

**TABLE 356-2** RELATIVE FREQUENCY OF COMMON PRESENTING SYMPTOMS

Symptoms	Frequency
Abdominal pain	>95%
Anorexia	>70%
Constipation	4–16%
Diarrhea	4–16%
Fever	10–20%
Migration of pain to right lower quadrant	50–60%
Nausea	>65%
Vomiting	50–75%

will most often observe that their nausea, if present, followed the development of abdominal pain, which can help distinguish them from patients with gastroenteritis, for example, where nausea occurs first. Emesis, if present, also occurs after the onset of pain and is typically mild and scant. Thus, timing of the onset of symptoms and the characteristics of the patient's pain and any associated findings must be rigorously assessed. Anorexia is so common that the diagnosis of appendicitis should be questioned in its absence.

Arriving at the correct diagnosis is even more challenging when the appendix is not located in the right lower quadrant, in women of childbearing age, and in the very young or elderly. Because the differential diagnosis of appendicitis is so broad, often the key question to answer expeditiously is whether the patient has appendicitis or some other condition that requires immediate operative intervention. A major concern is that the likelihood of a delay in diagnosis is greater if the appendix is unusually positioned. All patients should undergo a rectal examination. An inflamed appendix located behind the cecum or below the pelvic brim may prompt very little tenderness of the anterior abdominal wall.

Patients with pelvic appendicitis are more likely to present with dysuria, urinary frequency, diarrhea, or tenesmus. They may only experience pain in the suprapubic region on palpation or on rectal or pelvic examination. A pelvic examination in women is mandatory to rule out conditions affecting urogynecologic organs that can cause abdominal pain and mimic appendicitis such as pelvic inflammatory disease, ectopic pregnancy, and ovarian torsion. The relative frequencies of some presenting signs are displayed in [Table 356-3](#).

Patients with simple appendicitis normally only appear mildly ill with a pulse and temperature that are usually only slightly above normal. The provider should be concerned about other disease processes beside appendicitis or the presence of complications such as perforation, phlegmon, or abscess formation if the temperature is  $>38.3^{\circ}\text{C}$  ( $\sim 101^{\circ}\text{F}$ ) and if there are rigors.

Patients with appendicitis will be found to lie quite still to avoid peritoneal irritation caused by movement, and some will report discomfort caused by a bumpy car ride on the way to the hospital or clinic, coughing, sneezing, or other actions that replicate a Valsalva maneuver. The entire abdomen should be examined systematically starting in an area where the patient does not report discomfort if

**TABLE 356-3** RELATIVE FREQUENCY OF SOME PRESENTING SIGNS

Signs	Frequency (%)
Abdominal tenderness	>95%
Right lower quadrant tenderness	>90%
Rebound tenderness	30–70%
Rectal tenderness	30–40%
Cervical motion tenderness	30%
Rigidity	$\sim 10\%$
Psoas sign	3–5%
Obturator sign	5–10%
Rovsing's sign	5%
Palpable mass	<5%

**TABLE 356-4** CLASSIC SIGNS OF APPENDICITIS IN PATIENTS WITH ABDOMINAL PAIN

Maneuver	Findings
Rovsing's sign	Palpating in the left lower quadrant causes pain in the right lower quadrant
Obturator sign	Internal rotation of the hip causes pain, suggesting the possibility of an inflamed appendix located in the pelvis
Iliopsoas sign	Extending the right hip causes pain along posterolateral back and hip, suggesting retrocecal appendicitis

possible. Classically, maximal tenderness is identified in the right lower quadrant at or near McBurney's point, which is located approximately one-third of the way along a line originating at the anterior iliac spine and running to the umbilicus. Gentle pressure in the left lower quadrant may elicit pain in the right lower quadrant if the appendix is located there. This is Rovsing's sign ([Table 356-4](#)). Evidence of parietal peritoneal irritation is often best elicited by gentle abdominal percussion, jiggling the patient's gurney or bed, or mildly bumping the feet.

Atypical presentation and pain patterns are common, especially in the very old or the very young. Diagnosing appendicitis in children can be especially challenging because they tend to respond so dramatically to stimulation and obtaining an accurate history may be difficult. In addition, it is important to remember that the smaller omentum found in children may be less likely to wall off an appendiceal perforation. Observing the child in a quiet surrounding may be helpful.

Signs and symptoms of appendicitis can be subtle in the elderly who may not react as vigorously to appendicitis as younger people. Pain, if noticed, may be minimal and have originated in the right lower quadrant or, otherwise, where the appendix is located. It may never have been noticed to be intermittent, or there may only be significant discomfort with deep palpation. Nausea, anorexia, and emesis may be the predominant complaints. The rare patient may even present with signs and symptoms of distal bowel obstruction secondary to appendiceal inflammation and phlegmon or abscess formation.

#### LABORATORY TESTING

Laboratory testing does not identify patients with appendicitis but can help the clinician work through the differential diagnosis. The white blood cell count is only mildly to moderately elevated in approximately 70% of patients with simple appendicitis (with a leukocytosis of 10,000–18,000 cells/ $\mu\text{L}$ ). A "left shift" toward immature polymorphonuclear leukocytes is present in  $>95\%$  of cases. A sickle cell preparation may be prudent to obtain in those of African, Spanish, Mediterranean, or Indian ancestry. Serum amylase and lipase levels should be measured.

Urinalysis is indicated to help exclude genitourinary conditions that may mimic acute appendicitis, but a few red or white blood cells may be present as a nonspecific finding. However, an inflamed appendix that abuts the ureter or bladder may cause sterile pyuria or hematuria. Every woman of childbearing age should have a pregnancy test. Cervical cultures are indicated if pelvic inflammatory disease is suspected. Anemia and guaiac-positive stools should raise concern about the presence of other diseases or complications such as cancer.

#### IMAGING

Plain films of the abdomen are rarely helpful and so are not routinely obtained unless the clinician is worried about other conditions such as intestinal obstruction, perforated viscus, or ureterolithiasis. Less than 5% of patients will present with an opaque fecalith in the right lower quadrant. The presence of a fecalith is not diagnostic of appendicitis, although its presence in an appropriate location where the patient complains of pain is suggestive.

The effectiveness of ultrasonography as a tool to diagnosis appendicitis is highly operator dependent. Even in very skilled hands, the appendix may not be visualized. Its overall sensitivity is 0.86, with a