# Neonatal volvulus of the small bowel around a total persistent omphalomesenteric canal: an exceptional finding.

# Abstract:

# Total persistent omphalomesenteric canal as a cause of small-bowel obstruction is an exceptional finding. A neonate presented with occlusion due to volvulus of the small bowel around a total persistent omphalomesenteric canal. Remnants of the duct were successfully resected and the postoperative course was uneventful.

# Keywords: omphalomesenteric canal, volvulus, neonate, surgery.

# Introduction:

# The omphalomesenteric duct remnant is one of the rare congenital anomalies associated with the primitive yolk stalk (1).  Most omphalomesenteric duct remnants tend to be Meckel’s diverticulum while the occurrence of a persistent omphalomesenteric duct is infrequent (2) (3). Small bowel volvulus due to persistent omphalomesenteric canal is an extremely infrequent complication, with very few cases reported in the literature. The main mechanism described is the persistence of a true omphalomesenteric canal which constitutes an anchor point for the handles’ rotation.

# We present a case of neonatal occlusion due to intestinal volvulus around a persistent omphalomesenteric duct and we discuss the presentation of this rare condition and its management.

# Observation:

A 7-day-old full-term male baby with a birth weight of 3800 g was born to a 24-year-old mother. He was admitted with bilious vomiting started 2 days after birth without abdominal distention or failure to pass meconium. The family history, maternal history and prenatal examinations were all unremarkable. No drugs or infectious exposure was documented during pregnancy. There were no signs of intestinal obstruction on ultrasound during pregnancy.

At 2 days of life, the patient repeatedly vomited and developed feeding difficulty. Abdominal radiography showed significant gastric distension with absence of gas shadow in the pelvic region (Figure 1).

Abdominal ultrasonography did not indicate intestinal malrotation. A contrast enema showed significant enlargement of the small intestine, without passage of contrast in the pelvic region, suggesting provisional diagnosis of distal ileal atresia.

Patient was optimized for operation. He was managed with intravenous hydration and refeeding. At 7 days of life, laparotomy was performed. When the abdominal cavity was inspected, a volvulus of the small bowel around a duct was identified (Figure 2). This duct extending from the anti-mesenteric border of the preterminal ileum to the posterior wall of the umbilicus was identified, justifying the suspicion of persistent omphalomesenteric duct (Figure 3). The persistent omphalomesenteric duct was released from the umbilicus with resection of adjacent ileum (Figure 4). Then, an ileo-ileal anastomosis was done.

Histopathological examination confirmed the diagnosis of a persistent omphalomesenteric duct with associated [heterotopic](https://en.wikipedia.org/wiki/Heterotopia_(medicine)) rests of [gastric](https://en.wikipedia.org/wiki/Gastric) mucosa.

The postoperative condition was good, and the patient was discharged from hospital 10 days after surgery.

**Discussion:**

The omphalomesenteric duct (omphaloenteric duct, vitelline duct, or yolk stalk) normally connects the embryonic midgut to the yolk sac ventrally, providing nutrients to the midgut during embryonic development. The vitelline duct narrows progressively and disappears between the 5th and 8th weeks of gestation (4). Persistent vitelline duct remnants are the most common congenital anomalies of the small intestine. Meckel's diverticulum, a remnant of the prolonged vitelline duct, is the most common occurring in approximately 2% of infants (2) . Persistence of the mid-vitelline duct results in an omphalomesenteric cyst. Preservation of the entire structure results in a patent omphalomesenteric duct, as in this case. Although these malformations are found with equal frequency between the sexes, a significantly greater incidence of symptoms is encountered in males (4) .

An omphalomesenteric duct remnant induces several symptoms, such as intestinal obstruction, abdominal pain, melena, and umbilical hernia. These symptoms tend to occur most frequently during the childhood years (2). Eighty-five percent of infants younger than 1 month and 77% of children aged 1 month to 2 years had a symptomatic presentation (1).

Small bowel obstruction due to total persistent omphalomesenteric canal is extremely rare with very few cases reported in the literature. There are many mechanisms for small bowel obstruction from a persistent omphalomesenteric duct. These mechanisms include intussusception, in case of a patent omphalomesenteric duct, volvulus or internal hernia from a patent omphalomesenteric duct or a fibrous connection between the umbilicus and the ileum (2). A patent omphalomesenteric duct, such as in the presented case, results from an omphalomesenteric duct that is not completely obliterated and absorbed. The originality of this case is that our patient never had umbilical secretion or umbilico-ileal fistula. Congenital omphalomesenteric duct is clinically significant because they may lead to intestinal obstruction, as in our patient.

Acute obstruction can lead to bowel necrosis, especially if volvulus is the cause. These patients deteriorate rapidly; ascites may be present and perforation of bowel may occur (5).

Demonstration of the obstructed small bowel loop by barium enema is unusual. The barium enema is more important as a marker for the non dilated colon. It can demonstrate intestinal atresia as the cause of the obstruction in neonate and can also exclude Hirschsprung disease. Antegrade barium contrast study in a patient with acute low small-bowel obstruction is not usually indicated, since it may delay surgical intervention (6). If bowel necrosis is present, spillage of barium into the peritoneum at a point of perforation may occur (3). Study with dilute barium or the newer nonionic contrast material may be helpful in determining the site of obstruction and may also demonstrate the obstructed loop (3).

Pre-operative diagnosis of the omphalomesenteric duct as the cause of small-bowel obstruction is not always feasible and is usually confirmed with surgery (3) (7).

In general, the most appropriate treatments of small-bowel obstruction as well as timing of surgery remain controversial (8) (3).

 Careful examination and awareness are necessary for managing this condition, and the right treatment must be individualized for each patient (3). A surgical resection is necessary for symptomatic omphalomesenteric duct remnants, but not necessary for asymptomatic omphalomesenteric duct remnants (7) (9).  In the reported case, since the contrast enema suggested the diagnosis of distal ileal atresia, an operative intervention was decided. Operative findings justified such treatment of our patient.

The use of laparoscopic surgery is considered to be an effective, safe and less invasive treatment in adult (2) (10), but this technique does not seem to be advantageous in children (9) (11).

**Conclusion:**

Although small bowel obstruction is common, persistent omphalomesenteric duct as a cause of this condition is an exceptional finding in newborns. It is a highly severe condition, requiring quick and correct diagnosis as well as immediate, rational and effective therapy. Surgery is required for a definitive diagnosis and successful outcome.

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