A RARE PRESENTATION OF MECKELS DIVERTICULUM WITH LADD'S BAND- REVIEW ARTICLE

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ABSTRACT
The purpose of this review article is to present a rare case of Meckel's diverticulum though common in children less than 2 years, but we present a case of 16-yearold female who presented with abdominal pain, CT was done which was suggestive of small volvulus. Operative management was discussed with the patient and consent was taken for laparoscopy and laparotomy if indicated. Laparoscopy showed ladd's band connecting parietal peritoneum of umbilicus and ileal loops and Meckel's diverticulum (incidental finding), patient was planned for laparotomy for meckelian diverticulectomy with closure of enterotomy.
Keywords: Meckle's diverticulum, ladd's band, small volvulus, rare presentation

INTRODUCTION
Meckel diverticulum is caused by the incomplete obliteration of the omphalomesenteric duct in the developing embryo. It is the most common congenital anomaly of the gastrointestinal (GI) tract.[1] The incomplete obliteration of the duct results in a diverticulum in the small intestine. Often, these are completely asymptomatic.[2] If the duct fails to partially or entirely separate and involute, it can result in an omphalomesenteric cyst, omphalomesenteric fistula that drains through the umbilicus, or a fibrous band from the diverticulum to the umbilicus, which can cause an obstruction.[3] This embryonic remnant arises from the antimesenteric border of the ileum.[4] Meckel diverticulum occurs in 2% of the population, 2% are symptomatic, children are usually less than 2 years, affects males twice as often as females, is located 2 feet proximal to the ileocecal valve, is 2 inches long or less, and can have 2 types of the mucosal lining.[5,6]
The majority of Meckel's diverticulum, whose prevalence is ranging from 1 to 4% of the population, is clinically silent and is incidentally identified at surgery or during autopsy.[7]

The frequent complications of Meckel's diverticulum are haemorrhage, intestinal obstruction, and diverticulitis. Intestinal obstruction is the second most common complication of Meckel's diverticulum[8] and can be caused by intussusception, small bowel volvulus around a diverticular band anchored to the anterior abdominal wall, axial torsion of Meckel's diverticulum, Littre's hernia, and incarceration of a bowel loop via a mesodiverticular band.[7] Although it is classically described as painless rectal bleeding, some patients may present with abdominal pain.[9]

REVIEW OF LITERATURE

Meckel's diverticulum was first described in a paper published in 1809 by the German anatomist, Johann Friedrich Meckel, the younger (1781–1833), who described it as a remnant of the omphalo-mesenteric duct,[1] although such an abnormality had been mentioned quite early by Fabricius Hildamus in 1598 and in 1671 by Lavater. However, it was not until almost 100 years later that the understanding of Meckel's diverticulum increased with the discovery of ectopic gastric mucosa's by Salzer and associated ulceration of ileum by Deetz.[10] In the foetal life, the omphalo-mesenteric duct connects the yolk sac to the intestinal tract and usually it obliterates in the 5th to 7th week of life. If obliteration fails, the congenital anomalies develop, leading to the residual fibrous cords, umbilical sinus, omphalo-mesenteric fistula, enterocyst and most commonly, Meckel's diverticulum.

In a Meckel diverticulum, the ectopic gastric mucosa secretes an acid that is not neutralized resulting in ulceration of the adjacent mucosa leading to painless rectal bleeding. The ectopic mucosa can also originate from the pancreas, jejunum, or a combination of the mucosa.[11]

The site of the bleeding is usually distal to the diverticulum and not within the diverticulum. The presence of a fibrous band attached to the diverticulum can result in small bowel obstruction.

The most sensitive test is a Meckel radionuclide scan (commonly known as a Meckel scan). It is a nuclear study done by injecting technetium-99m, which is absorbed by the ectopic gastric mucosa allowing for visualization of the Meckel diverticulum. The uptake of the dye can be enhanced using cimetidine or glucagon. The feeding artery of the Meckel diverticulum, (an anomalous superior mesenteric artery branch), has a long and non-branching course and ends toward the right lower quadrant.

