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Original Research Paper

General Surgery

INVERTED MECKEL DIVERTICULUM – RARE CAUSE OF SECONDARY INTUSSUSCEPTION IN CHILDREN- CASE REPORT

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ABSTRACT **Introduction** Inverted Meckel diverticulum has been identified as the lead point for intussusception in adult in about 4%, very rare in pediatric age group and very few cases has been reported so far. Modern imaging helps but imaging and operative discordance are not reported. It is difficult to diagnose inversion of Meckel diverticulum preoperatively **Aims And Objective-** To report a case of 18-month-old girl presented with multiple episodes of bilious vomitings, pain abdomen and grossly distended abdomen, diagnosed with intussusception upon performing exploratory laparotomy there was an inverted Meckel diverticulum acting as a lead point for intussusception **Discussion-** Mechanism of inversion of Meckel diverticulum is not clearly understood. It is presumed that abnormal peristaltic movement around the diverticulum and non-fixity of the diverticulum itself. The inverted diverticulum itself can cause luminal compromise and acts as a lead point for intussusception leading to obstruction **Conclusion-** Intussusception due to inverted Meckel diverticulum is rare in children and can only be detected intraoperatively. A definitive preoperative clinical or radiological diagnosis is difficult. However inverted Meckel diverticulum is a definite clinical entity and may cause intussusception in children

KEYWORDS : Inverted Meckel Diverticulum, Intussusception, Md (meckel's Diverticulum)

INTRODUCTION-

Meckel's diverticulum is the most common congenital anomaly of gastrointestinal tract caused by an incomplete obliteration of vitelline duct (i.e., failure of the omphalomesenteric duct to close at 5-8 week of gestation) leading to patent proximal part of duct. Found in 2% of population with equal incidence in male and female [1]. The failure of this duct to disappear completely gives rise to various malformations such as omphalomesenteric cyst (incomplete atrophy at both ends), omphalomesenteric fistula (complete failure of atrophy), umbilical sinus (incomplete atrophy of the duct at its midgut side results in an umbilical sinus at its umbilical end), fibrous cord and Meckel Diverticulum. Although the ileo-umbilical fistula usually presents early because of fecal discharge at the umbilicus, the other anomalies are usually difficult to detect unless associated with some complications. Of these anomalies, Meckel's diverticulum is the commonest, accounting for nearly 98% of the cases of omphalomesenteric duct anomalies. MD is located typically on anti-mesenteric border at terminal ileum and very rarely on the mesenteric side. It is a true diverticulum containing all layers of the bowel wall [2]. Most patients remain undiagnosed and clinically asymptomatic till it becomes complicated. Complications of Meckel's Diverticulum are reported to occur in approximately 4-40% such as hemorrhage, intussusception, small bowel obstruction, and inflammation (diverticulitis) [3]. Occasionally inversion of Meckel's diverticulum occurs a phenomenon in which diverticulum invaginates upon itself into the lumen of the terminal ileum which is a rare pathology and even rarer to cause intussusception especially in pediatrics age group, very few cases has been reported in indexed literature so far [4,5]. The incidence of intussusception attributed to an inversion of Meckel's diverticulum is 4% which occurs when Meckel's diverticulum sags into bowel lumen and then acts a lead point to allow invagination of small intestine, first into distal ileum and then large intestine, causing ileo-ileal and ileocolic type of intussusception [6]. It is clinically and radiologically challenging to diagnose preoperatively and is discovered as incidental intraoperative finding.

Case Report

18-month-old girl admitted with multiple episodes of bilious vomitings, pain abdomen for 4 days high grade fever, abdominal distension for 2 days, no history of blood in stools, no delay in achieving milestones. She has no history of any intermittent abdominal pain, vomiting, bleeding per rectum, hematochezia, melena. On examination, the child was toxic, febrile with HR- 155bpm, spo02- 98% at room air. Abdomen was grossly distended, diffuse tenderness, no guarding or rigidity. on auscultation - bowel sounds were absent. Initially the child was resuscitated with NPO, Ryles tube aspiration, IV fluids and broad-spectrum antibiotics. Tlc- 23,410, Hb- 8.7 gm/dl, platelet adequate, and normal renal function.

Investigation-

Xray erect abdomen shows multiple air fluid levels. [figure1] Ultrasound examination shows dilated loops with sluggish peristalsis. To evaluate further CECT was done which showed intussusception noted within the ascending and transverse colon with dilation of proximal large bowel and small bowel loop. [figure2,3] With a preoperative diagnosis of intussusception child was planned for exploratory laparotomy after detailed informed consent.

Intraoperative findings-

complex ileo ileocolic intussusception with terminal ileum as intussusceptum and ascending colon as intussuscipiens, inverted Meckel diverticulum acting as lead point 20 cm from IC junction [figure4,5,7].

Procedure-

Reduction of intussusception and resection of segment of ileum and Meckel diverticulum and end to end ileo-ileal anastomosis. [figure6] Post op recovery was uneventful. child was discharged on post op day 7 and is doing well.

