INTERNATIONAL JOURNAL OF ADVANCE RESEARCH AND DEVELOPMENT

(Volume 4, Issue 9)

Available online at: www.ijarnd.com

Management of a rare case of spontaneous Meckel's Diverticular perforation in an old age patient presented in the emergency room

Dr. Archit P. Parikh[1], Dr. Bhavesh V. Vaishnani[2], Dr. Setu N. Ladani[3], Dr. Jatin V. Dhameliya[4]

Other[1], Associate Professor[2], Senior Resident[3], Junior Resident[4],

Pandit Dindayal Upadhyay Medical College, Rajkot, Gujarat

ABSTRACT

Meckel's diverticulum is the commonest congenital abnormality of the gastrointestinal tract. Hemorrhage, obstruction, and inflammation are the three main categories of complications resulting from Meckel's diverticulum. Spontaneously perforation of Meckel's diverticulum is very rare and mimics acute appendicitis. 50yr old male patient presented to the emergency room of our institute with abdominal pain for five days associated with fever with chills and complain of vomiting and anorexia. On the subsequent investigation it was found out to be a gastrointestinal perforation. We operated the patient under general anesthesia and intra-operative it was found out to be the Meckel's diverticular perforation. So, we have done resection of contained part and done ileo-ileal anastomosis. Meckel's diverticulum is the result of dysgenesis of the small bowel as it develops in relation to the embryologic yolk sack and arises from the incomplete obliteration of the vitelline duct between the 5th and 8th weeks of gestation. Perforation is an uncommon complication of MD, and the symptom can mimic other acute abdominal conditions such as acute appendicitis as well as gynecological and urological condition while in the emergency space. We should take diagnosis under consideration as a differential diagnosis when we encounter patients whose impression was firstly acute appendicitis and treatment should be followed accordingly.

Keywords— *Meckel's diverticular perforation, Emergency exploratory laparotomy, Peritonitis, Ileo-ileal anastomosis, Mimic enteric perforation*

1. INTRODUCTION

Named after the German anatomist and embryologist Johann Meckel, a Meckel diverticulum is the most common congenital anomaly of the small intestine. We are taught to think of a Meckel diverticulum in terms of the *Rule of 2s*: located 2 feet (60 cm) from the terminal ileum, 2 inches in length, affecting 2% of the general population, occurring twice as often in males, containing one or two types of heterotopic mucosa (most commonly gastric or pancreatic), and presenting in the first 2 decades of life, most commonly in the first 2 years of life [1]. While this catchy phase is easy to remember and captures the most common presentations of Meckel diverticula, it does not expand on how the diagnosis is made, the indications for surgical intervention, and what surgery entails.

Meckel's Diverticulum (MD) is the result of the incomplete obliteration of the vitelline ducts; however, it rarely presents symptomatically. The most common presenting symptom of MD is gastrointestinal bleeding in children; while in adults, the most common presentation is obstruction, either due to intussusception or adhesive bands [2,3]. In both populations, perforation is an uncommon presentation, particularly among older aged women. Perforated MD often presents as does perforated acute appendicitis; namely with fever, chills, nausea, vomiting, right lower quadrant abdominal pain, and peritoneal signs. This semblance often results in diagnostic inaccuracy. Despite the uncommon incidence of symptomatic MD in adults, the morbidity associated with adult symptomatic MD is significant. The available research, however, remains inconclusive on whether or not an incidental MD should be prophylactically excised. We present the case of an otherwise healthy 50-year-old male who presented with a clinical diagnosis of acute appendicitis. He underwent emergency exploratory laparotomy and found out to be the Meckel's diverticular perforation and subsequently treated with resection and anastomosis.

2. CASE PRESENTATION

A 50-year-old male patient presented in the emergency room of our institute with complains of abdominal pain for 5 days. The pain was started in the periumbilical region and was sudden in onset as well as continuous in nature and agonising in character. Pain was associated with episodes of chills which was on-off in nature with bouts of hyperpyrexia and pain was increased with bodily movement and remain constant with patient remain in supine position or say in the sleeping posture. The pain was gradually spreading in the lower abdominal quadrant and finally it becomes generalised in character. The patient also had associated complain of anorexia and vomiting. Vomiting was non-bilious, clear watery type and sometime containing food particle, non-projectile in nature, 4-5 times a day along with the bouts of hyperpyrexia and frequency increased since last 2 days. The patient is chronic smoker

(5 bidis/day for 30 years). No other medical or surgical past history. On examination, the patient was found to be tachycardic with increased body temperature and had a toxic look. Per abdomen finding was as following: generalised tenderness with guarding present and no abdominal distension was there. However; guarding was more pronounced in the right lower abdominal quadrant. No significant per rectal findings. On investigation, all the reports are within normal limits except total leucocytes count which was 18,800/cu mm and the report of CPR was positive. On subsequent investigation in the form of x-ray abdomen standing revealed the air under the right dome of a diaphragm with no air fluid level and ultrasonography was suggestive of mild to moderate ascites with moving echoes and air foci underneath the diaphragm suggestive of gastro-intestinal perforation.

