

PRESENTATIONS OF MECKEL'S DIVERTICULUM AT KHYBER TEACHING HOSPITAL PESHAWAR

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Background: This study was conducted with an objective to observe various presentations of Meckel's Diverticulum in our setting and compare it with other national and international studies. **Methods:** It was a retrospective analysis of hospital record carried out at the department of paediatric surgery Khyber Teaching Hospital, Peshawar. A total of 63 patients meeting the inclusion criteria were included in the study who had presented to our unit with signs and symptoms of Meckel's Diverticulum and who were diagnosed either by investigations or at surgery. All the patients were explored and resection and anastomosis performed. We did not do H. Pylori culture. Patients with bleeding per rectum were investigated by Meckel's scan. Analysis of the results was done by SPSS version 10. **Results:** Majority of our patients presented with obstruction (82.5%) in contrast to the Western studies (around 40%) while only 4.7% presented with bleeding per rectum again in contrast to the Western countries (38–56%). **Conclusion:** There appears to be a geographical and/or racial difference in the presentation of Meckel's diverticulum.

INTRODUCTION

According to Charles Mayo "A Meckel's diverticulum is frequently suspected, often sought for and seldom found".¹ This is a very true statement. Meckel's is frequently suspected in cases of bleeding per rectum but contrary to popular belief it rarely causes bleeding per rectum.² The more common presentations of Meckel's diverticulum are intestinal obstruction either due to inflammation, bands, internal herniation or intussusception.³ Meckel's causing chronic problems like chronic abdominal pain and unexplained anaemia has also been documented.^{4,5} Other presentations of Meckel's are due to patent omphalomesenteric duct remnants, which presents as umbilical fistula or sinus or intestinal prolapse through the umbilicus.³ Geographical variations have also been reported.⁶

Contrary to popular belief bleeding per rectum and intussusception are not the most common presentations of Meckel's diverticulum. Meckel's diverticulum can present in many ways. Majority of the presentations can be traced back to the embryological origin of Meckel's diverticulum.⁷ The Meckel's diverticulum originates from incomplete involution of Omphalomesenteric duct and this can result in umbilical polyp, umbilical sinus, umbilical fistula, umbilical cyst, various types of bands and omphalomesenteric vessels remnants with or without Meckel's diverticulum.⁷ Ectopic gastric mucosa near the base of Meckel's diverticulum is responsible for many presentations like inflammation, recurrent abdominal pain due to ulceration of adjacent intestinal mucosa, perforation, and G.I. bleeding.^{8,9} Pancreatic ectopic mucosa frequently causes intussusception.¹⁰ Another variety is inverted Meckel's diverticulum, which also frequently produces intestinal obstruction.⁵

We conducted a study in our department to get an insight into the different presentations of Meckel's Diverticulum in our part of the world.

MATERIAL AND METHODS

Three years retrospective analysis from January 1999 to December 2001 was conducted at the department of Paediatric Surgery, Khyber Teaching Hospital, Peshawar on the various presentations of Meckel's diverticulum. The record was reviewed for all those patients who presented to our ward with the signs and symptoms of Meckel's diverticulum and who were diagnosed either by investigations or at surgery. Patients with silent Meckel's diagnosed at lapa-rotomy for some other reasons were excluded from the study. Also the patients with umbilical pathologies like umbilical polyps, omphalomesenteric duct sinus or cysts were not included in this study. However the patients who presented with omphalomesenteric duct fistulas with or without intestinal prolapse were included in the study. All the patients were explored and in every case resection anastomosis was performed. We did not perform culture for Helicobacter Pylori. The patients with bleeding per rectum were investigated by Meckel's scan. Records of those patients who had inflamed Meckel's diverticulum, was also reviewed and included in the study.

RESULTS

We recorded 63 patients with signs and symptoms related to Meckel's diverticulum. Out of these 16 (25%) were females and 47 (75%) were males. Among these 63 patients, 52 (82%) presented with acute intestinal obstruction with age ranging from less than 1 year to 10 years. Out of these 8 (12.6%) patients presented in 1st year of life including 5 (8%) in the neonatal period. 32 (50%) patients were seen between the age group of 2-4 years, while 12 (19%) presented between 5–10 years of age. One of the patients was operated for umbilical hernia somewhere else and developed post-operative intestinal obstruction. On exploration we found an inflamed Meckel's diverticulum tip causing obstruction. The cause of obstruction 41 (65%) cases was internal herniation of the intestine in a gap between the

inflamed tip of Meckel's and another part of intestine or mesentery or mesodiverticular bands. In 8 (12.6%) patients volvulus caused obstruction due to a band attached to the tip of the Meckel's Diverticulum and only in three we found Meckel's as a pathologic lead point with intussusception.

