

Vitelline artery remnant causing intestinal obstruction in an adult

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A 35-YEAR-OLD MAN presented to our hospital with a 12-hour history of severe central abdominal pain of acute onset, nausea, and vomiting. He had no history of any abdominal surgery in the past but complained of rare episodes of self-limiting epigastric and periumbilical pain for years.

Physical examination revealed a diffusely tender abdomen with generalized rebound tenderness. The white cell count was elevated at $12.2 \times 10^9/L$, and C-reactive protein was 40 mg/L. An abdominal x-ray with the patient standing upright revealed dilated loops of small bowel with multiple air-fluid levels.

At emergency laparotomy, the patient was found to have small bowel obstruction, caused by trapping of ileal bowel loops by a band tethering a Meckel's diverticulum to the ileal mesentery (Figure). The intestine proximal to the obstructed loops was distended and that distal to the band was collapsed. After reduction, the trapped ileum was proven to be nonischemic and was functional. The Meckel's diverticulum measured 7 cm in length and 4 cm in diameter, and a mass was palpable at the apex. A diverticulectomy was performed with a linear stapler, and the cord structure was ligated and divided near the mesoileum. On pathologic examination, the presence of heterotopic gastric, colonic and pancreatic tissue was noted at the tip of the Meckel's diverticulum. The patient made an uneventful postoperative recovery.

DISCUSSION

Persistent omphalomesenteric or vitelline artery is among the rarer conditions that are encountered

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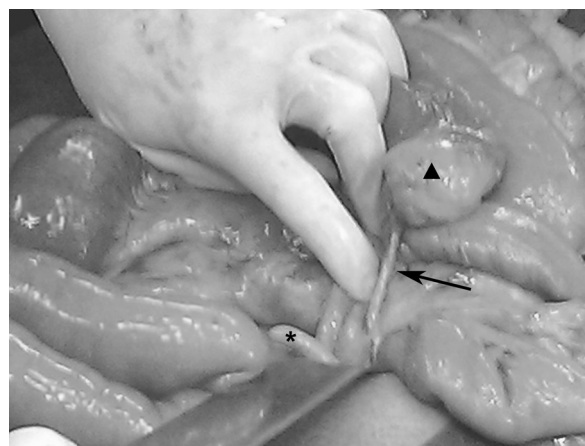


Figure. Band (arrow) extending from the tip of the Meckel's diverticulum (▲) to the mesoileum near the appendix (*). Obstructed loops of ileum are reduced and are slightly dusky in appearance but viable.

by surgeons during operation.¹ Its presence is one of the infrequent causes of intestinal obstruction associated with a high rate of mortality.^{1,2}

Aitken,² in a study of 88 children with vitelline remnants, reported 50% mortality in those presenting with intestinal obstruction. In 12 of the 18 children in this group, a cord extended from the Meckel's diverticulum to the mesentery, as also noted in our case. Most of these patients were in the 4–5 years' age group, when children are uncooperative, making an earlier diagnosis difficult and delaying admission to a hospital.

It has been reported that in 59% of cases with persistent omphalomesenteric artery, a Meckel's diverticulum also was present, an association explained by the origin and changes noted in these structures, in the embryo.¹

The embryonic midgut is connected ventrally to the yolk sac via the vitelline duct. Normally regressing between the fifth and seventh weeks of gestation, the persistence of a portion of the vitelline duct on the antimesenteric side of the intestine results in one of several anomalous structures either alone or

in combination. Meckel's diverticulum is probably the most common, but others include vitelline sinuses, cysts, fibrous cords from the intestine to the umbilicus, and omphaloenteric fistulas. The right and left vitelline arteries originate from the primitive dorsal aorta and travel with the omphaloenteric duct. The left involutes whereas the right becomes the superior mesenteric artery.³

Vitelline artery remnants can persist as fibrous bands that may contain a patent vessel, covered by peritoneum. Usually one end of the persistent artery is attached to the anterior abdominal wall and the other is attached to the ileal mesentery. Less often, it connects a Meckel's diverticulum to the ileal mesentery. In a few cases, the cord is attached at only one end.¹

Rutherford and Akers⁴ observed that, although the right vitelline artery remnant may persist as an accentuation of the superior mesenteric, the left vitelline artery may, likewise, also persist arising from the aorta. They course along the side of the mesentery and insert into Meckel's diverticulum or the posterior wall of the umbilicus.

Vitelline artery remnants are therefore associated with intestinal obstruction that can result

either from volvulus around a band or entrapment of the intestine in a snare-like opening created between the apex of the diverticulum and the mesentery, leading to incarceration and infarction.

Torn vitelline remnants have also been implicated in cases of haemoperitoneum.⁵ Persistent vitelline artery is a rare cause of acute intestinal obstruction and usually presents a diagnostic challenge. Early recognition and prompt surgical management is essential because of the high rate of mortality associated with this rare condition.

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