*Case Report*

# IN A MECKEL'S DIVERTICULUM, PEPTIC PERFORATION - A CLASSIC SNAPSHOT!

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## RESUMEN

El divertículo de Meckel es un remanente congénito localizado en el ileum distal, el cual resulta de un defecto en el cierre del saco de Yolk. Esta anomalía es comunmente detectada en la poblacion pediátrica antes de los 2 años de edad. Por lo tanto, es una causa extraña de obstrucción intestinal y de mortalidad en adultos. Este es el reporte de un individuo de 26 años con 3 dias de fiebre y seis dias de dolor abdominal y vómito continuo. La laparotomía exploratoria demostró la presencia de una diverticulitis de Merkel y signos de obstrucción intestinal. Se realizó la resección del divertículo y parte del ileum afectado, seguido por anastomosis ileo-ileal. Sin embargo, el curso clinico del paciente se deterioró rápidamente debido al desarrollo de falla renal aguda y multiorgánica. Estas complicaciones llevaron al fallecimiento del paciente en su cuarto dia postoperatorio. En conclusión, la baja frecuencia de esta anomalía en adultos dificulta su diagnostico oportuno, teniendo como consecuencia un aumento en la mortalidad de estos casos clínicos.

***Palabras clave:*** *divertículo de Meckel, falla multiorgánica.*

## ABSTRACT

Meckel's diverticulum is a congenital outpouching located in the distal ileum which occurs due to the failure of obliteration of the yolk stalk. The peak age in which this anomaly is mostly found is the paediatric age especially below the age of 2. Hence it is noted as an uncommon cause of intestinal obstruction and fatality in adult life. This is a case report of a 26 year old man with abdominal pain and vomiting for 6 days associated with fever for 3 days. Emergency laparotomy revealed Meckel's diverticulitis with small bowel obstruction. Meckel's diverculectomy with ileal resection and ileoileal anastamosis was performed. However, the patient developed renal dysfunction leading to Multiorgan Dysfunction Syndrome and died on the 4th post operative day. This anatomical anomaly is rare in adult patients and is difficult to diagnose early due to its bizarre presentation resulting in high mortality. Hence we find this case of interest.

**Keywords:** *Meckel's diverticulum, Gastric ectopic rest, Multi Organ Dysfunction Syndrome*

## INTRODUCTION

Meckel's diverticulum (MD) is the most prevalent congenital abnormality of the gastrointestinal tract (Turgeon and Barnett, 1990). It is a condition that results due to the persistence of the proximal part of the vitellointestinal duct. This duct connects the midgut to the yolk-sac, and normally disappears by the 6th week of intrauterine life. Failure of its obliteration leads to various anomalies namely umbilical polyp, umbilical sinus, patent vitellointestinal duct and MD (Fig. 1).

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A review of literature shows that the incidence of this developmental abnormality is 0.3% but may be as high as 2% when surgical cases are reviewed (Harden et al, 1967). It is reported that this diverticulum is mostly found in children and occurs equally in both sexes (Arnold and Pellicane, 1997). Soltero and Bill. (1976) pointed out that the detection of the MD decreases with age and hence this becomes a rare cause of intestinal obstruction in adults.

The diagnosis of symptomatic MD is difficult in male, especially in adult. The occurrence of MD must be considered in any patient with unexplained abdominal complaints of nausea and vomiting or intestinal bleeding. Various investigations are laparotomy, biopsy, ultrasonography (USG) of abdomen, superior mesentric angiography to diagnose a bleeding Meckel's diverticulum (Rossi et al, 1996) and techtinium scan to detect a heterotopic rest within the diverticulum (Williams, 1981). The postoperative mortality following diverticulectomy ranges from 2-15% (Mendelson et al, 2001).

