Remnant causing obstruction! - A case of patent omphalomesenteric duct in adult

ABSTRACT

Omphalomesenteric duct remnant is a congenital anomaly associated with the primitive yolk stalk commonest remnant being Meckel's diverticulum. Persistence of omphalomesenteric duct in infants is a rare congenital anomaly present in 2% of the population with complete patency being observed in 0.1 % population. In adults, the incidence is not reported though there are a few case reports (approximately 23) out of which 13 cases presented as small bowel obstruction, 6 as mesenteric cyst, and 4 as discharge from the umbilicus. An exceptional case of persistent omphalomesenteric duct in adolescents leading to small bowel obstruction is hereby presented. After relevant investigations on exploratory laparotomy, a patent band identified as an omphalomesenteric duct causing small bowel obstruction was seen and resection and anastomosis were done. The patient was discharged on postoperative day 10 and is currently asymptomatic. In conclusion, the persistent omphalomesenteric duct is an extremely rare cause of small bowel obstruction in adults, while it can be taken into consideration in patients without a history of previous abdominal surgery.

KEYWORDS- Omphalomesenteric duct; Meckel's diverticulum; intestinal obstruction

INTRODUCTION

Small bowel obstruction is a surgical emergency that requires quick and correct diagnosis as well as immediate, rational and effective management[1]. It is a major cause of morbidity around the world and a significant cause of admissions for emergency surgical treatment [1,2]. One of the rarest causes of small bowel obstruction is a persistent omphalomesenteric duct, particularly in adults.[3]

The omphalomesenteric duct remnant is a congenital anomaly associated with the primitive yolk stalk [4,5]. The commonest remnant of the omphalomesenteric duct is Meckel’s diverticulum [5,6]. An omphalomesenteric duct remnant in childhood presents with intestinal obstruction, black stools or melena, pain in the abdomen and umbilical hernia or drainage [4,5]. In adults, the persistence of the omphalomesenteric duct is rare and the persistent duct causing small bowel obstruction is extremely rare, which is being presented here.

CASE REPORT

A 14-year-old male mentally sound patient without any medical or abdominal surgical history presented at our emergency department with colicky abdominal pain, vomiting, absence of passage of gas and faeces with abdominal distension of 72-hour duration. On physical examination, the abdomen was distended and the routine blood tests such as complete blood count, and renal and liver function tests were normal. Abdominal X-ray revealed multiple air-fluid levels in the periphery suggestive of small bowel obstruction (Figure 1). The patient was admitted with the above findings and underwent a CT scan of the abdomen after resuscitation.

FIGURE 1 X-ray abdomen erect showing multiple air-fluid levels

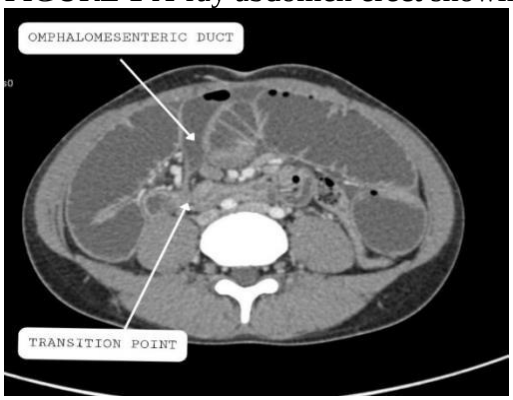

FIGURE 2 CT abdomen showing persistent omphalomesenteric duct

Computed tomography (CT) of the abdomen and pelvis demonstrated dilated small bowel and a band like structure originating from the umbilicus and extending to the transition point in the small bowel loops; a remnant of the omphalomesenteric duct was suspected (Figure 2).

The patient was kept nil per oral, a nasogastric tube was inserted and Foley's catheterisation was done. The patient was started on intravenous fluid therapy and an exploratory laparotomy was done, which revealed a duct with a patent lumen extending from the anti-mesenteric border of the terminal part of the ileum extending to the posterior wall of the umbilicus was seen, causing a closed-loop ileal obstruction. The omphalomesenteric duct was resected along with the segment of the ileum and resection anastomosis was done. The patient was gradually started on feeds on postoperative day 2 and was shifted to a full diet on postoperative day 3 and was discharged after two weeks and is currently asymptomatic. The histopathological report did not show the presence of ectopic gastric or pancreatic tissue. At follow-up, he was symptom-free and not on any medications on a full diet.

