Whirlpool Sign in Small-Bowel Volvulus Due to a Mesenteric Cyst

S. Boopathy Vijayaraghavan, MD, DMRD, Valkodai Ramanathan Ravikumar, MS, MCh, Gopalakrishnan Srimathy, MBBS

The “whirlpool sign” on gray scale and color Doppler sonography is a well-recognized and definitive sign of small-bowel volvulus (SBV) secondary to malrotation of the midgut. We describe a case of SBV caused by a mesenteric cyst in which the whirlpool sign was seen.

Case Report

A 58-day-old boy was referred for sonography because of recurrent attacks of vomiting since birth. He had been delivered normally, and the antenatal period had been uneventful. The child had been vomiting persistently for 4 hours. It was bilious in nature. On examination, the child appeared sick and tachypneic with a distended abdomen. Sonography was done with an HDI 5000 scanner (Philips Medical Systems, Bothell, WA) using a 5- to 12-MHz linear probe. Sonography revealed a multiseptated thin-walled mesenteric cyst measuring $37 \times 26 \text{ mm}$ to the right of the umbilicus, as well as ascites and pneumoperitoneum (Figures 1 and 2). The whirlpool sign was seen on both gray scale imaging and a color Doppler study (Figures 3 and 4). The relationship of the superior mesenteric vein (SMV) and superior mesenteric artery (SMA) was normal. A diagnosis of volvulus of the small bowel due to a mesenteric cyst, complicated by perforation of the bowel, was made. Laparotomy confirmed the presence of a chylous cyst of the mesentery of the small bowel with volvulus. The small bowel close to the cyst had a small perforation, but it did not show features of ischemia. There was no malrotation of the midgut. Resection of a segment of the small bowel along with the cyst was done. The child did well postoperatively.
Small-bowel volvulus is a rare but life-threatening surgical emergency. The etiology may be primary or secondary. Primary SBV occurs in an otherwise normal abdominal cavity and is very rare. Small-bowel volvulus can occur secondary to a predisposing factor. The predisposing factor can be congenital or acquired. Some of the congenital conditions that can predispose to SBV are malrotation of the midgut, a persistent omphalomesenteric duct, and a mesenteric cyst. Acquired conditions can be adhesions, ascariasis, and a mesenteric cyst or tumor. Small-bowel volvulus results in a closed loop obstruction of the small bowel. Later, it may cause complications such as venous occlusion and, still later, arterial occlusion, resulting in gangrene of the bowel. Perforation of the bowel can occur, leading to peritonitis. The perforation may occur because of ischemia or overdistension of the bowel caused by the closed loop obstruction.

Sonographic and color Doppler features of SBV secondary to malrotation of the midgut are well described. The classic sign described is the whirlpool sign. This sign corresponds to a clockwise wrapping of the SMV and the mesentery around the SMA. The whirlpool sign directly
indicates the anatomic alteration caused by midgut volvulus. In midgut volvulus, not only the bowel but also the mesenteric vessels are twisted. The SMV and tributaries wrap around the SMA as a result of the volvulus. The whirlpool sign represents this characteristic pattern of the SMV and SMA on sonograms. The sensitivity of this sign ranges from 89% to 100%. The sensitivity of this sign ranges from 89% to 100%.

To our knowledge, the whirlpool sign thus far has been described only in connection with SBV secondary to malrotation of the midgut. Here we report this whirlpool sign in a child with the SBV caused by a mesenteric cyst. In this child, the sonographic sign of malrotation, namely, the inversion of the SMV and SMA, was absent. On computed tomography, a similar whirl sign has been described in SBV due to malrotation as well as other causes. The same sign also has been reported in primary SBV.

In conclusion, the sonographic whirlpool sign can be seen in SBV due not only to malrotation but also to other causes.

References


