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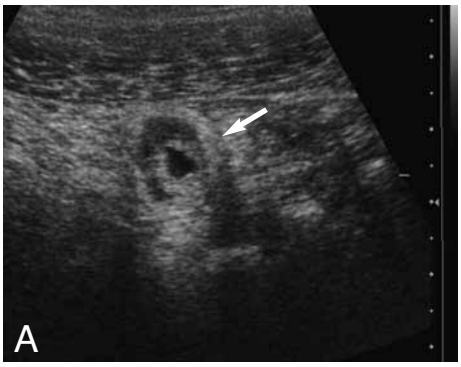
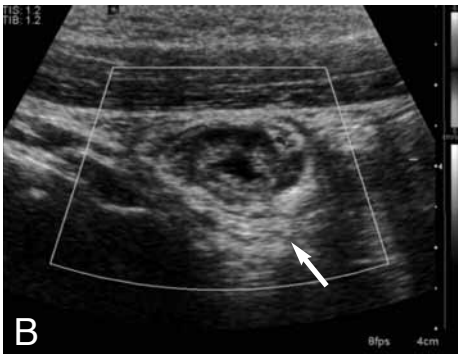
IMAGES IN CLINICAL RADIOLOGY





Sonographic findings of Meckel's diverticulitis

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An 18-year-old young man with no medical history presented at the emergency department with nausea, vomiting and pain in the right iliac fossa and the periumbilical region. Blood analysis was normal except for an elevated C-reactive protein (CRP) of 64 mg/L.

High frequency gray-scale sonogram was performed and showed a normal presentation of the appendix. A tubular hypo-echogenic structure (length of 3 cm, width of 1 cm) with a cystlike center and an irregular thickened wall was discovered in the right periumbilical region (Fig. A). Color Doppler sonogram reveals a hypervascular wall (Fig. B) and infiltration of the surrounding mesenteric fat arrow in Fig. A and B). Diagnosis of Meckel diverticulitis was suggested, although a complicated duplication cyst could not be excluded.

CT scan that followed showed a rim-enhancing tubular structure in the right peri-umbilical region with surrounding inflammatory changes (Fig. C). Surgery and pathology that followed confirmed a Meckel diverticulitis.

Comment

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract, with an incidence of 1-3% of the population, although only 4% of those affected become symptomatic. When the vitelline (omphalomesenteric) duct fails to obliterate during fetal development, several anomalies appear, Meckel's diverticulum being the most frequent. It occurs on the antimesenteric border of the ileum, 40-100 cm proximal to the ileocecal valve.

Clinical symptoms arise from complications of the diverticulum, which are most common in male and in the pediatric population. Hemorrhage from peptic ulceration, small intestinal obstruction, and diverticulitis are the most frequent complications. Diverticulitis can mimic appendicitis clinically and on sonography the inflamed Meckel's diverticulum can be wrongly interpreted as an abnormal cecal appendix.

Meckel's diverticulitis appears as a round or tubular, cystlike structure with a thick, irregular hyperechoic internal wall and a hypoechoic external wall (Fig. A). The outer hypoechogenic layer corresponds to the muscularis propria of the intestinal wall, and the inner hyperechogenic layer corresponds to the mucosa and submucosal layers. This mural pattern of echogenicity is called the *gut signature*. The inflamed diverticulum may resemble appendicitis because it may be non-compressible when pressure is applied to the abdominal wall with the ultrasound transducer; in contrast, the inflamed diverticulum may be compressible and resemble a duplication cyst. In the latter circumstance, a duplication cyst usually has a smooth internal wall, compared with the irregular internal wall and the more tubular structure of an inflamed Meckel's diverticulum. The presence of air inside the Meckel's diverticulum and its mobility during the peristaltic activity of the adjacent bowel loops can give the Meckel's diverticulum an appearance that is similar to the rest of the intestine. Color Doppler sonography can be important in revealing hypervascularization, signs of inflammation of the Meckel's diverticulum and showing the presence of anomalous vessels, an appearance not found in the rest of the intestine. Echogenic foci in the lumen may represent enteroliths, fecoliths, or inflammatory debris.

Sonography will not supersede ^{99m}Tc pertechnetate scintigraphy because scintigraphy is a highly accurate tool to use in establishing the diagnosis of an inflamed Meckel's diverticulum. Sonography may, however, be useful in patients who have rectal bleeding and whose scintigraphic findings are negative. For patients with diverticulitis and clinical signs and symptoms suggestive of appendicitis, a sonographic diagnosis may be made if the Meckel's diverticulum presents as a cystlike structure with a wall exhibiting the *gut signature*. Routine color Doppler sonography reveals anomalous vessels and signs of inflammation on the wall of the Meckel's diverticulum.

Reference

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