DISCUSSION

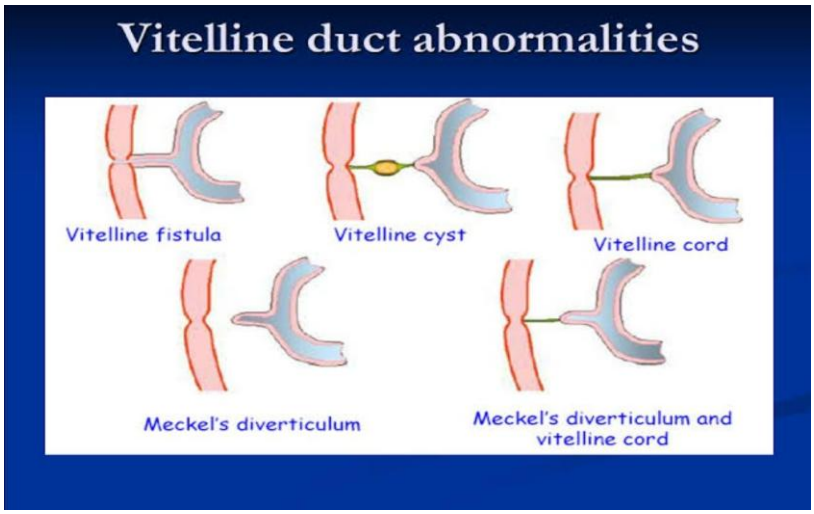

FIGURE 3 Diagrammatic representation of Vitello-intestinal duct abnormalities

Acute small bowel obstruction is a common surgical emergency [1,2]. Immediate and correct diagnosis of this condition and its aetiology are essential and appropriate treatment is needed [3]. The clinical presentation of these patients [3,6] along with the cause of obstruction [1] is variable while appropriate management remains controversial [1,2,7,8]. The most common symptoms and signs of small bowel obstruction, although variable is abdominal pain, vomiting, constipation, abdominal distension and tenderness [3,7]. Adhesions, incarcerated hernias, and large bowel cancer constitute the most frequent causes of obstruction while adhesions are the leading cause accounting for 45%-80%[1,7,9]. Miscellaneous causes of bowel obstruction account for 2-3% of all cases but should be considered in the differential diagnosis are intussusception of the bowel usually secondary to pathologic lead point such as polyp or tumours, gallstones, enteroliths, phytobezoars [10]. Small bowel obstruction is extremely rare due to persistent omphalomesenteric duct, particularly in adults with very few cases reported in literature approximately 13 case reports/series in total [11-19]. The vitelline duct is the primitive connection of the yolk sac to the embryonic midgut and the anomalies are related to the failure of obliteration of the vitelline duct[4,5]. It normally becomes a thin fibrous band, which eventually disintegrates and is absorbed spontaneously between the 5th-10th week of gestation [4,5]. The omphalomesenteric duct will continue to grow if it fails to obliterate; the failure of such closure may result in various lesions which are determined by the stage of the arrest of normal involution. The following are the remnants of omphalomesenteric duct Meckel's diverticulum, ileal umbilical fistula, vitelline duct cyst or a fibrous cord connecting the ileum to the umbilicus diagrammatically represented in figure 3 [4,5,17]. The commonest small intestinal congenital anomaly is Meckel's diverticulum. The remnants of the omphalomesenteric duct may persist in approximately 2% of infants [17]. Although these malformations are found with an equal frequency between the sexes, the symptoms are encountered in males significantly [5].

Even though asymptomatic in most cases, common presentation of omphalomesenteric duct malformations includes abdominal pain, rectal bleeding, intestinal obstruction, umbilical drainage, and umbilical hernia[4,5] depending on the age of presentation. In most cases, the symptoms usually appear before the age of 4 years[4]. As the age increases usually symptoms don't appear. It has also been reported that 40% of the children with this anomaly have symptomatic lesions, while this anomaly is usually asymptomatic in adults [4].
There are various mechanisms for small bowel obstruction in the case of the persistent omphalomesenteric duct. Following are the mechanisms described mainly intussusception, in the case of a patent omphalomesenteric duct, volvulus or internal hernia (closed-loop obstruction) from a patent

omphalomesenteric duct or a fibrous connection between
the umbilicus and the ileum [11-16]. A patent duct connecting the umbilicus to the ileum, such as in this case,
results from a persistent omphalomesenteric duct that is not completely obliterated and absorbed. In general, appropriate treatment of obstruction of the small bowel, as well as its timing of surgery, remains unequivocal [1,2,7,8]. Management of this condition requires careful assessment and awareness while the appropriate treatment needs to be tailored according to the individual situation [9]. Many of these patients can be treated non operatively if there's an improvement in the symptoms due to spontaneous resolution of the obstruction. However, since the incidence of strangulation of the bowel is quite high, it should be done with greater caution [6,7,9].

FIGURE 4
Intraoperative image showing fibrocystic structure from anti-mesenteric border of preterminal ileum to umbilicus

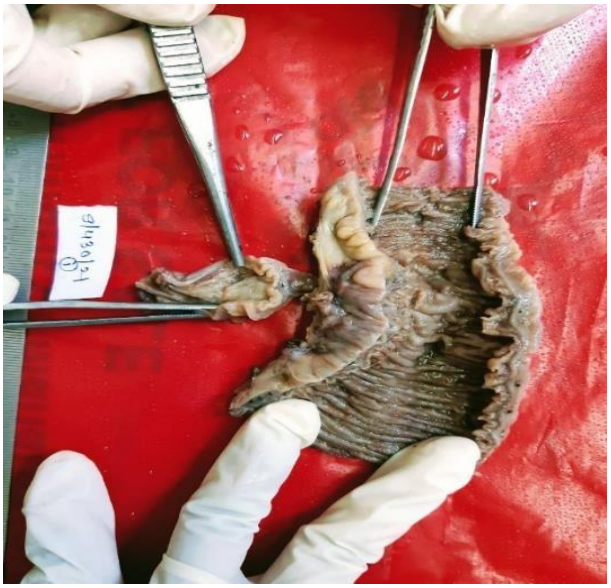

FIGURE 5
Gross histopathological examination showing the incomplete obliteration of omphalomesenteric duct

