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Appendicitis

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Appendicitis is inflammation of the vermiform appendix that may lead to an abscess, ileus, peritonitis, or death if untreated.

Appendicitis is the most common abdominal surgical emergency.

The current standard treatment for uncomplicated appendicitis is usually surgical removal of the appendix (appendectomy), but there has been increasing evidence published on the use of antibiotics.

The evidence comparing surgery with antibiotics is weak and confounded by factors such as inconsistencies with results and outcomes measured, which makes it difficult to compare these interventions.

Appendectomy may be associated with reduced overall treatment failure (including recurrence requiring surgery within one year) in the treatment of adults with acute appendicitis, but may also be associated with an increase in complications and sick days compared with antibiotics.

- We do not know whether appendectomy and antibiotics differ with regard to hospital stay or improvement in quality-of-life scores.
- We found no studies reporting outcomes beyond one year, which is a major limitation of the available evidence.
- All of the evidence we found was in adults; we found no randomized controlled trials (RCTs) in children.

Clinical Question

What are the effects of surgery compared with antibiotics for acute appendicitis?

Likely to be beneficial	Surgery vs. antibiotics (increased initial treatment success and decreased recurrence with surgery compared with antibiotics in adults, but may be associated with some increased complications; we found no good evidence in children)

At present, the weight of evidence does not suggest that antibiotics are superior to surgery for treating appendicitis.

There is a lack of high-quality RCTs comparing what might be termed optimal current surgical techniques with optimal current antibiotic regimens. Further trials are underway, which may provide further information on how current surgical techniques compare with current antibiotic regimens when both treatment approaches are optimized.

Definition

Appendicitis is inflammation of the vermiform appendix. Progression of the inflammatory process can lead to abscess, ileus, peritonitis, or death if untreated. Complicated appendicitis refers to the presence of gangrene or perforation of the appendix. Free perforation into the peritoneal cavity can lead to purulent or feculent peritonitis. A contained perforation can lead to appendix abscess or phlegmon (inflammatory mass).

Incidence and Prevalence

Appendicitis is the most common abdominal surgical emergency. The reported lifetime risk of appendicitis in the United States is 8.6% in men and 6.7% in women, with an annual incidence of 9.38 per 100,000 persons. In the United States, it is estimated that about 326,000 operations for appendicitis were performed in 2007. In the United Kingdom, about 42,000 to 47,000 operations for appendicitis were performed yearly between 2007 and 2012. Large studies from the United Kingdom and United States have shown that complicated appendicitis is found at surgery in about 16.5% to 24.4% of cases.

Etiology and Risk Factors

The cause of appendicitis is uncertain, although various theories exist. The predominant theories center on luminal obstruction of the blind-ending appendix as the primary pathology. When goblet cell secretions are blocked from escaping by the luminal obstruction, the intraluminal pressure within the appendix increases and leads to ischemia of the appendix wall. The translocation of bacteria from the lumen across the compromised mucosa causes transmural inflammation. Ongoing tissue ischemia and inflammation can then lead to infarction and perforation of the appendix (complicated appendicitis). Free perforation will lead to soiling of the intraperitoneal cavity with pus or feces. A perforation can also be enclosed by the surrounding soft tissues (omentum, mesentery, or bowel), thus leading to the development of an inflammatory mass. This inflammatory mass may contain pus (abscess), or it may not (phlegmon). There is some debate as to whether perforated appendicitis is a disease process distinct from uncomplicated appendicitis.

Hyperplasia of the lymphoid tissue in the mucosa or submucosa has been posited as the most common mechanism causing obstruction of the appendix lumen. This may present with acute catarrhal appendicitis, with a gradual onset of symptoms. Lymphoid hyperplasia may be caused by infections (bacterial, viral, fungal, parasitic) or by inflammation, such as in inflammatory bowel disease. Other, rarer causes of obstruction may include parasites (more common in developing countries), fibrous bands, foreign bodies, or carcinoid and cecal carcinoma. A more abrupt course of symptoms has been described in acute obstructive appendicitis from fecaliths.

Prognosis

The prognosis of untreated appendicitis is unknown, because RCTs comparing treatment with no treatment would be unethical. Spontaneous resolution of radiologically confirmed appendicitis has been reported to range from about 4% to 20%. However, spontaneous resolution and recurrence of appendicitis (the grumbling appendix) remains a contentious issue among surgeons. The current standard treatment for uncomplicated appendicitis is usually surgical removal of the appendix (appendectomy) to prevent potential complications from untreated appendicitis. There has been increasing evidence published on the use of antibiotics. Surgical treatment is performed through an incision (open appendectomy) or using keyhole surgery (laparoscopic appendectomy). One systematic review found that wound infection was less likely with laparoscopic appendectomy compared with open appendectomy (odds ratio = 0.43; 95% confidence interval, 0.34 to 0.54), but intra-abdominal abscess formation was more likely with laparoscopic appendectomy (odds ratio = 1.87; 95% confidence interval, 1.19 to 2.93). The incidences of wound infection and abscess formation appear to be higher in complicated appendicitis. A perforated appendix in childhood does not seem to have subsequent negative consequences for female fertility.

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