A retrospective study by Jeng-Jung Chen,[12] Hung-Chang Lee, "Meckel's diverticulum: factors associated with clinical manifestations" was done on 126 patients at Mackay Memorial Hospital in Taiwan from 1984 to 2009. The diagnosis was made according to surgical and pathologic findings. Data extracted from the charts included gender, the age at presentation, clinical manifestations, and the surgical and pathologic findings, and they concluded that Age, gender, and pathology affect the clinical presentations of Meckel's diverticula.

A study in July 2017 "Meckel's diverticulum in the adult" by J. Lequet a, B. Menahem, concluded that resection is indicated in case of complications but remains debatable when MD is found incidentally. According to an analysis, surgery is not indicated in the absence of risk factors for complications: these include male gender, age younger than 40, diverticulum longer than two centimetres and the presence of macroscopically mucosal alteration noted at surgery. Resection followed by anastomosis seems preferable to wedge resection or tangential mechanical stapling because of the risk of leaving behind abnormal heterotopic mucosa.

One such case report on 17year male by Serdar Kuru, Hakan Bulus, Kemal Kismet on dec'2013 at a General Surgery Department, Kecioren Training and Research Hospital, b General Surgery Department, Ankara Training and Research Hospital, Ankara, Turkey, diagnosis was mechanical intestinal obstruction with mesodiverticular band of Meckel's diverticulum, a manual two-layer, end-to-end anastomosis was performed to restore the continuity of the small bowel. The study concluded incidence of an internal hernia caused by a mesodiverticular band of Meckel's diverticulum is rare. It may be overlooked in the case of intestinal obstruction

because of nonspecific symptoms. Delay in the diagnosis can lead to significant morbidity and mortality.

In 2018, 'A Rare Presentation of Meckel's Diverticulum: A Case Report' done by Naif Almalki, Turki Almalki, in a 24-year male patient, revealed Multiple adhesions at ascending colon and distal small bowel with incidental finding of Meckel's diverticulum with severe adhesion around, for which bowel resection and side to side anastomosis was done.

In 2018, Carl Christian Hansen, "systematic review of epidemiology, presentation, and management of Meckel's diverticulum in the 21st century" conducted a systematic database search on studies reporting the epidemiology of Meckel's diverticulum and concluded that the general properties of Meckel's are stable and well described in the recent literature, which for the most part consists of retrospective studies. Symptomatic Meckel's is managed by surgical resection, but the issue of prophylactic resection remains controversial and unresolved.

CASE REPORT

A 16-year female presented with complaints of pain in umbilical region for 2 days, insidious in onset, non-progressive, and non-radiating. Patient also gives history of intermittent diarrhoea for 3 months. Patient has similar complaints since past 3 years (on/off). There was no history of nausea, vomiting, fever, or bladder abnormality. No previous medical or surgical illness. The patient was vitally stable. Per abdomen was soft, non-distended, tenderness present at right iliac fossa on deep palpation, no organomegaly, bowel sounds were audible at all four quadrants. Biochemical analysis was within normal limits. A computed tomography (CT) of abdomen and pelvis with contrast showed twisting mesenteric vessels and adjoining small bowel loops appear just beneath anterior abdominal wall in mid line in infraumbilical region-small volvulus. Few sub centimetric sized mesenteric lymph nodes noted in right iliac fossa-reactive. Decision of diagnostic laparoscopy was done under general anaesthesia. There was evidence of ladd's band connecting parietal peritoneum of umbilicus and ileal loops and evidence of Meckel's diverticulum ,2 feet away from ileo-caecal junction adherent to umbilicus parietal peritoneum. (Figure-1,2) Ladds band near the parietal peritoneum was dissected. Intra-op decision was taken for exploratory laparotomy with due consent, meckelian diverticulectomy with closure of enterotomy (figure 3) was done. Abdomen drain and Ryles tube were inserted till POD-5 and POD-3 respectively. There were no postoperative complications. HPE was suggestive of Meckel's diverticulum. Patient was discharged on post-op day-7 and suture removal was done on POD-11.