In the reported case, since there was no history of previous abdominal surgery and computed tomography suggestive of closed-loop small bowel obstruction was present, operative intervention was decided. Intraoperatively patent band extending from the terminal ileum to the anterior abdominal wall at the level of the umbilicus was seen and the lumen was palpable hence resection of that ileal segment along with the patent duct was done and the umbilical end was tied off which was left in situ (FIGURE 4,5). The intra-operative findings justified the treatment done for the patient.

Recent advances in diagnostic modalities have resulted in an increased incidental discovery of asymptomatic congenital anomalies. In such cases, the use of laparoscopic surgery is considered to be an effective, safe and less invasive treatment. (18)

In conclusion, persistent omphalomesenteric duct obstructing small bowel in adults is extremely rare, with very few cases reported all over the world in the literature. It should be taken into consideration in adults with acute small bowel obstruction without any prior history of abdominal surgery.

Competing interests: None

Consent and Ethical approval: Patient's and Hospital approval taken.

REFERENCES
1) Mucha P. Small intestinal obstruction. Surg Clin North Am 1987; 67: 597-620

2)Miller G, Boman J, Shrier I, Gordon PH. Natural history of patients with adhesive small bowel obstruction. Br J Surg 2000; 87: 1240-1247
3)Kadian YS, Verma A, Rattan KN, Kajal P. Vitellointestinal duct anomalies in infancy. Journal of Neonatal Surgery. 2016 Jul;5(3).
4) Cheadle WG, Garr EE, Richardson JD. The importance of early diagnosis of small bowel obstruction. Am Surg 1988; 54: 565-569
5)Vane DW, West KW, Grosfeld JL. Vitelline duct anomalies. Experience with 217 childhood cases. Arch Surg 1987; 122: 542-547
6) Moore TC. Omphalomesenteric duct malformations. Semin Pediatr Surg 1996; 5: 116-123
7)Kuremu RT, Jumbi G. Adhesive intestinal obstruction. East Afr Med J 2006; 83: 333-336
8)Bizer LS, Liebling RW, Delany HM, Gliedman ML. Small bowel obstruction: the role of nonoperative treatment in simple intestinal obstruction and predictive criteria for strangulation obstruction. Surgery 1981; 89: 407-413

9)Williams SB, Greenspon J, Young HA, Orkin BA. Small bowel obstruction: conservative vs. surgical management. Dis Colon Rectum 2005; 48: 1140-1146

10) Tito WA, Sarr MG. Intestinal obstruction. Shackelford's surgery of the alimentary tract. 1996;5:375-416.

11)Herman M, Gryspeerdt S, Kerckhove D, Matthijs I, Lefere P. Small bowel obstruction due to a persistent omphalomesenteric duct. JBR-BTR 2005; 88: 175-177
12) Bueno Lledó J, Serralta Serra A, Planeéis Roig M, Dobón Giménez F, Ibáñez Palacín F, Rodero Rodero R. Intestinal obstruction caused by omphalomesenteric duct remnant: usefulness of laparoscopy. Rev Esp Enferm Dig 2003; 95: 736-738
13)Amendolara M, Pasquale S, Perri S, Carpentieri L, Errante D, Biasiato R. Intestinal occlusion caused by persistent omphalomesenteric duct and Meckel's diverticulum: report of 2 cases. Chir Ital 2003; 55: 591-595
14)Armstrong O, Karayuba R. A rare cause of intestinal obstruction revealed during pregnancy (Kamenge University Hospital Center, Bujumbura, Burundi). Med Trop (Mars) 1993; 53: 93-99
15)Schillings GJ. Strangulation ileus is caused by a not completely obliterated omphalomesenteric duct in a 32-year-old patient. Zentralbl Chir 1987; 112: 383-386
16)Bedard CK, Ramirez A, Holsinger D. Ascending colon volvulus due to a vitelline duct remnant in an elderly patient. Am J Gastroenterol 1979; 71: 617-620
17)Gumport SL, Aronson SG. Acute intestinal obstruction secondary to Meckel's diverticulum with the persistent obliterated omphalomesenteric duct. Am J Surg 1959; 97: 225-228
18)Sawada F, Yoshimura R, Ito K, Nakamura K, Nawata H,

Mizumoto K, Shimizu S, Inoue T, Yao T, Tsuneyoshi M, Kondo A, Harada N. Adult case of an omphalomesenteric cyst resected by laparoscopic-assisted surgery. World J Gastroenterol 2006; 12: 825-827