



Management and Epidemiology of the Appendicitis in Patients

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Abstract: Acute appendicitis is one of a relatively dwindling number of conditions in which a decision to operate may be based solely on clinical findings. Laparoscopic appendectomy is becoming the gold standard of treatment but non-operative management with antibiotics may suffice in selected cases with uncomplicated appendicitis. The advantages of the innovations in minimally invasive and endoscopic surgery are unlikely to render formal open appendectomy obsolete.

The controversy in the management of the appendix mass/abscess remains.

Keywords: appendicitis, Laparoscopic, Patients.

Introduction:

The word appendicitis stems from Latin, combining appendix and -itis, and it means the inflammation of the appendix. The term appendix was coined in the 1540s to describe an elongated outgrowth of an internal organ [1]. Appendicitis was first described in 1759 by Metiever, but it was believed at the time that the appendix was not the origin of the disease process and it was termed perityphlitis, typhlitis, paratyphlitis, or extra-peritoneal abscess of the right iliac fossa [2]. From the early 20th century onwards, appendicitis originated from obstruction leading to the secretion of fluids by the appendix. An early study demonstrated, by inserting a manometric recording device that higher pressures resulted in histologically evident hypercellularity and exudate pattern correlating with appendicitis [3]. Early mortality secondary to appendicitis was reported to be 26% [4].

Appendicitis is the most common intra-abdominal emergency. The presentation of acute appendicitis is varied, ranging from subclinical and self-resolving to overwhelming sepsis and death. Typically, patients who develop appendicitis in isolated settings (e.g., on ships, submarines, saturation dives, or in remote areas) are treated conservatively with antibiotics, and, in most cases, appendicitis is resolved without surgery [5, 6]. Surgery for the acute abdomen caused by appendicitis only evolved when the mortality associated with perforated appendicitis was found to be significant (>5%). The mortality was associated with the age of the patient and delayed diagnosis resulting in perforated appendicitis [7]. Conservative treatment with later drainage of any abscess had been the standard and diffuse peritonitis was usually fatal. The fact that only few patients progressed to potentially lethal complications provided the argument for conservative antibiotic treatment. Although it is clearly advantageous to spare patients from unnecessary surgery, the morbidity and mortality from failing to diagnose appendicitis until perforation has occurred are greater than that associated with the removal of a normal appendix [8]. Thus, early surgery for all patients with suspected appendicitis became the definitive method of preventing severe peritoneal sepsis. However, recent studies particularly during the coronavirus-19 (COVID-19) lockdown have re-iterated the fact that although there is a 20% risk

of recurrent attacks, simple appendicitis may be treated with antibiotics only [9]. This may explain the decreased incidence of acute appendicitis during the COVID-19 pandemic following antibiotic treatment for right iliac fossa pain, but the high incidence of complicated appendicitis due to the “stay at home” message [5]. Advances in interventional radiological techniques for peritonitis have also significantly reduced the morbidity and mortality of physiologically severe complicated abdominal infections including appendix abscesses [10].

Acute appendicitis (AA) is the leading cause of surgical acute abdomen worldwide, with a prevalence of approximately 7% of the population. It has a peak incidence between 10-14 years in females and 15-19 in males². Appendectomy is the treatment of choice. Besides allowing definitive diagnosis, it also significantly reduces the risk of complications such as perforation, sepsis and death. The most important causal factor of AA appears to be the development of luminal obstruction, whose etiology is associated with age - lymphoid hyperplasia is the most common factor found in patients younger than 20 years, while the obstruction by a fecalith is more common in the elderly [11].

Epidemiology

Appendicitis occurs most commonly between the ages of 10 and 20 years and it has a male-to-female ratio of 1.4:1. The lifetime risk is 8.6% for males and 6.7% for females in the United States [12]. Studies have indicated an association between acute appendicitis and the manifestation of colorectal cancer. In fact, 2.9% of patients who suffered from acute appendicitis were found to have colorectal cancer compared to 0.1% of those who did not [13]. In patients who are 55 years and older, acute appendicitis was found to be associated with right-sided neoplasm. The overall diagnosis of appendicitis, whether resected or treated conservatively, was associated with an overall increase in colorectal cancer rate. Hence, patients who are 55 years and older suffering from acute appendicitis should follow up to receive colorectal cancer screening [14].

Pathophysiology

Acute appendicitis is typically caused by direct luminal obstruction, usually either secondary to a faecolith or lymphoid hyperplasia, or less commonly by a malignancy

(Such as a caecal adenocarcinoma or appendiceal neuroendocrine tumour)

When obstructed, commensal bacteria in the appendix can multiply, resulting in acute inflammation. Reduced venous drainage and localised inflammation can result in increased pressure within the appendix, in turn resulting in ischaemia within the appendiceal wall.

If left untreated, ischaemia can result in necrosis, which in turn can cause the appendix to perforate.