Inflamed Meckel's diverticulum without any other complication was found in only five patients. These were operated for appendix but when normal looking appendix was found search for other pathology revealed inflamed Meckel's.

Patent omphalomesenteric duct was found in 4 (6.3%) patients. One of the patients was operated by a general surgeon but unfortunately the baby developed intestinal fistula and the patient came to us for further management.

Massive intestinal bleeding per rectum occurred only in three cases (4.7%). Meckel's scan was positive only in two (3.1%) of these cases.

DISCUSSION

Meckel's diverticulum can present at any age. It has been documented that majority of Meckel's diverticulum symptoms occur before the age of 40 years.^{7,11} In paediatric age group it can present at any time right from birth till the end of childhood years.⁹ The mean age recorded has been 3.5 years, which was also the most common age of presentation in our series.⁹ In adult population fourth decade seems to be the most common age of presentation.⁹ Different symptoms appear at different ages.^{7,12,13} In one study the mean age of bleeding per rectum recorded was 2.8 years, for obstruction 0.6 years and for inflammation 8.2 years.⁷ In another study obstruction was recorded mainly in less than 10 years of age, but perforation occurred mainly between 10 to 30 years of age.¹² We had two peaks of obstruction, one in the neonatal age and the other between 2–5 years of age. The overall incidence in a population is between 2–3%.¹³ Although the common belief is that only 2% among these are symptomatic but studies have shown that the incidence of symptomatic patients can be as high as 56%.^{7,12,16} We also believe that the frequency of symptomatic Meckel's diverticulum is much higher as we see incidental Meckel's diverticulum infrequently.

Various types of clinical presentations of Meckel's diverticulum signify more than one mechanism for production of these symptoms and signs. Curiously different presentations occur at different ages.^{7,12} Intestinal obstruction is the leading presentation all over the world, in all age groups with frequency ranging from 38% to 80%.^{9,12,14-16} In a study done in Karachi the patients presenting as emergency, more than 50% had intestinal obstruction due to bands or volvulus, while in another study done in India more than 60% of children presented with acute intestinal obstruction.¹⁵ In a large series done at Quebec, Canada only 42% of the children had intestinal obstruction, while in another study done in Netherlands the incidence of acute intestinal obstruction was 39%.^{12,16} In our study the frequency of intestinal obstruction was much higher, i.e., 82.5%. The cause of this high incidence needs further studies such as presence of hypertrophic gastric mucosa or *Helicobacter Pylori* in the diverticulum.

In our study we found inflamed Meckel's diverticulum in only 5 cases, which accounts for about only 8% of the total cases. In a study done at Karachi the incidence of diverticulitis was more than double, i.e., 19%.³ In another study in Turkey this incidence was 11.9% while Bemelmen from Netherlands have reported an incidence of 12% and St-Vil from Canada has reported an incidence of 14%.^{16,17} Although our frequency is close to other international studies, the author from Karachi has not explained the reason for higher incidence³. We recorded 3 cases (4.76%) with bleeding per rectum caused by Meckel's diverticulum. This incidence is much lower as compared to other international studies. In a study reported by Akhtar *et al* 100 cases of bleeding per rectum were investigated in children but none turned out to be due to Meckel's diverticulum², so Meckel's should be considered a very rare cause of bleeding per rectum. In India a study conducted in adult population for massive bleeding per rectum revealed Meckel's diverticulum to be the cause in 12% of the cases.⁶ In the Western world this incidence is much higher and ranges from 19.5% to 56%.^{7,9,16,17} We did not find any difference in the incidence of Meckel's diverticulum presenting as umbilical pathology from other studies.⁷

The causes of these presentations are multiple. The simple obstruction due to bands, volvulus or internal herniation can be explained on the basis of peculiar anatomy of the Meckel's diverticulum. Ectopic gastric mucosa and its colonization by *Helicobacter Pylori* can explain many complications like ulceration, inflammation, obstruction and bleeding per rectum. In a study from Spain ectopic gastric mucosa and ulceration were related to the symptoms in children but they could not find any *H Pylori* in the resected specimens.⁸ In other studies a causal relationship has been documented. Oguzkurt *et al* concluded from his study that hypertrophic gastric mucosa is mainly associated with bleeding per rectum but it has no association with colonization with *Helicobacter Pylori*. However hypertrophic gastric mucosa with colonization with *Helicobacter Pylori* increase the incidence of other complications like obstruction, inflammation and perforation⁹. Nearly the same results were reproduced by a Bemelmen *et al* as well as by St-Vil *et al*.^{12,16} Interestingly Maieron *et al* could not find any *Helicobacter Pylori* in the resected specimens of symptomatic diverticulum and he attributed it to the use of NSAIDs especially in cases of bleeding per rectum.¹⁸ In our study the

different results could be attributed to difference in the incidence of ectopic gastric mucosa and its colonization with *Helicobacter pylori* for which we need further studies. The results are summarized in Table 1.

