

scores the impact of eight factors: *migration, anorexia, nausea and vomiting, tenderness in the right lower quadrant, rebound of pain, elevation of temperature, leukocytosis, and shift to the left.* A patient with a score of 5 or 6 is usually observed, but an individual with a score of 7 or greater should undergo surgery.

Two prospective trials demonstrated the accuracy of helical computed tomography (CT) with contrast for the diagnosis of acute appendicitis. The initial CT findings of appendicitis are enlargement of the appendix, usually to an appendiceal diameter of more than 6 mm (Fig. 95-2). The wall is thickened and enhances with contrast. Later findings include inflammation,

thickening of the cecal wall, and pericecal fat stranding. An appendicolith is a helpful sign. If perforation has occurred, extensive inflammatory changes are seen, which may include an abscess cavity. Although there has been controversy about whether CT scans are necessary or more accurate than clinical assessment in every case, the current standard of care in emergency departments includes a CT scan. Use of CT has reduced the rate of finding normal appendices at surgery from between 11% and 15% to between 3% and 5%.

Diagnostic ultrasound is accurate if carefully performed and can be particularly useful in small children and pregnant women. Because of its accuracy and lack of ionizing radiation, magnetic resonance imaging (MRI) has become the scanning modality of choice in many centers for children, pregnant women, and other patients. Nonetheless, CT scanning is rapid and more likely available, and it is therefore the procedure of choice for most patients.

The differential diagnosis for acute appendicitis is long. It includes urinary tract infection and stones; gynecologic problems such as a ruptured ovarian cyst, ectopic pregnancy, and pelvic inflammatory disease; and bowel pathology, including diverticulitis and Crohn's disease.

Treatment

Laparoscopic (75% of procedures) or open appendectomy is the treatment of choice for emergent cases. If rupture is identified, antibiotics and drainage are indicated. Pretreatment antibiotics in all cases prevent wound infection and intraabdominal infections as indicated by a Cochran review. Antibiotics to cover *E. coli*

TABLE 95-4 ALVARADO OR MANTRELS* SYSTEM FOR DIAGNOSING ACUTE APPENDICITIS

| FEATURES SCORED | VARIABLE | VALUE |
|-------------------|--|-------|
| Symptoms | Migration | 1 |
| | Anorexia | 1 |
| | Nausea-vomiting | 2 |
| Signs | Tenderness in right lower quadrant | 2 |
| | Rebound of pain | 1 |
| | Elevation of temperature ($\geq 37.3^{\circ}\text{C}$) | 1 |
| Laboratory values | Leukocytosis (white blood cell count $>10,000/\mu\text{L}$) | 2 |
| | Shift to the left ($>75\%$ neutrophils) | 1 |
| Total score | | 10 |

From Wray CJ, Kao LS, Millas SG, et al: Acute appendicitis: controversies in diagnosis and management, *Curr Probl Surg* 50:54–86, 2013.

*MANTRELS mnemonic: *M*igration, *a*norexia, *n*ausea and vomiting, *t*enderness in right lower quadrant, *r*ebound of pain, *e*levation of temperature, *l*eukocytosis, *s*hift to the left.

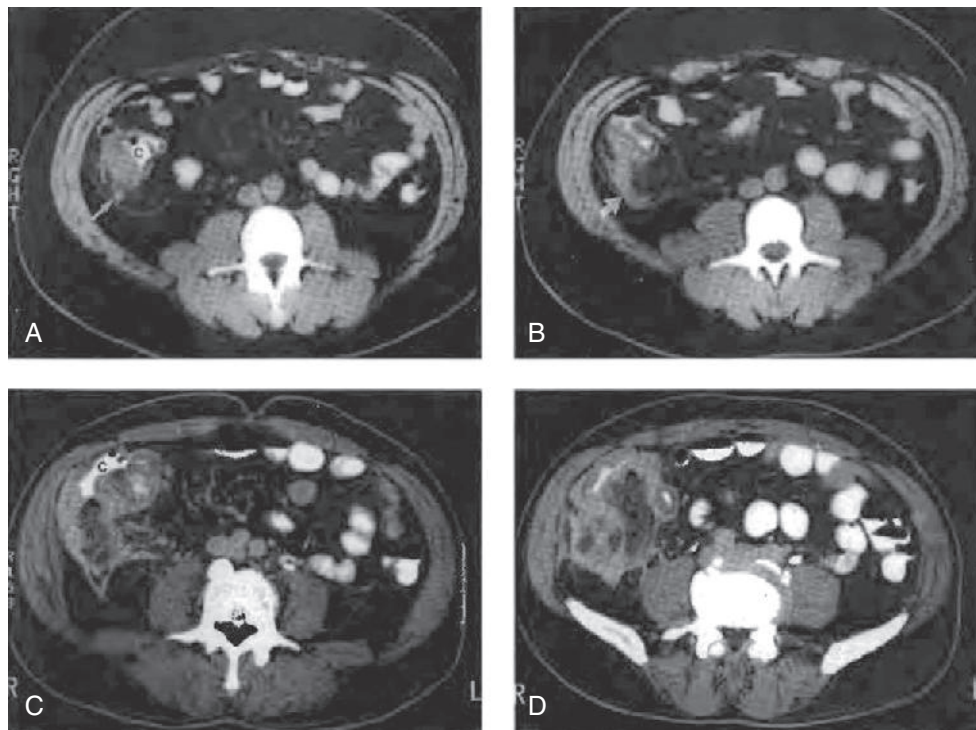


FIGURE 95-2 Computed tomography (CT) of acute appendicitis. **A**, CT scan of uncomplicated appendicitis shows an appendicolith (arrow). **B**, CT scan shows a dilated appendix (arrow) and surrounding inflammation in the pericecal fat. **C** and **D**, Two views at different levels of perforated appendicitis with abscess formation. C, Cecum. (From Novelline RA, editor: *Squire's fundamentals of radiology*, ed 6, Cambridge, Mass., 1964, Harvard University Press, Figures 13.43 and 13.44.)