**Patent Vitellointestinal Duct causing bowel obstruction in an Adolescent patient- A rare case report**

Dr Aishwarya Avnish¹, Dr Saguna Pandit²

¹(Senior Resident in Dept. Of General Surgery/Mahatma Gandhi Medical College and Hospital, Jaipur)  
²(PG student in Paediatrics/Mahatma Gandhi Medical College and Hospital, Jaipur)

**Corresponding Author: Dr Aishwarya Avnish**

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**Abstract:** The omphalomesenteric duct (OMD) more commonly referred as vitelline duct/ vitellointestinal duct is a remnant of the embryonic yolk sac and is considered a very unusual congenital anomaly occurring in less than 2% of population where it persists as embryonic yolk stalk. Patent vitellointestinal duct causing intestinal obstruction is a very rare condition in an adolescent patient. We have reported an extremely uncommon case of persistent vitellointestinal duct uncommonly causing small intestinal obstruction in an adolescent age group where exploratory laparotomy was performed which showed dilated jejunum and proximal ileum with collapsed distal ileum because of a presence of a unobliterated vitelline duct extending from the anti-mesenteric border of the ileum around 95 cms from ileocolic junction to the posterior wall of the umbilicus was noted with twisting of distal loop. Omphalomesentric duct remnants being congenital are associated with the primitive yolk stalk which normally becomes a thin fibrous band, and eventually disintegrates and is absorbed spontaneously by 5th - 9th week of gestation. Any failure in disintegration and absorption may lead to growing of the duct resulting in various anomalies as: Meckel’s diverticulum (most common), patent omphalomesentric duct or umbilicoileal fistula, umbilical sinus, umbilical cyst, umbilical mucosal polyp or a fibrous cord connecting the ileum to the umbilicus. In the reported case, since there was no history of previous abdominal operation and no resolution of the obstruction or improvement of the clinical picture of the patient was observed after a trial of conservative management, an operative intervention was decided. It should be kept in mind as a possible cause, in young patients presenting with acute mechanical small bowel obstruction without any previous history of surgery. Immediate intervention is to be implemented in order to reduce the mortality and morbidity.

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**I. Introduction**

The omphalomesenteric duct (OMD) more commonly referred as vitelline duct/ vitellointestinal duct is a remnant of the embryonic yolk sac and is considered a very unusual congenital anomaly occurring in less than 2% of population where it persists as embryonic yolk stalk. Most omphalomesentric duct remnants tend to be Meckel’s diverticulum while the occurrence of a persistent omphalomesentric duct is infrequent. A persistent vitellointestinal duct can induce abdominal pain, bowel obstruction, intestinal hemorrhage and umbilical sinus, fistula or hernia which commonly occurs in infants. Patent vitellointestinal duct causing intestinal obstruction is a very rare condition in an adolescent patient. We have reported an extremely uncommon case of persistent vitellointestinal duct uncommonly causing small intestinal obstruction in an adolescent age group.

**II. Keywords**

Vitellointestinal (omphalo-mesenteric (OMD)) duct, Meckel’s diverticulum, small bowel obstruction

**III. Case Presentation**

A 15yr old male presented with complaints of generalized pain abdomen along with bilious vomiting for the last 5 days, associated with abdominal distension and obstipation since last 4 days. He did not give any history of previous hospital admission or any operative/ medical history. He even denied any complaint of discharge from umbilicus. Family and personal history was insignificant. On examination the patient was ill, dehydrated with blood pressure measuring 110/70mm Hg and pulse rate being 116 per min with low volume. On Per Abdomen examination- abdomen was distended but soft, with tenderness in central part of the abdomen. There was no guarding/ rigidity, hyperdynamic bowel sounds were present (Fig 1). On per-rectal examination fecal staining was observed. Patient was resuscitated with wide bore IV lines, using crysaloids, nasogastric tube and Foley’s catheter inserted. After a conservative treatment for 24hours abdominal distension increased with tenderness and guarding all over the abdomen with absent bowel sounds, p/r being empty with ballooning. On routine Blood investigations hemoglobin was 12.2gm% with white blood cell count of

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19000cells/mm³ and platelet count of 160,000cells/mm³. His renal functions were mildly deranged. Abdominal erect skiagrams was suggestive of dilated small bowel loops with significant air fluid levels giving an impression of acute small bowel obstruction. Ultrasound of abdomen was done which revealed dilated bowel loops with minimal inter-bowel free fluid suggestive of intestinal obstruction. Emergency exploratory laparotomy was performed which showed eddilated jejunum and proximal ileum with collapsed distal ileum because of the presence of a unobliterated vitelline duct extending from the anti-mesenteric border of the ileum around 95 cms from ileocolic junction to the posterior wall of the umbilicus was noted with twisting of distal loop (Fig 2). The persistent vitello-intestinal duct was separated from the anterior abdominal wall and small gut was untwisted and duct was excised with anastomosis of the remaining bowel in two layers. Enlarged mesenteric lymph nodes were present and was excised (Fig 3) and sent for histopathological examination with the remaining specimen (Fig 4). Drain was placed and abdomen was closed in layers. Post-operative period was uneventful. Patient was discharged on 12th post-op day after suture removal. Histopathology reports confirmed the finding of persistent vitello-intestinal duct with reactive hyperplastic lymph nodes.