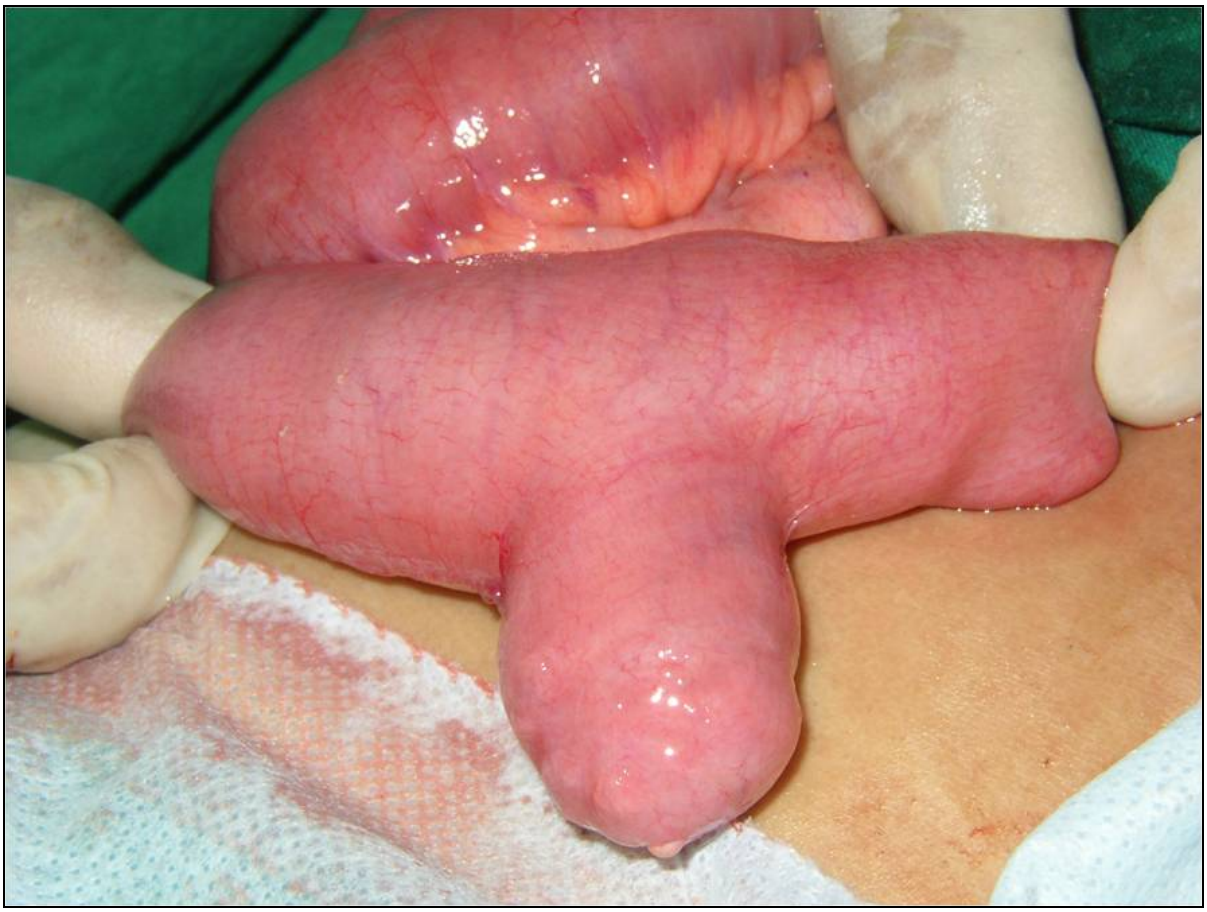

**Figure 1**. Meckel's Diverticulum shown during surgery.

## CASE REPORT

A 26 year old male patient was brought to the casualty with complaints of diffuse, intermittent, dragging and non-radiating type of abdominal pain that had no aggravating factors but relieved on medication for one week. It was associated with episodes of non-projectile vomiting which had digested food content but not blood stained or foul smelling. Patient also had a history of fever which remained 104 degree Celsius and never touched baseline for three days. It is also noted that the patient has had complaints of diffuse and intermittent abdominal pain for the

past 3 years. On examination the patient was found to have altered sensorium, tachycardia and hypotension suggestive of sepsis. Examination of the abdomen showed a generalised guarding and rigidity of an acute abdomen. The patient was immediately intubated and an emergency laparotomy was done which revealed Meckel's diverticulitis with small bowel obstruction. The inflamed diverticulum was located at the terminal ileum, with dense adhesions to the sigmoid colon. Mobilisation of the diverticulum caused perforation with pouring of the ileal contents into the peritoneal cavity. The surgical procedure involved ileal resection with ileoileal anastamosis, a peritoneal wash followed by the placement of a right abdominal flank drain. On the first post operative day, the patient developed paralytic ileus. There was an increased abdominal girth of 100cm and urine output became low. Blood Urea Nitrogen was 54mg/dl and creatinine was 3mg/dl. USG abdomen showed dilated fluid filled bowel loops. Patient's condition kept deteriorating despite the administration of inotropes, atropine, adrenaline and hemodialysis. On the 4$^{th}$ operative day, the patient was declared dead due to Multi Organ Dysfunction Syndrome (MODS).

