be ascertained. If a child is old enough to localize pain this can be particularly helpful. In the younger child parents may infer

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Learning objectives

- to understand the principal causes of the acute abdomen in infants and children
- offer readers a structured approach to the assessment of the abdomen in order to reach a differential diagnosis
- to help learners utilize investigative modalities appropriately e.g. laboratory tests, radiology
- to distinguish between medical and acute surgical causes of abdominal pain
- to understand the management of common causes of abdominal pain

abdominal pain from the drawing up of legs, irritability and inconsolability.

Figure 1 shows possible surgical causes of abdominal pain based upon situation and lateralization, while Figure 2 illustrates a spectrum of causes by typical age-group affected. Table 1 illustrates diagnosis by the characteristics of the vomit.

Physical examination

A thorough examination should be undertaken preferably when the child is comfortable. Appropriate analgesia should be given, although in the past this practice has been controversial. It was felt that provision of opiate analgesia may mask clinical findings and potentially cause a delay in making an accurate diagnosis. Randomized controlled trials in children have shown that administration of effective analgesia (intravenous opiates) does not delay in making an accurate diagnosis of appendicitis for instance. Repeated examination by the same physician is beneficial when the diagnosis is uncertain at presentation, although shift patterns in hospital conspire against this. Rectal examination in children has to be reserved for specific situations where the procedure is potentially life-saving (e.g. rectal decompression in the enterocolitis of Hirschsprung's disease) or when the information gained is likely to be specific (e.g. faecal impaction in those with idiopathic constipation). There is generally no role for rectal examination in the trauma setting and if there are genuine concerns over a potential perineal/perianal injury then an examination under anaesthetic is more appropriate.

Peritonitis

Peritonitis, the definitive sign of an acute abdomen, can be localized or generalized and usually occurs secondary to spreading microbial sepsis or soiling following perforation of a hollow viscus.

The physical sign of peritoneal involvement is muscle guarding – that is a reflex contraction of the abdominal wall muscles – initially voluntary because probing hurts and then involuntary with onset of muscular rigidity. Peritoneal afferent nerve fibres become hypersensitive with inflammation and tests based on palpation such as percussion, or rebound are designed to detect this. As rigidity supervenes, breathing becomes painful and rapid to avoid peritoneal irritation. The phenomenon is

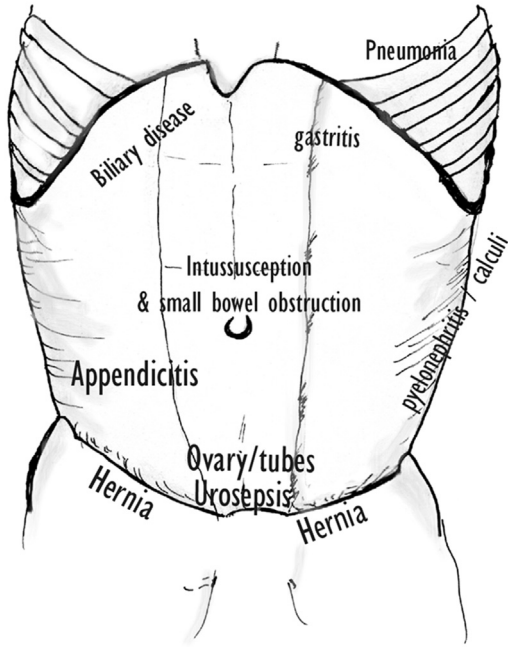


Figure 1 Diagnosis of abdominal pain in relation to location.

largely clinical, and ancillary aids such as X-ray merely confirmatory. Pneumoperitoneum may be detectable – but be conscious of where the air might be rise to on a plain abdominal film. Maximize the chance of finding it using erect positioning or a shoot-through lateral film in the supine abdomen.

Occasionally children with ascites due to end-stage liver disease, nephrotic syndrome or on peritoneal dialysis may get “spontaneous” bacterial peritonitis and lack a septic focus. The commonest pathogens are *Streptococcus pneumonia* and *Escherichia coli*. Diagnosis is confirmed by aspiration and microscopy looking for presence of bacteria or a neutrophil count less than 250/mm³.

Common causes of acute abdominal pain

Appendicitis

Appendicitis was only really recognized as a distinct entity in the 1880s; there then followed a huge increase in prevalence over the entire period of the 20th century. Over the past 20 years or so there is some evidence that this surge has now come to an end and the tide is now receding. This dramatic epidemiological variation has been attributed to the wider population’s better access to clean water, better sewage disposal and the decline of all-pervading spectre of infantile gastroenteritis – another manifestation of the so-called *hygiene hypothesis*. This stated that some of the modern generations’ problems have been the result of deferring exposure to pathogens later in life. This led to a marked increase in allergic conditions and also may have contributed to rapid lymphoid hyperplasia leading to luminal occlusion in the base of the appendix triggering appendicitis.

Appendicitis is the commonest acute surgical emergency and overall accounts for over 40,000 admissions in the UK every year. It is commonest in those aged 10–20 years and slightly more prevalent in boys. It is commonly quoted that the lifetime risk for the development of appendicitis is about 7%. It is also increasingly recognized that there may be two distinct strands of appendicitis; one with rapid and early progression to perforation

1 - 12 months	1 - 5 years	6 - 12 years	13 - 18 years
Infantile colic	Non-specific abdominal pain		
Intussusception	Appendicitis		
	Mesenteric adenitis (viral-associated abdominal pain)		
Gastritis / Gastroenteritis			
Incarcerated hernias (inguinal, rarely umbilical)			
Hirschsprung's	Constipation		
Metabolic diseases	Pharyngitis/tonsillitis	Cholecystitis /pancreatitis	
	Internal hernias	Crohn's disease / Ulcerative colitis	
Midgut volvulus	Omental torsion, Meckel's diverticulum		
	Urinary tract infections		Ovarian torsion Pelvic Inflammatory Disease
	Urinary calculi		

Notes: Surgical , Non-surgical , Common, uncommon.

Figure 2 Causes of abdominal pain during childhood by age.

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