On the part of the treatment emergency, an exploratory laparotomy was done. Approx. 500cc of pyo-peritoneal fluid was present which was drained along with pus flakes present over the whole length of small intestine. On further exploration a 0.5 * 0.5 cm size of perforation was present over diverticular structure 75 cm proximal to IC junction so that would be the Meckel's diverticular perforation. The length of MD was 2.5cm and base of the MD wide but showing the signs of congestion in the form of increased vascularity and induration in the adjacent part of the intestine. All the other part of bowel and intra-abdominal organ was found normal specifically appendix was found normal with no signs of congestion or induration or dilatation. We had done resection of the MD along with the 2cm part of the ileum on both the side and done ileo-ileal anastomosis with the 4-layer method using vicryl 3-0 and silk 3-0 suture. We had removed RT and started orally on the post- operative day 4th and removed abdominal drain on the post-operative day 6th. We had discharged patient on post-operative day 10th after all stich removal with no significant post-operative complicative dilemma.

3. DISCUSSION

MD is the true diverticulum. In the third week of gestation, the vitelline duct, also called the omphalomesenteric duct, is widely patent allowing the yolk sac to communicate with the gut. Between the fifth and ninth weeks of gestation, the duct will obliterate and the placenta replaces the yolk sac as the source of fetal nutrition. If the vitelline duct fails to obliterate, a Meckel diverticulum can result. This is why a Meckel diverticulum is a true diverticulum—and the only true diverticulum—of the small intestine that contains all layers of the small bowel. Interestingly, failure of the vitelline duct to obliterate can result in other anomalies, although these are much less common than a Meckel diverticulum. Such anomalies include an ileal umbilical fistula, which occurs if the entire duct remains patent; a vitelline duct cyst, which results from the failure of the umbilical side of the duct to obliterate; and a fibrous cord connecting the ileum to the umbilicus. A Meckel diverticulum is by far the most common, representing 90% of vitelline duct anomalies. [4] Up to 60% of Meckel diverticula have heterotopic mucosa. Although pancreatic tissue is the most common type of heterotopic tissue, gastric tissue is the most common type in a symptomatic Meckel diverticulum, as later discussed. A Meckel diverticulum is usually positioned within 100 cm of the ileocecal valve, although the mean distance varies with age: the older the patient, the farther away the Meckel diverticulum is from the ileocecal valve. In children less than 2 years of age, the mean distance is 34 cm, compared to 46 cm in children aged 3 to 21 years old and 67 cm in people older than 21 years.

Meckel's diverticulum only affects between 2 and 4% of the population. Manifesting as gastrointestinal bleeding, symptomatic MD is more commonly seen in children, with a mean age of presentation at age 10[5]. Among adults, symptomatic MD is even rarer. The estimated lifetime risk for developing complications of MD range from 4 to 6.4% [6,7] that makes our case a rare presentation. The most common presenting symptom in adults is bowel obstruction, followed by GI bleed and lastly, diverticulitis that if not treated leads to perforation. [2,3]. Spontaneous perforation due to diverticulitis is even less common, especially in the older population [8]. In a study of perforated MD in adults, Ding et al. found that 60% of patients were diagnosed with perforated appendicitis preoperatively, while only 13% were diagnosed with perforated MD [9]. This may be due to the fact that Meckel's diverticulitis is often symptomatically indistinguishable from appendicitis, as the disease process is identical, particularly in adults. Several risk factors are associated with increased complication rates including age, gender, and anatomic variants of Meckel diverticula. The risk of complications is inversely related to age, with a 4% to 5% risk at 2 years of age and 1% at 40 years. By 75 years of age, there is a near zero percent risk of complication from a Meckel diverticulum [10]. It is estimated that 50% of patients who develop symptoms are younger than 10 years of age. Symptomatic Meckel diverticula are more common in men than women with a male-to-female ratio ranging from 2:1 to 5:1. Anatomically, longer, narrow-based diverticula are more likely to cause obstruction or inflammation as compared to short, large-based diverticula, which are more prone to entrapment.