IV. Discussion

Incidence of small bowel obstruction is quite common in surgical practice⁷,⁹ Prompt and accurate diagnosis of such a condition is of utmost importance in decreasing the morbidity and mortality (8). The clinical picture is very decisive as many patients present with variable etiology of obstruction for which appropriate management remains controversial¹⁻⁶,⁹,¹⁶ Large number of patients with small bowel obstruction presents with abdominal pain, nausea and vomiting, constipation, abdominal distention and tenderness of variable degree. About 45-80% population presenting with intestinal obstructions were observed to have adhesions⁶,⁷,¹⁰,¹¹ whereas the rest have either adhesions, incarcerated hernias, and large bowel tumours. Crohn’s disease, bowel volvulus, and intussusception constitutes about 2-14% of the other known causes of small bowel obstruction especially in children⁶,¹⁰,¹¹. Small bowel obstruction, however, due to persistent omphalomesentric duct, particularly in an adolescent age group, is extremely rare with very few cases reported in world literature¹³,¹⁴,¹⁵. Omphalomesentric duct remnants (vitelline duct anomalies) have been reported to be congenital anomalies associated with the primitive yolk stalk²⁻⁵. It is the embryonic structure connecting the primary yolk sac to the embryonic mid gut which normally becomes a thin fibrous band, and eventually disintegrates and is absorbed spontaneously by 5th -9th week of gestation⁷. Any failure in disintegration and absorption may lead to growing of the duct resulting in various anomalies as: Meckel’s diverticulum, patent omphalomesentric duct or umbilicoileal fistula, omphalomesentric duct/umbilical sinus, omphalomesentric duct/umbilical cyst, umbilical mucosal polyp or a fibrous cord connecting the ileum to the umbilicus⁵,¹⁴,¹⁵. Out of the above mentioned anomalies Meckel’s diverticulum remains the most common and may persist in approximately 2% of the infants with a higher male preponderance whose exact reason is unknown. Even though they may be asymptomatic, however 85% of infants younger than 1 month and 77% of children aged 1 month to 2 years have a symptomatic presentation which includes abdominal pain, rectal bleeding, intestinal obstruction, umbilical drainage, and umbilical hernia. Some of the well known theories for the mechanism of obstruction in cases with persistent OMD includes intussusception, in case of a patent omphalomesentric duct, volvulus or internal hernia (closed loop obstruction) from a patent omphalomesentric duct or a fibrous connection between the umbilicus and the ileum¹²⁻³. A fibrous cord connecting the umbilicus to the ileum, such as in the presented case, results from an atrophic omphalomesentric duct that is not completely obliterated and absorbed¹⁰,¹²,¹⁴,¹⁵. In a nutshell, appropriate management of small bowel obstruction as well as timing of surgery still remains controversial⁶,⁷,⁹,¹⁰,¹⁶. Conservative strategy are effective and safe methods especially for adhesive small bowel obstructions¹⁷,¹⁸. However, if there is no history of an abdominal operation and no resolution of the obstruction findings, greater caution is required. Early diagnosis is especially important for the dangerous form of the obstruction, mainly the closed loop type obstruction, in which a segment of intestine obstructed both distally and proximally leads to rapid rise in the luminal pressure, and progresses to strangulation. In the reported case, since there was no history of previous abdominal operation and no resolution of the obstruction or improvement of the clinical picture of the patient was observed after a trail of conservative management, an operative intervention was decided. Operative findings and following management did very well justice to our patient.

V. Conclusion

Persistent omphalomesentric duct constitutes an extremely infrequent cause of small bowel obstruction in adolescent age group, with very few cases reported in the literature. It should be kept in mind as a possible cause, in young patients presenting with acute mechanical small bowel obstruction without any previous history of surgery. Immediate intervention is to be implemented in order to reduce the mortality and morbidity.
References


 IMAGES

Fig 1. Plain film shows multiple loops of dilated small bowel and air-fluid levels.
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Fig 2. Intraoperative image showing patent vitellointestinal duct

Fig 3. Excised specimen of the vitelline duct with the ileal segment with ischemic changes
**Fig 4.** Histopathological report of the patient suggestive of vitelline duct with reactive hyperplasia, without any evidence of meckels diverticulum.