

MIDGUT VOLVULUS DUE TO HERNIATION OF THE ILEUM INTO THE RIGHT PARADUODENAL RECESS FOLLOWING BLUNT ABDOMINAL TRAUMA

Md Minhajuddin Sajid¹ Md Khurshid Alam Sarwar¹ M A Mushfiqur Rahman¹
Md. Akbar Husain Bhuiyan² Md Abdullah Al Farooq² Tanvir K Chowdhury³ Md Golam Habib⁴

Summary

Midgut volvulus with gangrene is not a rare event. With normal rotation, the mesentery is broad and fixed, but the narrow pedicle formed by the base of the mesentery in malrotation of the gut predisposes the midgut to clockwise twisting from the duodenum to the transverse colon. Excessive length of the mesentery, or a point of adhesion at the convexity of the loop may act as an axis for the loop. The actual inciting mechanism is unknown but various possibilities, including unusual movement of the torso, abnormal intestinal peristalsis, or segmental bowel distention, have been suggested. This is a grave surgical emergency to save the life of the patient. We are reporting a case of midgut volvulus with herniation of the ileum into the right paraduodenal recess after blunt abdominal trauma (BAT). A 8 years old boy complaints of abdominal pain, vomiting, and distension of the abdomen following diving to a pond. Abdominal x-ray and USG, CBC, Serum Electrolyte were carried out to evaluate the child. The patient was first treated conservatively but later on, he deteriorated and needed urgent laparotomy.

Key words

Midgut volvulus; internal herniation; paraduodenal recess.

Introduction

The bowel may twist on its own blood supply, this condition is termed volvulus. When volvulus involves the entire small bowel, it is referred to as mid-gut volvulus. Intestinal malrotation is a defect that occurs at the 10th week of gestation.

During this stage of development, the intestines normally migrate back into the abdominal cavity following a brief period where they are temporarily located at the base of the umbilical cord. As the intestine returns to the abdomen, it makes two rotations and becomes fixed into its normal position, with the small bowel centrally located in the abdomen and the colon (large intestine) draping around the top and sides of the small intestine. When rotation is incomplete and intestinal fixation does not occur, this creates a defect known as intestinal malrotation [1]. Midgut malrotation is a congenital anomaly presenting mainly in the childhood [2]. Its presentation as an acute intestinal obstruction is extremely rare in adults, usually recognized intra operatively therefore a high index of suspicion is always required when dealing with any case of acute intestinal obstruction [3,4]. An internal abdominal herniation is the protrusion of an abdominal organ through a normal or abnormal mesenteric or peritoneal aperture [5].

Paraduodenal recess is an occasional recess in the peritoneum to the left or right of the terminal portion of the duodenum located posterior to a fold containing the inferior mesenteric vein [6]. We are presenting a rare case of malrotation, herniated small bowel into right paraduodenal recess with midgut volvulus.

Case

A 8 years old boy, hailing from Harshtaya, Satkania, Chittagong was admitted in the ward of pediatric surgery of Chittagong Medical College Hospital (CMCH) on 21/08/2012 with the complaints of pain in the abdomen for one day, distension of the abdomen for the same duration followed by vomiting once. On query, he gave history of diving into a pond from a height on the same day just before the attack of abdominal pain. The patient gives a history mild abdominal pain 1 year back which subsided later without any treatment. On examination, the patient was ill looking, mildly anemic, temperature 99^o F, the pulse rate was 124/min and BP was 90/60 mm Hg. Abdomen was distended, tense, non-tender, and no mass could be palpated. Bowel sound was present and rectum was found empty. Several investigations were carried out

-
1. Assistant Professor of Pediatric Surgery
Chittagong Medical College, Chittagong
 2. Associate Professor of Pediatric Surgery
Chittagong Medical College, Chittagong
 3. Assistant Registrar of Pediatric Surgery
Chittagong Medical College, Chittagong
 4. Medical Officer
Bangladesh Institute of Tropical & Infectious Diseases, Chittagong

