

Case Report

Strangulated Meckel's Diverticulum Causing Intestinal Obstruction

Dr. Ramnath G¹, Dr. B. Ananda Rama Rao¹, Dr. Krishna Kishore²,
Dr. J. Shalini³, Dr. Sai Kumar. P³

¹Professor of Surgery, ²Assistant Professor of Surgery, ³Junior Residents,
SVS Medical College, Mahabubnagar, TS 509002

Corresponding Author: B. Ananda Rama Rao

ABSTRACT

Meckel's diverticulum is the most common congenital anomaly of the small intestine. It may remain completely asymptomatic. Common complications related to a Meckel's diverticulum include hemorrhage, intestinal obstruction, and inflammation. Small bowel obstruction can be due to intussusception, incarceration, adhesions, strictures, torsion. Herein, we discuss our experience in managing a 16 year old female who was diagnosed with small bowel obstruction due to mesodiverticular band which is a remnant of left vitelline artery which caused torsion and gangrene of entire Meckel's diverticulum.

Key Words: Meckel's Diverticulum Mesodiverticular band, Vitelline artery, Gangrene of appendix

INTRODUCTION

Meckel's diverticulum was named after Johann Friedrich Meckel who established its embryonic origin in 1809. [1] And it is the most common congenital anomaly of the gastrointestinal system. [2-4] It originates from failure of the vitello-intestinal duct to obliterate completely during fifth week of fetal development, which is usually located on the antimesenteric border of the ileum. The characteristics features of Meckel's diverticulum can be best remembered by the "rule of two": occurs in 2% of population; usually discovered before two years of age; two inches long and two cm in diameter; located two feet proximal to the ileocecal valve; two times more common in males; only 2% of the individuals with Meckel's diverticulum are symptomatic. [5-7] Blood supply is derived from a remnant of the primitive vitelline artery arising from the

superior mesenteric artery, or less commonly from the ileocolic artery. [8,9] Most of the Meckel's diverticula are discovered incidentally during a surgical procedure performed for other reasons. Haemorrhage, small bowel obstruction, and diverticulitis are the most frequent complications. Involvement of the mesodiverticular band of the diverticulum is seen rarely. We present a very unusual case of Meckel's diverticulum where small bowel obstruction is caused by mesodiverticular band causing axial torsion and leading to gangrene of Meckel's diverticulum. Axial torsion of Meckel's diverticulum is the rarest of complications. [10] Gangrene of Meckel's diverticulum secondary to axial torsion has been reported only eleven times in adults. [10-17]

CASE REPORT

A 16 year old female, moderately built and nourished, presented to casualty with chief complaints of pain abdomen and one episode of vomiting since three days. Absolute constipation present for two days. On examination abdomen was soft, tenderness present in right iliac fossa, no palpable mass. Rectum was empty on per rectal examination. Vitals were normal. Laboratory investigations were showing raised WBC count and neutrophils. Ultrasound abdomen was suggestive of acute small bowel obstruction. Multiple air fluid levels were noticed on x ray erect abdomen.(Fig-1) CT abdomen revealed narrow lumen of terminal ileum two feet from ileocaecal junction.

On emergency exploratory laparotomy, thick turbid non feculent fluid was present. Distended small bowel loops with a band constricting the neck of the diverticulum causing torsion and complete gangrene of Meckel's diverticulum was seen (Fig-2-4) Multiple adhesions and pus flakes noticed. Release of constricting band and resection of diverticulum along with segment of ileum was done and end to end anastomosis of ileum was done. Other viscera were normal. Postoperative period was uneventful. Histological examination of specimen revealed serosal congestion and mucosal necrosis with infiltration of neutrophils, lymphocytes, plasma cells and eosinophils.



Fig. no. 1
Multiple air fluid levels



Fig no.2
Mesodiverticular band

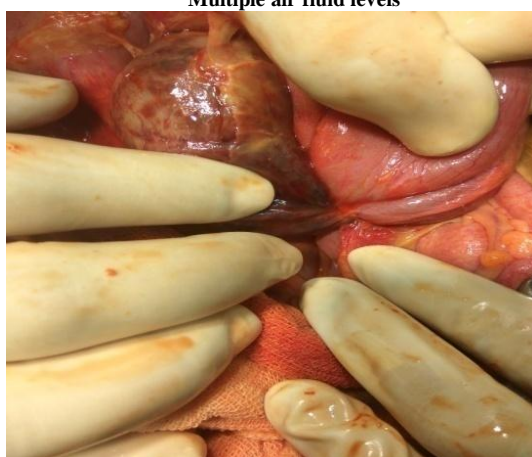


Fig no.3
Torsion of Meckels diverticulum



Fig no.4

DISCUSSION

The prevalence of Meckel's diverticulum in general population is about

1-3% and it is the most common congenital anomaly of the small intestine, [3,18,19] It is a remnant of un-obliterated vitello-intestinal