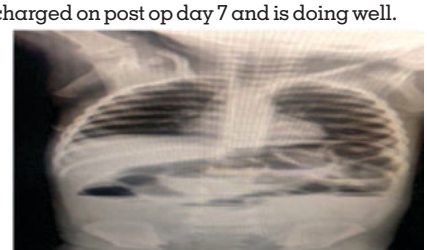

FIGURE 1 – Plain abdominal radiograph showing multiple air fluid

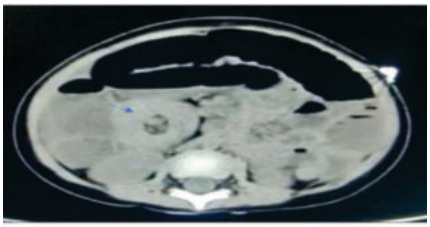

FIGURE 2- Computed tomography reveals intussusception within ascending colon and dilation of proximal loops

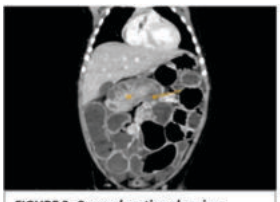

FIGURE 3- Coronal section showing ileocolic intussusception

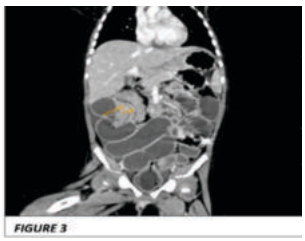

FIGURE 3

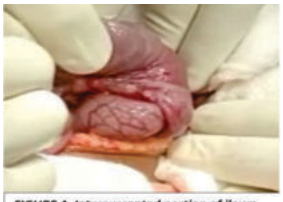

FIGURE 4- Intussuscepted portion of ileum attributed to inverted Meckel diverticulum

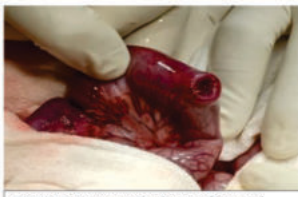

FIGURE 5- Intraoperative image of inverted diverticulum located 20cm from IC junction

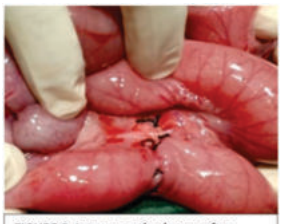

FIGURE 6- Intraoperative image after resection of segment of ileum and Meckel diverticulum and end to end ileo ileal anastomosis

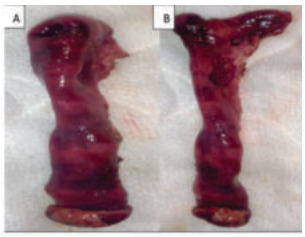

FIGURE 7- A- Specimen of inverted Meckel diverticulum with segment of ileum B- after reduction of Meckel diverticulum

DISCUSSION

The mechanism of inversion of Meckel diverticulum is not clearly understood. It is presumed that abnormal peristaltic movement around the diverticulum, non-fixity of the diverticulum itself and secondary to ectopic tissue or ulceration at base of MD may lead to inversion particularly when the ectopic gastric mucosa is present [7]. The inverted diverticulum itself can cause luminal compromise and act as a lead point for intussusception leading to obstruction. Ileocolic intussusceptions are most frequent and result in an edema, vascular compromise of bowel wall, which becomes ischemic and necrotic and ultimately perforates [9]. The median age of those presenting with this rare condition is 27.7 years. To our knowledge, there have been fewer than 50 reports of inversion of MD in the indexed literature to date, making it a rare finding, with the number of cases that were diagnosed pre-operatively representing a miniscule proportion of the total reported [8].

Patients with inverted MD can present with constellation of symptoms consistent with GI bleeding, intestinal obstruction, recurrent abdominal pain, vomitings depending on complication. It mainly causes two clinical manifestations: GI bleeding and intussusception.

Most complaints are of hematochezia and/or melena due to ulceration of the inverted MD. Ulceration may be caused by ectopic gastric or pancreatic tissues in the inverted MD itself but can also occur without accompanying abnormal ectopic tissues [9]. There is no gold standard diagnostic test that exists for an inverted MD causing intussusception.

Clinical diagnosis of inverted MD is often challenging. Radiography is the initial workup of patient presented with abdominal pain or obstruction but in case of diagnosing of inverted Meckel diverticulum it is of limited value. It shows findings of bowel obstruction or gas or air fluid levels within diverticulum [10]. In our case air fluid levels was seen suggestive of obstruction. In Ultrasonography it appears as a central fatty hyper echogenicity surrounded by echo- poor bowel wall, "double target "appearance of alternating concentric rings of echo poor diverticula and small bowel walls with echogenic mesenteric fat. "Gut signature" sign, as its wall consists of all the layers of a normal bowel wall [11]. Barium studies can demonstrate MD as blind ending pouch or saccular structure arising from the antimesenteric border of the terminal ileum. The diverticulum is directed away from the axis of the root of the mesentery, proving its antimesenteric location. Because of inversion of MD, it may be difficult for capsule endoscopy and colonoscopy to detect as it depends on access to lumen of diverticula [12]. CECT is the definitive investigation but can be missed it due to resemblance with lipoma, it appears as an intraluminal mass surrounded by a thick collar of enhancing soft tissue due to the entrapped peri enteric fatty tissue within the inverted serosal side of the diverticulum. It can be differentiated as a typical lipoma lacks a soft-tissue collar [13] but in our case inverted Meckel diverticulum was missed on USG and CECT and came out to be incidental finding intraoperatively.

Definitive treatment of an inverted MD is surgical resection of the involved segment of small bowel with subsequent anastomosis. The extent of resection is according to intraoperative findings and complications. Simple wedge resection and closure of defect is done if MD is narrow based and no palpable mass within diverticulum. In the case of GI bleeding segmental ileal resection is done [14]. In our case we did segmental resection of ileum and end to end anastomosis.

CONCLUSION

Intussusception due to inverted Meckel diverticulum is rare in children and can only be detected intraoperatively. A definitive preoperative clinical or radiological diagnosis is difficult. However inverted Meckel diverticulum is a definite clinical entity and may cause intussusception in pediatric age group.

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