

Diverse Presentation of Meckel's Diverticulum in Pediatric Patients

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ABSTRACT

Background: Meckel's Diverticulum is the common congenital disease and seen in 2% of the population. It is difficult to diagnose preoperatively, mostly found during operation with its variability in presentation. **Materials and Methods:** In this retrospective study, all the cases diagnosed as MD among the cases that were operated for different disease entity preoperatively were selected. Demographic data, clinical presentation, preoperative diagnosis, perioperative findings and histopathological reports were analyzed to assess the variability in the presentation of Meckel's diverticulum in 8 years of duration at the College of medical sciences, Bharatpur, Nepal. **Results:** Out of 32 cases, there were twenty males and twelve females with M: F=1.66:1. The mean age \pm SD was 8.34 ± 3.98 years. Abdominal pain followed by vomiting and abdominal distention and per rectal bleeding were common complaints. Altogether sixteen (50%) cases had features intestinal obstruction. Perforation of MD was present in nine (28.1%) cases, intussusception in seven (21.8%), Meckel's diverticulitis in five (15.6%), small bowel volvulus around fibrous band in six (18.8%) cases, internal herniation in three (9.4%) cases, and significant massive bleeding due to MD in two (6.3%) cases. MD was commonly found within range of 40-60 cm from the ileocecal junction. In all cases, the presence of MD was incidental intraoperative finding. Postoperatively, three (9.4%) cases had superficial wound infection. The mean \pm SD hospital stay was 6.15 ± 1.4 days. Small intestine mucosa (n=12, 37.5%) followed by gastric (n=9, 28.1%), pancreatic (n=7, 21.9%) and colonic mucosa (n=3, 21.9%) were the common histological finding. **Conclusions:** MD is a true diverticular anomaly that may remain clinically silent for a lifetime, or it may have life-threatening complications. Meckel's diverticulum and its complications should be kept as an important differential diagnosis in acute abdomen because of its nonspecific clinical features.

Keywords: intestinal obstruction; meckel's diverticulum; volvulus.

INTRODUCTION

Meckel's Diverticulum (MD) is the most common congenital disease and seen in 2% of the population.¹ It is mostly detected in male.¹ It was first named by German anatomist Johann Friedrich Meckel in 1809 who defined this pathology being embryological in origin.² It occurs due to incomplete closure of omphalomesenteric duct or vitelline duct which should be obliterated by 5-6th weeks fetal period.² It is seen in the anti-mesenteric border, 45-100 cm proximal to the ileocecal junction.² It usually contains ileal mucosa, but there may be heterotopic gastric, pancreatic, duodenal or colonic mucosa.² Most of the cases of MD are clinically asymptomatic and is found more commonly as an incidental finding in the operation theater but some cases can present to

us as complications like gastrointestinal bleeding, intestinal obstruction, diverticulitis, umbilical fistula, diverticular perforation, and cecal or small bowel volvulus.³ As there are low mortality and lifetime complication, there has been a controversy between resection of asymptomatic MD but for complicated cases resection has been recommended.⁴

MATERIALS AND METHODS

This was a retrospective study conducted at the Department of Gastrointestinal Surgery of College of Medical Sciences, Bharatpur, Nepal in between January 2010 to January 2017 to assess the various presentation of MD. After taking written informed consent and clearance from the Institutional Review Committee of College of Medical Sciences, all the