duct and a true diverticulum containing all layers of the bowel wall. [3,7,19,20] The cells lining the vitelline duct are pluripotent and it is uncommon to find heterotopic tissue (gastric mucosa and pancreatic tissue) in diverticulum. [2] This diverticulum is usually found within 100 cm of the ileocaecal valve on the antimesenteric border of the ileum. Most of the cases that have Meckel's diverticulum are asymptomatic and only 4-16% cases develop symptoms arising from complications and the diagnosis is difficult to confirm preoperatively. The frequent complications of Meckel's diverticulum are hemorrhage, intestinal obstruction, and diverticulitis. [21,22] Estimated risk for developing lifetime complications like perforation, obstruction of the Meckel's diverticulum is around 4%. [2,7,19,20] Hemorrhage is the most common complication in adults and second most complication in children. [23] Hemorrhage is due to ulceration of heterotopic gastric or pancreatic mucosa in the diverticulum and also the adjacent ileal mucosa. Technetium-99m pertechnetate scan is a useful non-invasive investigation in patients presenting with gastrointestinal bleeding. However it is less reliable in adults when compared to children. [24,25] As the technetium-99 m pertechnetate scan is specific to ectopic gastric mucosa and not specifically to Meckel's diverticulum, it may be positive in gut duplication cysts with ectopic gastric mucosa. [26] Intestinal obstruction is the second most common complication of Meckel's diverticulum in adults. [3] The obstruction may be due to the attachment of apex of diverticulum to the umbilicus or to the mesentery by means of a fibrous band. The definitive treatment of symptomatic Meckel's diverticulum is surgery, viz; laparotomy, laparoscopic or laparoscopic-assisted approaches. The extent of resection depends on the complication and intra-operative findings. A simple wedge resection of the diverticulum and closure of the ileal defect is done in cases of a narrow-base omphalomesenteric remnant without any palpable mass in the lumen causing

intestinal obstruction [6] In cases where the diverticulum has a wide base or palpable ectopic tissue or where there is inflammatory or ischemia changes in adjacent ileum, it is preferable to resect the involved bowel with end-to-end bowel anastomosis. [27,28] Segmental ileal resection is also required for treatment of patients with gastrointestinal bleeding as the site of bleeding is usually in the adjacent ileum. Involvement of the diverticulum by benign tumors can be dealt with a simple diverticulectomy, depending on the site and size of the lesion. Wide intestinal and mesenteric resection would be required where malignant tumors are involved. [29,30]

CONCLUSION

This case report highlights the importance of considering a Meckel's diverticulum as a cause of small bowel obstruction in individuals from all age groups and especially in a person with no previous abdominal pathology or surgery.

REFERENCES

1. Opitz JM, Schultka R, Göbbel L. (2006) Meckel on developmental pathology. *Am J Med Genet A*. 2006; 140:115-128
2. K. M. Elsayes, C. O. Menias, H. J. Harvin, and I. R. Francis, (2007) "Imaging manifestations of Meckel's diverticulum," *American Journal of Roentgenology*, vol. 189, no. 1, pp. 81-88, 2007.
3. G. Dutta, A. S. Chowdhury, and M. Panda, (2009) "Band of cacophony-abdominal catastrophe caused by the fibrous band of Meckel's diverticulum: a case report," *Cases Journal*, vol. 2, no. 7, article 7160, 2009.
4. O. Karatepe, C. Dural, C. Erçetin, Getal (2008) "Rare complication of Meckel's diverticulum: loop formation of diverticulum," *Turkish Journal of Medical Sciences*, vol. 38, no. 1, pp. 91-93, 2008.
5. Skandalakis PN, Zoras O, Skandalakis JE, et al (2006). *Littre hernia: surgical anatomy, embryology, and technique of repair. Am Surg*. 2006;72:238-243
6. Sharma RK, Jain VK. (2008) Emergency surgery for Meckel's diverticulum. *World J Emerg Surg*. 2008;3:27.
7. Chan KW. (2009) Perforation of Meckel's diverticulum caused by a chicken bone: a case report. *J Med Case Rep*. 2009;3:48.
8. Smithy HG, Chamberlin JA. (1946) Persistence of the vitelline (omphalomesenteric) artery as a