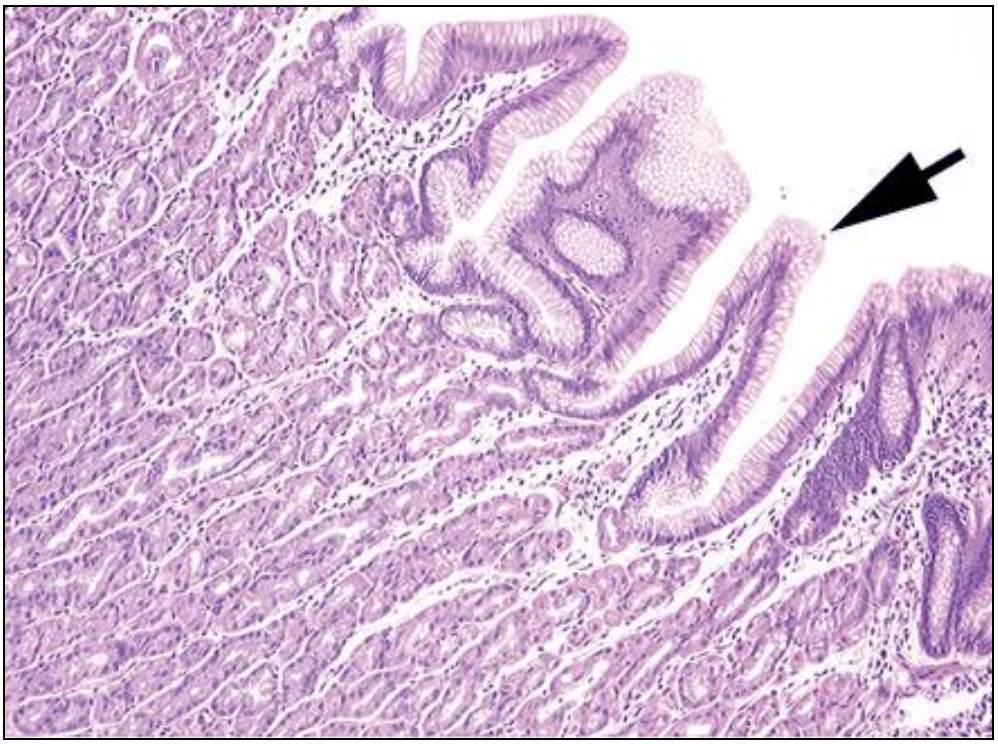

**Figure 2**. Histopathological slide showing erosions in the mucosa (arrowhead) with underlying heterotopic gastric antral glands (arrow).

## DISCUSSION

A truly intestinal diverticulum that results due to the persistence of the omphalomesenteric or vitelline duct is known to be MD. Wilhelm Fabricius Hildanus was the first to describe the diverticulum in the year 1598 (Haber, 1947). However the diverticulum is named after Johann Friedrich Meckel (1809) who first reported its anatomy and embryology. Charles W. Mayo is credited with having stated that "Meckel's diverticulum is frequently suspected, often looked for, and seldom found". Reports on Meckel's diverticulum being fatal in adults are rare.

The diverticulum is known to classically follow the rule of 2 (Chaurasia, 2005). It occurs in about 2% subjects measuring about 2 inches in length and is situated about 2 feet away from the ileoceacal

valve. In this present study, the diverticulum found in the patient was about 3 cm long. Histologically, it contains all the three layers of the intestinal wall namely mucosa, submucosa and muscularis propria. Nevertheless literature has reported that heterotopic rests of gastric (Fig. 2) and colonic mucosa or pancreatic, duodenal, jejunal, hepatic or endometrial tissue may be present (DiGiacomo and Cottone, 1993). Gastric and colonic ectopic tissues can lead to complications like ulceration of the diverticulum which causes an upper gastrointestinal bleed. This is attributed to the acidic pH in the diverticulum due to the presence the ectopic tissue (Madhyastha et al, 2007).