DISCUSSION

Johann Friedrich Meckel first described the embryological origin of congenital diverticulum of the midgut in 1809.[13] It is difficult to establish diagnosis preoperatively but computed tomography (CT), Technetium-99m and ultrasound are helpful for excluding other causes and determine some complications such as intussusception, volvulus and perforation.[1] The correct diagnosis of Meckel's diverticulum before surgery is often difficult because a complicated form of this condition may be clinically indistinguishable from a variety of other intraabdominal diseases such as acute appendicitis, inflammatory bowel disease, or other causes of small bowel obstruction.[14]

The management of symptomatic Meckel's diverticulum comprises surgical resection. A wedge resection of the Meckel's diverticulum is generally carried out, and occasionally some ileum is resected by end-to-end anastomosis.[7]

Mortality rate was 1.5%. The cumulative incidence of late postoperative complications during a 20-year follow-up was 7%. Incidental diverticulectomies are safer, with an overall rate of morbidity of 2% and a mortality of 1%.[11]

CONCLUSION

In conclusion, some authors have reported high mortality rates of Meckel's diverticulum with a mesodiverticular band and intestinal obstruction.[4] Preoperative diagnosis is frequently challenging. Significant morbidity and mortality might result from a complicated Meckel's diverticulum that is not diagnosed right away.

To avoid intestinal gangrene and strangulation, early surgery is crucial. Meckel's diverticulum should be considered in the differential diagnosis of patients with the small bowel obstruction symptoms. In our case, patient presented with pain in abdomen and intermittent diarrhoea, complicated by ladds band and mesodiverticular band which led to twisting of mesenteric vessels and adjoining small bowel loops just beneath anterior abdominal wall in mid line in infraumbilical region suggestive of small volvulus, which was relieved by exploration and diverticulectomy.

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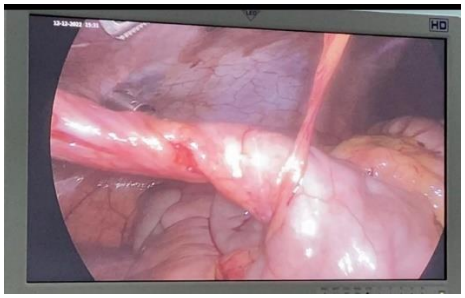

Figure 1- meckels diverticulum (red arrow) with ladds band (black arrow)

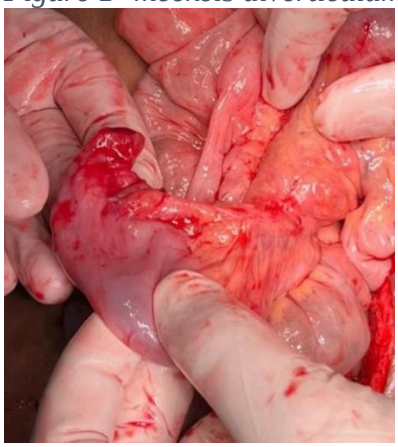

Figure 2- Intra-op photo

Figure 3- Meckels diverticulectomy

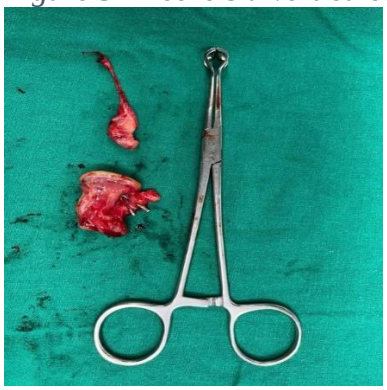

Figure 4- excised specimen of meckels diverticulum