Correspondence : Dr Md Minhajuddin Sajid
e-mail- minhajsajid@yahoo.com

during his stay in hospital. Plain X-ray abdomen A-P view revealed intestinal obstruction with several fluid and gas levels and coils of bowel was mostly on the Right side. USG of whole abdomen showed intestinal obstruction associated with mild peritoneal collection with intestinal ascariasis. On the day of admission (21/08/2012), serum electrolytes were normal and serum creatinine was 1.2 mg/dl. The patient was treated conservatively but did not respond. On 2nd day, a mini laparotomy was carried out with a supra umbilical transverse incision and hemoperitoneum was found, 30ml of blood was sucked out. But, gradually, the clinical condition of patient was worsening. On 26/8/2012, pulse rate was 112/min, BP 100/60mm Hg, temperature 100⁰ F, moderate anemia and dehydration with a urine output of 10ml. Decision was taken for immediate laparotomy and after preoperative preparation abdomen was opened by an extended midline. Foul smelling serosanguinous fluid came out. There was volvulus of the small intestine, which was distended like a tyre, a part of the small intestine was found gangrenous from the proximal part to the distal part of ileum 15cm proximal to the ileocaecal valve. The volvulus segment was twisted clockwise with herniation into the right paraduodenal recess. [Fig-1] The gangrenous part of the ileum was resected with ileo-ileal anastomosis. The sac of the paraduodenal recess was resected.[Fig-2] There was also ladd's band associated with malrotation of the gut. The band was released and malrotation corrected. Abdomen was closed in layers.

On 3rd postoperative day (POD), while checking, the dressing was found soaked. Serous fluid came out after removal of dressing and burst abdomen noted. Re-laparotomy was done and anastomotic leakage noted. After abdominal toileting, ileostomy was fashioned. Abdomen was closed by tension suture. The patient was discharged on 04/10/2012 with the advice to come after one month for ileostomy closure. After 1 month, the patient came back to the Pediatric surgery ward on 05.11.2012 and ileostomy closure was carried out on 25.11.2012. Postoperative period was uneventful and the patient was discharged again on 04.12.2012.

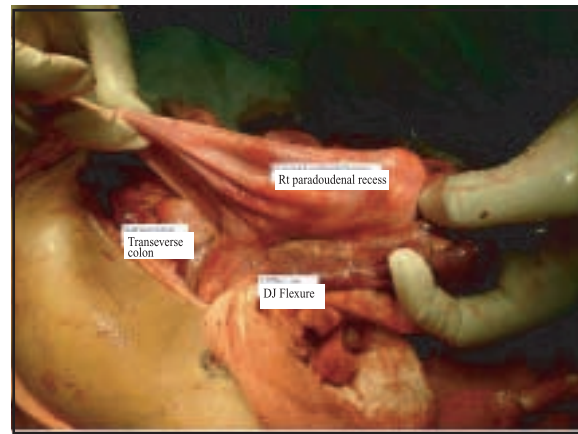


Fig 1 : Demonstration of right paraduodenal recess.



Fig 2 : Sac of right paraduodenal hernia before excision.

Discussion

Congenital internal hernias result from malformation of the peritoneum and, in some instances, midgut malrotation during the embryonic period [7]. Lack of fixation of the mesentery of the right or left mesocolon, or of the duodenum, may result in the formation of potential spaces for hernias. Internal hernias are associated with recurrent entrapment of bowel with potential obstruction and strangulation which account for a small percentage of small intestinal obstructions (0.6–5.8%) [2,7]. The most commonly seen internal hernias are the right and left mesocolic or paraduodenal hernias [3]. A right mesocolic hernia is produced when the pre-arterial limb fails to rotate around the superior mesenteric artery and the bowel loops are entrapped by the mesentery of the caecum and right or ascending colon [3].

Malrotation of the intestinal tract is a product of an aberrant embryology [7]. Contrast enhanced CT can show the abnormal anatomic location of a right sided small bowel, a left sided colon and an abnormal relationship of the superior mesenteric vein (SMV) situated to the left of the superior mesenteric artery (SMA) instead to the right. As the consequences of malrotation with midgut volvulus may be catastrophic, an understanding of the anatomy, diagnostic criteria and appropriate therapy for this emergency condition is imperative [7].

