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**Case Report**

# Inverted Meckel's diverticulum: a rare cause of intussusception in children

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## ABSTRACT

Invagination of proximal segment of intestine to distal one results in intussusceptions and is a common cause of intestinal obstruction in children. In most of the cases of intussusceptions, the cause is idiopathic in nature; the other causes may be infection, polyp or anatomical abnormalities. Occasionally, Meckel's diverticulum may cause intussusception and inverted Meckel's diverticulum leading to intussusceptions is very rare in children. It is difficult to diagnose inversion of Meckel's diverticulum preoperatively. Here in we report a case of 6 yrs old male child, who was operated for intussusception and found to have inverted Meckel's diverticulum as lead point.

**Keywords:** Intestinal obstruction, Inverted Meckel's diverticulum, Intussusception, Meckel's diverticulum

## INTRODUCTION

Intussusception, is a condition where a section of bowel invaginates into the distal section of bowel and is seen in about 56 children/100,000/year.[1] Mostly they are idiopathic, a pathologic lead point can only be identified in 25% cases. The most common site for intussusception is ileocolic, but it may occur at any point in the small or large intestine. Meckel's diverticulum is a true diverticulum and the most common gastrointestinal malformation, occurring in 2% of the population.[2] It is a developmental anomaly of gut due to persistence of vitello intestinal duct and may contain ectopic gastric or pancreatic tissues.[3] In majority of cases, they are asymptomatic and detected incidentally, but may present with rectal bleeding, melena and/or haematochezia. There is 4% chance of complications like Meckel's divert-iculitis, intestinal obstruction, volvulus, perforation, intussusception.[3] Intussusception is a known complication of Meckel's diverticulum, but inverted Meckel's diverticulum leading to intussusception is very unusual.

Inverted Meckel's diverticulum has been identified as the lead point for intussusceptions in adults in about 4% cases.[4] It is rare in paediatric age group, very few cases have been reported so far.[1,5-7] A six year old male child was managed who presented with acute intestinal obstruction due to intussusception. On exploratory laparotomy, inverted Meckel's diverticulum was found to be the lead point, because of its rarity in children, we are reporting this case.

## CASE REPORT

A six-year-old male child was admitted to emergency department with complain of pain abdomen, bilious vomiting and bleeding per rectum 2 times in last 3 days. On examination, the child was conscious, oriented, afebrile with HR-90/min, RR-24/min, and SPO2-98% in

room air. He presented with gross distension of abdomen with diffuse tenderness all over the abdomen with absent bowel sounds. There was no past history of intermittent pain abdomen, vomiting, bleeding per rectum, hematochezia or melaena. Initially child was managed with NPO, RT aspiration, IV drip and broad spectrum antibiotics and investigated. He had leukocytosis and normal renal functions. Straight X-ray abdomen showed multiple air fluid levels. Ultrasound examination of abdomen detected telescoping of bowel loop into itself in right iliac fossa giving appearance of target lesion suggestive of ileo colic intussusception. With a preoperative diagnosis of intussusception exploratory laparotomy was performed in emergency and found to have an ileo-colic intussusception. Inverted Meckel's diverticulum was detected to be the lead point of intussusception (Figure 1 and 2). As the portion of ileum up to ileocaecal junction was not viable and had multiple tears (Figure 3), resection of the affected segment and end to end anastomosis of ileum with ascending colon was performed. A polyp like lesion was palpated inside the lumen of Meckel's diverticulum after reduction. Enterotomy revealed no polyp or nodule and the oval mass was resembling an impacted fecolith (Figure 4). He had an uneventful recovery. Histopathology of Meckel's diverticulum showed hyperplasia of lymphoid follicles. Post operative recovery was uneventful. The patient was discharged on 10$^{th}$ post operative day and was doing well on follow ups for about six months.

**Figure 1: Intra operative of intussusceptions.**

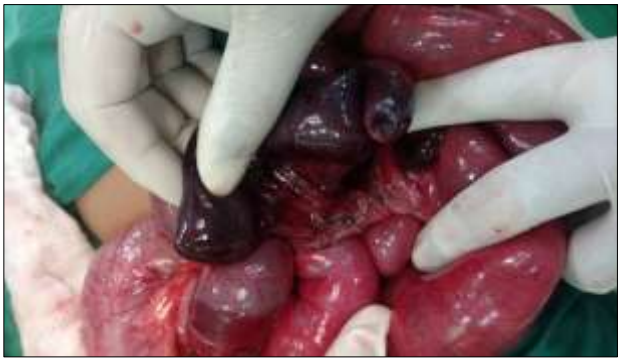

**Figure 2: Intra operative of partial inversion following reduction.**

**Figure 3: Gangrene with Meckels diverticulum.**

**Figure 4: Enterotomy of fecolith like mass.**

## DISCUSSION

Meckel's diverticulum may cause intestinal obstruction in both adult and children. At times inversion of Meckel's diverticulum causes intussusception, ischemia, and infarction. It is reported that 21% of Meckel's diverticulum are found to be inverted but 72% of them present with intussusception.[6] Overall cchance of intussusception due to inverted Meckel's diverticulum is only 4%.[4] It is more common in adults and rarely seen in children.[6,7] The cause of inversion of Meckel's diverticulum is not fully understood. It is presumed that abnormal peristaltic movement secondary to ectopic tissue or ulceration at the base of Meckel's diverticulum may lead to inversion particularly when ectopic gastric mucosa is present.[6,7] This inverted Meckel's diverticulum behaves as a lead point and cause intussusception.