Radionuclide scans (Meckel's scans) are the most promising imaging modality for diagnosing MD. However, this only seems to be applicable in the paediatric population. Scintigraphy has upwards of 90% accuracy in the paediatric population, but its usefulness drops to 46% accuracy in the adult population. As a result of radionuclide inaccuracy, as well as the previously mentioned diagnostic difficulties, less than 10% of MD are diagnosed preoperatively in adults with such difficulty in diagnosing MD preoperatively, the majority of MD are diagnosed during surgery, usually after the initial diagnosis of appendicitis or other abnormality has been ruled out [11]. For a symptomatic Meckel diverticulum, surgical resection is indicated. In the asymptomatic patient, indications for surgical intervention have been the subject of many studies, but despite these studies, the topic remains controversial. Part of the controversy is that older, retrospective reviews cite high rates of morbidity and mortality following diverticular resection. Historically, studies from the 1950s reported a mortality rate of 20% from a diverticulectomy. [12] In the 1970s, this decreased to an average of 7%. Since the 1980s, studies have repeatedly reported a near-zero mortality rate, changing the dogma on surgical management. The current recommendation is that unless there are strong contraindications, and incidentally discovered Meckel diverticulum should be removed [13]. Specially, if found incidentally, resection is indicated for any of the following criteria: patients younger than 50 years of age, a Meckel diverticulum longer than 2 cm, the presence of a fibrous band, or evidence of heterotopic mucosa. Strong contraindications include Crohn disease. The principles of resection are similar for symptomatic and asymptomatic Meckel diverticula: the diverticulum and any associated bands should be removed with an ileal resection or a simple diverticulectomy. The decision of which treatment option to pursue lies in whether the patient presents with bleeding. Bleeding usually results from an

ulcer in the heterotopic gastric mucosa and the ulcer along with the Meckel diverticulum should be excised with ileal resection. This can be achieved using a stapler to divide the small bowel just proximal and distal to the diverticulum. Primary anastomosis is then performed and the small bowel mesenteric rent is closed. In the absence of bleeding, a V-shaped diverticulectomy can be performed with a transverse closure to avoid narrowing of the lumen. A two-layer closure is often used with an inner running layer of absorbable suture followed by an outer layer of silk Lembert sutures.

Our patient is a 50-year-old male who sustained significant morbidity due to her complicated MD before surgical intervention. Her case is interesting in that she does not fit the common presentation of MD, due to his age and clinical scenario. He is also noteworthy due to the nature of his complication of spontaneous perforation. Based on a review of the relevant literature, perhaps further examination of the complication rates among known MD would be beneficial in answering the question.

4. CONCLUSION

However; it is rare that presentation of spontaneous perforation of MD (incidence of 7% of total complicated MD)[1] could be the challenging one, it should be noted that in any case not related to age and sex having clinical feature of appendicitis one should go through the appropriate investigation, however, the choice of investigation (CECT abdomen or Meckel's scan) remain always controversial and depends on the clinical scenario and availability of the same. Not taking into consideration to look for Meckel's at the time of investigation as well as during intra-operative period, may lead to big trouble for an initial surgeon as well as for patient. Further; regarding the management, any case of symptomatic Meckel's diverticulum one should under go the surgical intervention either by open or by laproscopic approach and in case of RA it advisable one should weigh the benefits of stapler anastomosis against the hand sewn anastomosis.

5. REFRENCES

[1] Shackelford's surgery of the alimentary tract. Eight editions. Volume 1. Section ii. Chapter 77. page 910.[Book article]
[2] A fifty-year experience with meckel's diverticulum. mackey wc, dineen p surg gynecol obstet. 1983 jan;156(1):56-64.
[3] Meckel's diverticulum: a systematic review. sagar j, kumar v, shah dk j r soc med. 2006 oct; 99(10):501-5.
[4] Turgeon DK, Barnett JL. Meckel's diverticulum. Am J Gastroenterol. 1990; 85:777-781.
[5] Lutdke F, Mende V, Kohler H, Lepsien G. Incidence and frequency of complications and management of Meckel's diverticulum. Surg Gynecol Obstet. 1989; 169:537–542. [PubMed] [Google Scholar]
[6] Cullen J, Kelly K, Moir C, et al. Surgical management of Meckel's diverticulum an epidemiologic, population-based study. Ann Surg. 1994; 220(4):564–569. doi: 10.1097/00000658-199410000-00014. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
[7] Soltero M, Bill A. The natural history of Meckel's diverticulum and its relation to incidental removal. A study of 202 cases of diseased Meckel's diverticulum found in King County, Washington, over a fifteen year period. Am J Surg. 1976; 132:168–173? doi: 10.1016/0002-9610(76)90043-X.
[8] Malcom R, Iglesias I, Smith-Singares E. Perforated giant meckel diverticulitis in an elderly patient: case report and review of the literature. Int J Surg Case Rep. 2018; 43:45–48. doi: 10.1016/j.ijscr.2018.01.023. [PMC free article] [PubMed] [CrossRef]
[9] Ding Y, Zhou Y, Ji Z, and et al. Laparoscopic management of perforated Meckel's diverticulum in adults. Int J Med Sci. 2012; 9(3):243–247. doi: 10.7150/ijms.4170. [PMC free article] [PubMed]
[10] Leijonmarck CE, Bonman-Sandelin K, Frisell J, Räf L. Meckel's diverticulum in the adult. Br J Surg. 986; 73:146-149.
[11] Fraser AA, Opie DD, Gnecco J 4th, Nashed B, Johnson DC. Spontaneous perforation of Meckel's diverticulum in an adult female with a literature review. Surg Case Rep. 2018; 4(1):129. Published 2018 Nov 1. doi:10.1186/s40792-018-0536-y
[12] Wansbrough RM, Thomson S, Leckey RG. Meckel's diverticulum: a 42-year review of 273 cases at the Hospital for Sick Children, Toronto. Can J Surg. 1957; 1:15-21.
[13] Cullen JJ, Kelly KA, Moir CR, et al. Surgical management of Meckel's diverticulum. An epidemiologic, population-based study. Ann Surg. 1994; 220:564-568, [discussion 568–569].