Table-1:

Condition	LRH	Karachi	Canada	Nether-lands	USA
Obstruction	82.5	51	42	39	33-42
Inflammation	8	19	14	12	6-14
Bleeding	4.75	0	38	12-14	38-56

CONCLUSIONS

The common beliefs about the presentations of Meckel's diverticulum need to be revised. There appears to be geographical or racial differences in the presentations of Meckel's diverticulum.

REFERENCE

1. Mann CV, Russell RCG, Williams NS. Small and large intestine. In Bailey and Love's Short Practice of Surgery 22nd ed 1995. Chapman and Hall. Madrid. P 787.
2. Firdous A, Akhtar I, Zia N, Shehzad K. Bleeding Per Rectum in Children. J Rawal Med Coll 2000;4(1-2):50-3.
3. Rasool N, Hussain I, Akhtar J, Ahmed S, Aziz A. Various presentations of Omphalomesenteric Duct remnants in children. J Coll Physicians Surg Pak 2002;12(4):204-7.
4. Huang FC, Ko SF, Lee SY. Meckel's diverticulum mimicking infantile colic: sonographic detection. J Clin Ultrasound 2000;28(6):314-6.
5. James GK, Berean KW, Nagy AG, Owen DA. Inverted Meckel's diverticulum: an entity simulating an ileal polyp. Am J Gastroenterol 1998;93(9):1554-5.
6. Anand AC, Patnaik PK, Bhalla VP, Chaudhary R, Saha A, Rana VS. Massive lower intestinal bleeding—a decade of experience. Trop Gastroenterol 2001;22(3):131-4.
7. Row MI, O'Neil JA, Grosfeld JL, Fonkalsrud EW, Coran AG. Meckel's Diverticulum. In Essentials of Pediatric surgery. 1st Ed. 1995. Mosby-Year Book, Inc. New York. P 515-9.
8. Pinero A, Martinez-Barba E, Canteras M, Rodriguez JM, Castellanos G, Parrilla P. Surgical management and complications of Meckel's diverticulum in 90 patients. Eur J Surg 2002;168(1):8-12.
9. Oguzkurt P, Talim B, Tanyel FC, Caglar M, Senocak ME, Buyukpamukcu N. The role of heterotopic gastric mucosa with or without colonization of *Helicobacter pylori* upon the diverse symptomatology of Meckel's diverticulum in Children. Turk J Pediatr 2001;43(4):312-6.
10. Martin JP, Connor PD, Charles K. Meckel's diverticulum. Am Fam Physician 2000;61(4):1037-42 .
11. Groebli Y, Bertin D, Morel P. Meckel's diverticulum in adults: retrospective analysis of 119 cases and historical review. Eur J Surg 2001;167(7):518-24.
12. Bemelman WA, Hugenholtz E, Heij HA, Wiersma PH, Obertop H. Meckel's diverticulum in Amsterdam: experience in 136 patients. World J Surg 1995;19(5):734-7.
13. Moore TC. Omphalomesenteric duct malformations. Semin Pediatr Surg 1996;5(2):116-23.
14. Arnold JF, Pellicane JV. Meckel's diverticulum: a ten-year experience. Am Surg 1997;63(4):354-5.
15. Das PC, Rao PL, Radhakrishna K. Meckel's diverticulum in children. J Postgrad Med 1992;38(1):19-20.
16. St-Vil D, Brandt ML, Panic S, Bensoussan AL, Blanchard H. Meckel's diverticulum in children: a 20-year review. J Pediatr Surg 1991;26(11):1289-92.
17. Aarnio P, Salonen IS. Abdominal disorders arising from 71 Meckel's diverticulum. Ann Chir Gynaecol 2000;89(4):281-4.
18. Maieron R, Stimac D, Avellini C, Zoratti L, Rizzi C, Scott C, et al. Acute gastrointestinal bleeding due to Meckel's diverticulum heterotopic gastric mucosa. Ital J Gastroenterol 1996;28(4):225-8.

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