Etiology

Appendicitis is thought to result from obstruction of the appendiceal lumen, typically by lymphoid hyperplasia but occasionally by a fecalith, foreign body, tumor, or even worms. The obstruction leads to distention, bacterial overgrowth, ischemia, and inflammation. If untreated, necrosis, gangrene, and perforation occur. If the perforation is contained by the omentum, an appendiceal abscess results.

The classic acute appendicitis symptoms are

- Epigastric or periumbilical pain followed by brief nausea, vomiting, and anorexia

After a few hours, the pain shifts to the right lower quadrant. Pain increases with cough and motion.

Symptoms and Signs

Classic signs of appendicitis are

- Right lower quadrant direct and rebound tenderness located at the McBurney point (junction of the middle and outer thirds of the line joining the umbilicus to the anterior superior iliac spine) [15].

Additional appendicitis signs are pain felt in the right lower quadrant with palpation of the left lower quadrant (Rovsing sign), an increase in pain caused by passive extension of the right hip joint that stretches the iliopsoas muscle (psoas sign), or pain caused by passive internal rotation of the flexed thigh (obturator sign).

Low-grade fever (rectal temperature 37.7 to 38.3° C [100 to 101° F]) is common.

Many variations of appendicitis symptoms and signs occur in > 50% of patients. Pain may not be localized, particularly in infants and children. Tenderness may be diffuse or, in rare instances, absent. Bowel movements are usually less frequent or absent; if diarrhea is a sign, a retrocecal appendix should be suspected. Red or white blood cells may be present in the urine. [16].

Atypical symptoms are common among older patients and pregnant women; in particular, pain is less severe and local tenderness is less marked.

Symptoms

Symptoms of appendicitis may include:

- Sudden pain that begins on the right side of the lower abdomen.
- Sudden pain that begins around the navel and often shifts to the lower right abdomen.
- Pain that worsens with coughing, walking or making other jarring movements.
- Nausea and vomiting.
- Loss of appetite.
- Low-grade fever that may rise as the illness worsens.
- Constipation or diarrhea. [17-19].
- Abdominal bloating.
- Gas.

The site of the pain may vary, depending on age and the position of the appendix. In pregnancy, the pain may seem to come from the upper abdomen because the appendix is higher during pregnancy. [20].

Diagnosis

Diagnostic testing is often indicated for individuals suspected of having appendicitis. Medical imaging such as CT scans, sonograms, or abdominal X-rays are used to help confirm possible appendicitis. Additional laboratory tests utilized are urine analyses, to make sure that a urinary tract infection or a kidney stone isn't causing the pain, or complete blood counts. Patients who present with typical appendicitis will have an elevated WBC count >20,000 mm³. Physicians will also perform a histological examination of the resected appendix for further confirmation of the condition. Iliopsoas and obturator muscle tests are administered to rule out potential abscesses or insults to muscle integrity. [21, 22].

Medical Management

Appendicitis is a medical emergency that requires immediate care. The most common treatment for appendicitis is an appendectomy with some patients receiving antibiotics pre-operatively. Early surgical removal decreases the risk of mortality and morbidity to < 1%. Prognosis for these patients who undergo surgery is typically good unless accurate diagnosis is delayed and perforation occurs. Poor prognostic indicators for this condition include hypovolemia, peritonitis, and septic shock. An appendectomy can be performed using a Laparotomy or Laparoscopic surgery. Laparoscopic surgery leads to fewer complications, such as hospital-related infections, and has a shorter recovery time with less scarring. [23].

If the appendix has ruptured and infection has spread beyond the appendix or if an abscess is present, immediate surgery through laparotomy may be required to clean the abdominal cavity and remove

the appendix. If the infection is not treated peritonitis can develop. If the infection spreads to the blood it can lead to sepsis.^{[81] [91]} One or two days is usually spent in the hospital after an appendectomy.

An alternative to surgery is antibiotic therapy. Studies that have compared the outcome of surgery to the outcome of antibiotics show that about 70 per cent of cases may resolve with antibiotic therapy and not require surgery. However, the factors leading to failure of antibiotic therapy are not known, so antibiotic therapy alone is usually reserved for patients too frail to undergo surgery.

Physical therapist may see patients post appendectomy. Therapist should be aware of the incision site between the anterior superior iliac spine and umbilicus. Patient education would include avoiding strenuous activity, supporting the abdomen when coughing, and breathing exercises. [24].

Conclusion:

Appendicitis is a common occurrence in both the adult and pediatric populations. The condition most commonly occurs between the ages of 10 and 20 years with a lifetime risk of 9.1% and 6.2% for males and females respectively. Its diagnosis focuses on clinical presentation and imaging modalities classified according to scoring systems such as the Alvarado scoring system. A number of imaging modalities can be used, with CT being the most common one. For acute appendicitis, surgical intervention is considered to be the gold standard of treatment. However, recent research has focused on other modalities of treatment including antibiotics and endoscopic retrograde appendicitis therapy (ERAT) to avoid surgical complications.

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