The complications that can be present are inflammation, perforation, vesiculodiverticular fistula, intussusception, volvulus, hernia and rarely malignancy. It is discerned that malignancy is found only in 0.45-0.50% of the patients (DiGiacomo and Cottone, 1993). The common benign neoplasm includes lipoma, leiomyoma, neurofibroma and angioma, while malignant tumours include leiomyosarcoma, carcinoid and adenocarcoma (Kittle et al, 1947; DiGiacomo and Cottone, 1993). Most of the patients are asymptomatic and hence are diagnosed incidentally. If symptomatic, they present with symptoms that are similar to that of acute appendicitis such as nausea, vomiting, pyrexia and abdominal pain. In patients with Meckel's diverticulum and upper gastrointestinal bleed, hematochezia or melena is usually present. However, it is pointed out that the most common presentation is obstruction in paediatrics and bleeding in adults (Park et al, 2005).

Investigation most often is laparoscopy or laparotomy in case of an incidentally found asymptomatic diverticulum (Ajaz et al, 2010). When symptomatic, the ideal investigation that can be performed is Technetium Tc 99m-pertechnate radioisotope scanning. The usage of this scan is based upon the principle of administering pertechnate intravenously which in turn is taken up by the mucus-secreting cells of the gastric mucosa present in the Meckel's diverticula (DiGiacomo and Cottone, 1993). This is called Meckel's scan. The accuracy of the scan can be improved by administering a combination of pentagastrin and glucagon thereby leading to an increased uptake of the isotope and cease peristalsis in the patient simultaneously (Hughes et al, 1998). Superior mesenteric angiography may be helpful in patients presenting with acute gastrointestinal bleeding and is effective when blood loss exceeds 0.5 mL/min. This has an accuracy of about 59% (Khan et al, 2008). Another useful investigation is a biopsy of the diverticulum tissue. In our patient the histopathological examination of the tissue revealed a Meckel's diverticulum lined predominantly by gastric epithelium with the base of the diverticulum showing perforation involving a portion of small intestine. The resected margin of the ileum showed congestion and submucosal oedema.

The approach to treatment of a Meckel's diverticulum depends on whether it is discovered incidentally or as a result of symptoms. There is a controversy in performing surgery on an asymptomatic diverticulum. A clinical study revealed that it is advisable to perform surgery on an asymptomatic patient if any one of the following criteria of the patient's age lesser than 50, male sex, length of diverticulum more than 2 cm or ectopic tissue within the diverticulum is present (Park et al, 2005).

The various surgical approaches are diverticulectomy with suture closure of the base, wedge resection of the intestinal wall containing the diverticulum with suture closure or segmental resection of the intestine, including the diverticulum and end-to-end anastamosis which are often performed on patients complicated with haemorrhage to ensure adequate excision of the part containing gastric and the ulcerated ileal mucosa. Division of the fibrous band with or without diverticulectomy is also an available option. Recently laparoscopic techniques are increasingly being used for diverticulectomy and intestinal resection. With advancements in technology, therapeutic interventions such as intracorporeal resection or laparoscopic-assisted extracorporeal resection are being performed.

The postoperative mortality ranges from 2-15% (Mendelson et al, 2001). Immediate post operative complications such as anastomotic dehiscence, early occlusions and small bowel fistulas are found in about 12-20% of cases (Yamaguchi et al, 1978). The incidence of late complications such as flanges occlusions (Grapin et al, 2005) and small bowel stenosis after a wedge resection (Bemelman et al, 1995) is about 7% (Yamaguchi et al, 1978) and promoted by incisional wound infection and malnutrition (Mendelson et al, 2001).

The occurrence of Meckel's diverticulum in paediatric population is not a curiosity but its symptomatic occurrence in an adult is. The ectopic rests of gastric tissue, as seen in this patient, often cause bizarre presentations. Sound knowledge of anatomy, a high index of suspicion and an awareness of unusual presentations are necessary for prompt diagnosis and timely intervention.

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