- clinical problem. Surg Gynecol Obstet. 1946; 82:579-585.
9. Rutherford RB, Akers DR. (1966) Meckel's diverticulum: a review of 148 pediatric patients, with special reference to the pattern of bleeding and to mesodiverticular vascular bands. Surgery. 1966;59:618-626.
 10. Malhotra S, Roth DA, Gouge TH, et al (1998) Gangrene of Meckel's diverticulum secondary to axial torsion: a rare complication. Am J Gastroenterol. 1998;93:1373-1375.
 11. Eser M, Oncel M, Kurt N.(2008) Gangrene secondary to axial torsion in a patient with Meckel's diverticulum. Int Surg. 2002;87:104-106.
 12. Limas C, Seretis K, Soultanidis C, Anagnostoulis S.(2006) Axial torsion and gangrene of a giant Meckel's diverticulum. J Gastrointestin Liver Dis. 2006;15:67-68.
 13. Kiyak G, Ergul E, Sarikaya SM, Kusdemir A. (2009)Axial torsion and gangrene of a giant Meckel's diverticulum mimicking acute appendicitis. J Pak Med Assoc. 2009;59:408-409.
 14. Sharma RK, Jain VK, Kamboj S, Murari K. (2008)Gangrenous Meckel's diverticulum causing acute intestinal obstruction in an adult. ANZ J Surg. 2008;78:1046-1047.
 15. Cartanese C, Petitti T, Marinelli E, (2011). Intestinal obstruction caused by torted gangrenous Meckel's diverticulum encircling terminal ileum. World J GastrointestSurg. 2011;3:106-109.
 16. Ruiz LVA, Camacho OLA, Diaz TDA. (2010)Giant Meckel's diverticula with necrosis due to axial torsion. Rev Col Gastroenterol. 2010;25:398-400.
 17. AlviteCanosa M, Couselo Villanueva JM, et al (2012) Intestinal obstruction due to axial torsion and gangrene of a giant Meckel's diverticulum. Gastroenterolhepatol.2012;35:452-453.
 18. J. Dumper, S. Mackenzie, P. Mitchell, F. et al (2006) "Complications of Meckel's diverticula in adults," Canadian Journal of Surgery, vol. 49, no. 5, pp. 353-357, 2006.
 19. A Tekin and T. Küçükkartallar, (2008) "MeckelDivertikülü'nün Nadir BirKomplikasyonu: Ileus," Firat Tip Dergisi, vol. 1, pp. 62-64, 2008.
 20. A Sarioglu-Buke, N. Corduk, U. Koltuksuz, M. et al (2008)i, "An uncommon variant of Meckel's diverticulum," Canadian Journal of Surgery, vol. 51, no. 2, pp. E46-E47,
 21. Prall RT, Bannon MO, Bharucha AE.(2001) Meckel's diverticulum causing intestinal obstruction. Am J Gastroenterol. 2001;96:3246-7
 22. Park JJ, Wolff BG, Tollefson MK, et al.(2005) Meckel diverticulum: the Mayo Clinic experience with 1476 patients (1950-2002) Ann Surg. 2005;241:529-33.
 23. Peranteau WH, Smink DS. (2013) Appendix, Meckel's and other Small Bowel Diverticula: Maingot's Abdominal Operations. 12th ed. New York: McGraw Hill Professional; 2013 p. 643-4.
 24. Kong MS, Chen CY, Tzen KY, et al.(1993) Technetium-99m pertechnetate scan for ectopic gastric mucosa in children with gastrointestinal bleeding. J Formos Med Assoc. 1993; 92:717-20.
 25. Lin S, Suhocki PV, Ludwig KA, Shetzline MA. (2002) Gastrointestinal bleeding in adult patients with Meckel's diverticulum: the role of technetium 99m pertechnetate scan. South Med J. 2002;95:1338-41.
 26. Kumar R, Tripathi M, Chandrashekar N, et al.(2005) Diagnosis of ectopic gastric mucosa using 99Tcm-pertechnetate: spectrum of scintigraphic findings. Br J Radiol. 2005; 78:714-20.
 27. Varcoe RL, Wong SW, Taylor CF, Newstead GL.(2004) Diverticulectomy is inadequate treatment for short Meckel's diverticulum with heterotopic mucosa. ANZ J Surg. 2004;74:869-72.
 28. Mukai M, Takamatsu H, Noguchi H, et al.(2002) Does the external appearance of a Meckel's diverticulum assist in choice of the laparoscopic procedure? PediatrSurg Int. 2002;18:231-3.
 29. Sutter PM, Canepa MG, Kuhrmeier F, et al. (1997) Carcinoid tumor in Meckel's diverticulum: case presentation and review of literature Schweiz med Wochenschr Suppl. 1997;89:20S-24S.
 30. Kovács M, Davidovics S, Gyurus P, Rácz I. (2006) Identification of a Meckel's diverticulum bleeding by urgent capsule endoscopy .Orv Hetil. 2006;147:2003-6.

How to cite this article: Ramnath G, Rao BAR, Kishore K et al. Strangulated Meckel's diverticulum causing intestinal obstruction. Int J Health Sci Res. 2018; 8(6):357-360.