Barry III et al reported a patient of 10 years old female child presenting with 2 months history of pain abdomen and non-bilious vomiting. Basing on USG and CT scan finding intussusception was diagnosed and on exploration Inverted Meckel's diverticulum was identified as the cause.[1] Lima et al, managed a two year old male child having pain abdomen, vomiting and bloody stool and found to have an inverted Meckel's diverticulum as a lead point of intussusception.[5] In 2013, Bilal Mirza reported a case of two year old girl having inverted Meckel's diverticulum with a polyp like growth, which was found to be pancreatic tissue on histopatho-logy.[6] Inverted Meckel's diverticulum causing intussus-ception

in 18 months male child was reported by Singhal et al.[8] All these patients were operated for intussusception and detected to have inverted Meckel's diverticulum as lead point. However clinically it is difficult to identify the cause. Intussusception may be of jejuno-jejunal, ileo-ileal, ileo-colic, ileo-caecal or colo colic type. The usual presenting symptoms are pain abdomen, bilious vomiting, painless rectal bleeding (red currant jelly), sometimes an abdominal lump is also palpable. Inverted Meckel's diverticulum usually leads to ileo ileal or ileo colic intussusception. In our case, six yrs male child presented with acute abdomen with three days history of pain abdomen, bilious vomiting and bleeding per rectum. He had gross distension of abdomen with features of peritonitis and absent bowel sounds and had leukocytosis. There was no past history of pain abdomen, bleeding per rectum or hematochezia. No abdominal lump was palpable.

In acute intestinal obstruction plain x-ray abdomen in erect posture is the initial investigation which may show multiple air fluid levels but is non-specific for diagnosing intussusception. Ultrasound examination of abdomen may detect classical appearance of target or doughnut sign on transverse view and pseudo kidney sign on longitudinal view.[9] Abdominal CT scan is most sensitive radiological method of investigation for intussusception.[9,10]

A barium or contrast enema may show a coiled spring appearance, but its usefulness is limited in diagnosing intussusceptions involving ileo caecal junction. However Barium fluoroscopy in combination with CT scan may be helpful in diagnosing inverted Meckel's diverticulum.[9] Lee et al. In 2009 described colonoscopic features of intussuscepted Meckel's diverticulum presenting with hematochezia in an adult patient. But it is of little use for assessment of intussusception.[10] Angiographic appearance of inverted Meckel's diverticulum was described by Sindoh et al.[11] This is again of no help in acute cases.

In this case there were multiple air fluid levels on plain X-ray abdomen; USG abdomen detected the classical target signs suggestive of intussusception. Authors did not opt for CECT abdomen as there was no confusion with the diagnosis.

Surgical exploration followed by reduction or resection is the preferred treatment in intussusception cases.Air or contrast enema has significant therapeutic value with reduction rate of 80 and 70 percentage respectively.[12] Air contrast enema is considered gold standard in paediatric patients.[8] Barium enema is contraindicated in suspected bowel ischemia with necrosis, severe shock sepsis or extreme age and it should not be attempted in patients presenting beyond 24 hours.[8] Surgical interventions are indicated if patient is unstable, intestinal perforation or non operative reduction is unsuccessful or there is a late presentation after 24 hours. Now a day's laparoscopic surgery or lap assisted surgery is gaining popularity as it is safe and effective .[9,13] One should be very selective in pediatric patients having tense abdomen with diffuse peritonitis. As the abdomen was grossly distended with diffuse tenderness and muscle guarding, we suspected gangrene and preferred open surgery. In our case, exploratory laparotomy was performed. Ileo-colic intussusception was detected. Though reduction was successful, the affected segment was gangrenous with multiple serosal tears. A polyp like lesion was palpated after reducing inversion of Meckel's diverticulum, but on enterotomy there was no polyp or nodule, the oval mass resembled an impacted fecolith and probably that acted like a lead point. Hence resection and end to end anastomosis of ileum with ascending colon was performed.

Histopathology may detect ectopic gastric or pancreatic tissue in 73% cases. Gastric tissue accounts for 97% of all ectopic tissues.[13] It is also useful to identify benign or malignant lesions. In our case histopathology report revealed hyperplasia of lymphoid follicles in entire length. And there was no evidence of malignancy or any ectopic tissues. Our finding was different from that of Bilal Mirza, who detected ectopic pancreatic tissue in inverted Meckel's diverticulum.[6]

Child had an uneventful recovery and was doing well on subsequent follow ups for about six months.

## CONCLUSION

Intussusception due to inverted Meckel's diverticulum is rare in children and can only be detected intra operatively. A definite pre operative clinical or radiological diagnosis is difficult. However, inverted Meckel's diverticulum is a definite clinical entity and may cause intussusceptions in children.

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