APPENDIX

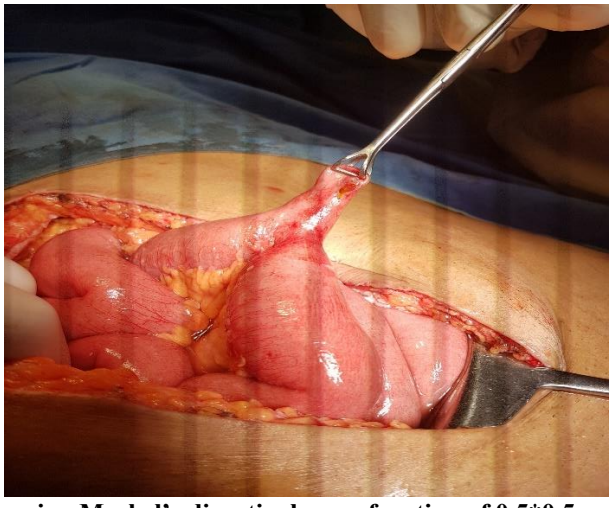

Fig. 1: Intra-operative finding showing Meckel's diverticular perforation of 0.5*0.5cm size with signs of congestion and wide neck and length of 2.5cm size.

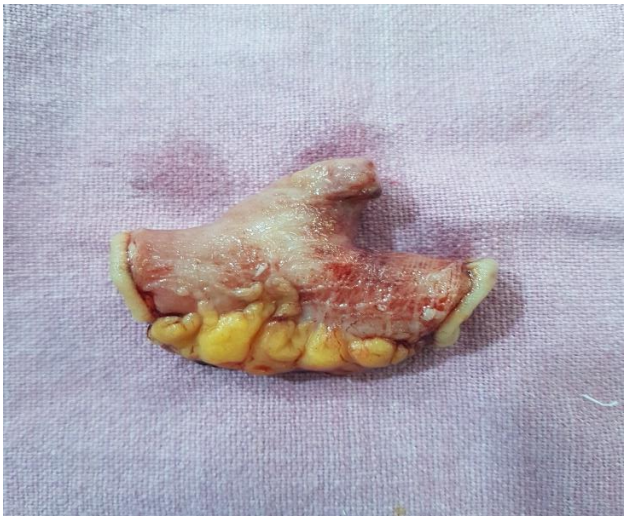

Fig. 2: Resected specimen of Meckel's diverticulum with perforation along with 1.5 cm margin of ileal loop on both side with base of diverticulum shows changes of congestion.

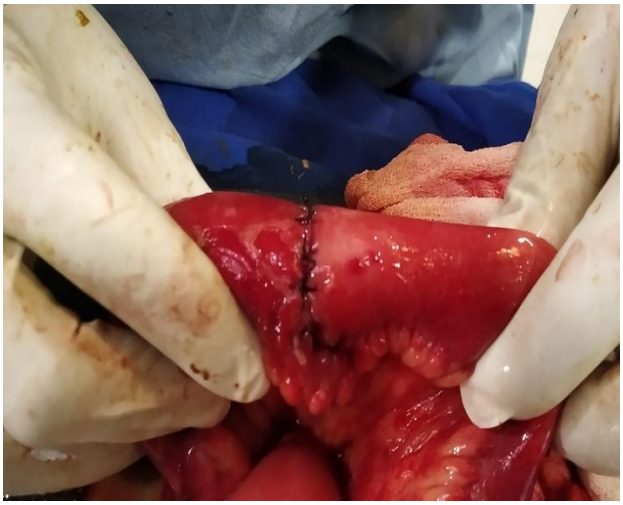

Fig. 3: Ileo-ileal anastomosis of the small intestine with 4-layer technique using vicryl 3-0 and silk 3-0.

