

Appendicitis

Acute appendicitis is one of the most common causes of abdominal pain in childhood. This diagnosis must be considered in all age groups but is more common between the ages of 4 and 15 years. The function of the appendix is unknown. In most patients the appendix is located in the right lower area of the abdomen. However, since the appendix is a fingerlike projection, it may be in various locations in the right upper area of the abdomen under the gallbladder, in the pelvis, across the top of the bladder, and behind the large intestine. (Figure 1).

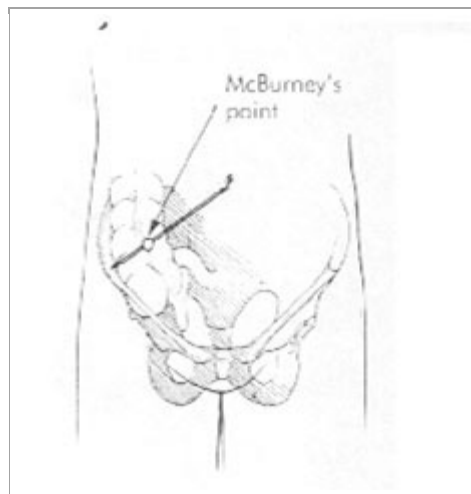


Figure 1: McBurney's point is located one third of the distance along a line from the front of the right pelvic bone and the belly button.

Appendicitis most often results from blockage by stool which has formed a stone (a fecalith) or, less commonly, from enlarged lymph nodes caused by a viral infection. Once a blockage occurs, bacteria located within the appendix grow. The pressure in the appendix increases and the appendix becomes swollen. Eventually the blood vessels to the appendix close and the appendix dies. Subsequent perforation will occur.

CLINICAL PRESENTATION

Acute appendicitis usually begins with pain, frequently localized to the area around the belly button. This is commonly followed by loss of appetite: most children with appendicitis show no interest in their favorite foods. Nausea and vomiting usually are seen next. In time the pain eventually shifts to the right lower area of the abdomen. In some patients, the appendix lies behind the first part of the large intestine and in those patients the shift of pain to the right

lower area of the abdomen may be absent. The pain in appendicitis is continuous and generally does not get better. The pain is usually present even when the patient is lying still. Occasionally a child complains of right lower abdominal pain while walking, or refuses to stand up or walk.

PHYSICAL EXAMINATION

The examination must include a careful abdominal examination. Observation of the child will often detect signs suggestive of appendicitis: the patient usually lies quietly on the side with the knees drawn up. The patient with appendicitis moves slowly and carefully, avoiding any sudden movements: sudden movement causes the appendix to irritate the inside of the abdomen and to cause pain.

The child can be asked to point with one finger at the spot where it hurts the most which is usually found in the right lower area of the abdomen at McBurney's point. Gentle pushing on the abdomen may identify tenderness in the right lower area of the abdomen which is suggestive of appendicitis. A patient with appendicitis will rarely get off the examining room table and jump up and down more than once and will have pain when doing so. Holding a hand above a child's head and challenging him or her to jump and touch it is irresistible to most children except those in whom pain is produced. As mentioned previously, watching how the patient moves on and off the examining table is also helpful.

DIAGNOSTIC TESTS

Many children with signs and symptoms of appendicitis do not need further testing but can be taken for surgery without x-rays. For less clear cases, radiographic evaluation may be helpful. Ultrasound examination is especially useful in teenage girls in whom gynecology conditions such as an ovarian cyst are being considered. Computed tomographic (CT) scans play a role in the diagnosis of appendicitis. Contrast (dye) is administered by mouth or through the rectum such that it fills the cecum and, hopefully, the appendix. The CT may show an enlarged, swollen appendix which often presents as a target sign. A reaction in the area surrounding the appendix may also be seen. CT scans are most useful in patients in whom the diagnosis of appendicitis is unclear.

DIFFERENTIAL DIAGNOSIS

Although appendicitis is a common childhood condition, arriving at the diagnosis may be difficult in up to half of the patients, especially in infants, very young children, mentally disabled children, patients initially hospitalized for other conditions, and teen-age girls in whom various gynecologic problems may also present with lower abdominal pain. One third to one half of patients with ruptured appendicitis has already been seen in a physician's office or an emergency room and is sent home with an incorrect diagnosis. Other conditions that may cause abdominal pain in childhood include viral gastroenteritis, Crohn's disease, intestinal bacterial infection, pancreatitis, perforated ulcer, gallstone or gallbladder problems. Abdominal pain may also be caused by constipation, urinary infection, kidney stones, and a number of other conditions.

TREATMENT

In instances of appendicitis, the child should receive intravenous fluids, antibiotics, and medication for pain relief. Once antibiotics are administered, there is often a reduction in pain and tenderness in many children. As such, in most instances, antibiotics and pain medications

should not be given until the diagnosis of appendicitis has been made. Appendectomy is accomplished at many centers via a laparoscopic approach. A laparoscopic operation can be performed in the same time that it takes to perform an open appendectomy. One benefit, other than that the scar is smaller, is the ability to completely see the other structures inside the abdomen should the appendix appear normal. In some cases, an open appendectomy is performed through a longer right lower abdomen incision. Patients can usually start eating following the operation and, in most cases of non-ruptured appendicitis, are discharged in the first 24 hours.

When the appendix has ruptured, antibiotics should be given to treat infection. Pain medication is administered. When ready, the patient may be taken to the operating room for appendectomy. However, in many cases of ruptured appendicitis, the approach of interval appendectomy is applied: patients are first treated with antibiotics to allow the infection to go away. Abscesses (pus pockets) are drained out using the CT to guide placement of a needle into the abscess. Antibiotics are continued until the infection is gone. A peripherally-inserted central catheter (PICC) may be placed into a vein and the antibiotics are typically given for one week. Nutrition given into the IV may be necessary until adequate nutrition can be taken by mouth. Appendectomy is then performed after 8 to 12 weeks.