A number of other acute and chronic signs of disease are related to intestinal malrotation and lack of fixation. These include chronic abdominal pain, malabsorption and malnutrition, and subsequent growth disturbances. This can result in the loss of most of the intestine. In some case, it may also result in death [1]. Most of the cases of paraduodenal hernia occur on the left side but small percentages of cases also occur on the right side [7]. Clinically, internal hernias can be asymptomatic or cause significant discomfort ranging from constant vague epigastric pain to intermittent colicky periumbilical pain [8,9]. Additional symptoms include nausea, vomiting (especially after a large meal), and recurrent intestinal obstruction [8-12]. Symptom severity relates to the duration and reducibility of the hernia and the presence or absence of incarceration and strangulation [12]. These symptoms may be altered or relieved by changes in patient position [9,11]. Because of the propensity of these hernias to spontaneously reduce, patients are best imaged when they are symptomatic [9,11]. Imaging studies often play an important role in the diagnosis of internal hernias because they are often difficult to identify clinically. In the past, these hernias were most frequently assessed with small-bowel oral contrast studies. However, CT has become the first-line imaging technique in these patients because of its availability, speed, and multiplanar reformatting capabilities. General radiographic features with barium studies include apparent encapsulation of distended bowel loops with an abnormal location, arrangement or crowding of small-bowel loops within the hernial sac, evidence of obstruction with segmental dilatation and stasis, with additional features of apparent fixation and reversed peristalsis during fluoroscopic evaluation [8,9]. On CT, additional findings include mesenteric vessel abnormalities, with engorgement, crowding, twisting, and stretching of these vessels commonly found and providing an important clue to the underlying diagnosis [11].

Our patient had a previous history of abdominal pain but presented later on an acute condition and the inciting cause was a dive into a pond from a height. We have done only abdominal X-ray and USG that only gave a clue of intestinal obstruction. No upper GI contrast was carried out before. CT scan was not done before or during acute condition. The pathology was a herniation into the right paraduodenal recess with presence of ladd's band and high up caecum. There was herniation with entrapment of the most of the jejunum and ileum with gangrene of a portion of ileum. This was completely similar to a case of malrotation with malfixation.

High index of suspicion with the acumen of an experienced surgeon is required to diagnose and manage a case like this.

Conclusion

Anomalies like midgut malrotation with internal herniation can present as an operative surprise. If its not detected it will lead to gangrene. Suspicion and awareness regarding it can help the surgeons to salvage the patients.

Disclosure

All the authors declared no competing interest.

References

1. Cincinnati Children's Hospital Medical Center. intestinal malrotation and volvulus. Health Topics. Home. 2013.[Available from] <http://www.cincinnatichildrens.org/health/i/intestinal-malrotation>.
2. Dott NM Anomalies of intestinal rotation: their embryology and surgical aspects with report of 5 cases. *Br J Surg*; 1923; 11:251.
3. Touloukian RJ, Smith EI: Disorders of rotation and fixation. In: Grosfeld J L, O'neil J A, Fonkalsrud E W et al. eds. *Pediatric surgery* Mosby, Missouri; 1998;5:1199-1214.
4. Mathieu D, Luciani A and the Germad group Internal abdominal herniation. *American Journal of Roentgenology* 2004;183(2): 397-404.
5. Meyers MA. *Dynamic radiology of the abdomen: normal and pathologic anatomy*, New York, NY: Springer Verlag, 1994;4.
6. *Stedman's Medical Dictionary*. Lippincott Williams & Wilkins; 2006. [Available from] <http://www.medilexicon.com/medicaldictionary.php?t=76424>

7. Singh S, Das A, Chawla AS et al A rare presentation of midgut malrotation as an acute intestinal obstruction in an adult: Two case reports and literature review. *Int J Surg Case Rep.* 2013;4(1): 72–75.
8. Ghahremani GG. Abdominal and pelvic hernias. In: Gore RM, Levine MS, eds. *Textbook of gastrointestinal radiology*, Philadelphia, PA: Saunders, 2000;1993-2009.
9. Meyers MA. *Dynamic radiology of the abdomen: normal and pathologic anatomy*, New York, NY: Springer-Verlag,1994;4.
10. Newsom BD, Kukora JS. Congenital and acquired internal hernias: unusual causes of small bowel obstruction. *Am J Surg* 1986; 152:279-284.
11. Blachar A, Federle MP, Dodson SF. Internal hernia: clinical and imaging findings in 17 patients with emphasis on CT criteria. *Radiology* 2001; 218:68-74.
12. Blachar A, Federle MP. Internal hernia: an increasingly common cause of small bowel obstruction. *Semin Ultrasound CT MR* 2002; 23:174-183.