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cases diagnosed as Meckel's diverticulum among the cases that were operated for different disease entity preoperatively were selected and analyzed. Demographic data, clinical presentation, preoperative diagnosis, intraoperative findings, surgical procedure performed, histopathological report and postoperative follow up were recorded. Patients were admitted from emergency and were prepared for operation. Prior to the surgery, a standard regimen of intravenous antibiotics (injection ceftriaxone and metronidazole) was given. Type of surgery was dependent on the basis of intraoperative finding. Perforation of MD was managed with diverticulectomy or segmental resection. Intestinal obstruction due to volvulus around a fibrous band was treated with by untwisting of bowel along with the division of band. If the bowel loop was found to be gangrenous, resection and anastomosis of the gangrenous segment were done. In cases of intussusception, the reduction was tried, if difficult, resection of intussuscepted mass followed by primary anastomosis was done. Diverticulitis was diagnosed when MD was found in distal ileum for the normal appendix in a suspected case of acute appendicitis. Resection of diverticulum at its base and closure perpendicular to the axis of the intestine. Patients who had a massive bleeding surgical resection of MD and adjacent ileum was done. Initially, patients were kept nil per oral and on intravenous fluids until bowel sounds were retrieved, followed by sips and liquid diet and then on a soft diet as the patient tolerated. Postoperative follow up was done up to six weeks. Normally distributed continuous variables were expressed as the mean \pm standard deviation (SD). Categorical variables were expressed as frequencies and percentages of an appropriate denominator. All of the statistical analyses were performed using SPSS 16 software (SPSS Inc., Chicago, Illinois, USA).

RESULTS

Out of thirty-two cases, nine cases (28.1%) were of 0-5years age group, thirteen (40.6%) cases of 6-10years age group and ten (31.25%) cases were above age 10 years. The mean age \pm SD was 8.34 \pm 3.98 years. In this study, twenty (62.5%) cases were male and twelve (37.5%) cases were female with M: F= 1.66:1. Abdominal pain was most common complaint followed by vomiting and abdominal distention. Per rectal bleeding was present in only two cases. Ultrasonography (US) was performed on all cases but none displayed evidence of Meckel's diverticulum. All cases underwent emergency surgery. Though the preoperative diagnosis was different, the presence of Meckel's diverticulum was

incidental intraoperative finding in all of the cases (Table 1).

Per-operatively, perforation at the base of Meckel's diverticulum was present in nine (28.1%) cases, intussusception was present in

Table 1. Characteristics pattern of Meckel's Diverticulum.

Parameters	Frequency (Percentage)
Age group	
0-5 years	9 (28.12)
5-10 years	13 (40.62)
10-15 years	10 (31.25)
Sex	
Male	20 (62.5)
Female	12 (37.5)
Clinical features	
Pain Abdomen	31 (96.8%)
Vomiting	28 (87.5%)
Abdominal distension	24 (75%)
lower GI bleeding	2 (6.2%)
Per-operative diagnosis	
Intestinal Obstruction	16 (50)
Intussusception	7 (21.87)
Volvulus	6 (18.8)
Internal herniation	3 (9.4)
MD Perforation	9 (28.12)
Meckel's diverticulitis	5 (15.62)
Lower GI Bleeding	2 (6.2)
Distance from Ileocecal junction	
20-40cm	10 (31.25)
40-60cm	14 (43.75)
60-80cm	7 (21.87)
>80 cm	1 (3.12)
Histopathology finding	
Small intestine mucosa	12 (37.5)
Gastric tissue	9 (28.1%)
Pancreatic tissue	7 (21.9%)
Colonic mucosa	3 (9.4)

seven (21.87%) cases followed by Meckel's diverticulitis in five (15.6%) cases, small bowel volvulus around fibrous band joining the Meckel's diverticulum to anterior abdominal wall in six (18.8%) cases, internal herniation in three (9.4%) cases, and significant massive bleeding due to MD in two (6.2%) cases. Altogether sixteen (50%) cases had features intestinal obstruction. The diverticulum was most commonly at a range of 40-60 cm from the ileocecal junction. Postoperative period was uneventful except in three cases. Three (9.4%) cases had superficial wound infection that was managed by daily dressing and oral antibiotics. The mean \pm SD duration of hospital stay was 6.15 \pm 1.4 days. In histopathology reports small intestine mucosa tissue was found in twelve (37.5%) cases, gastric mucosa tissue was found in nine (28.1%) cases, and pancreatic mucosa tissue

was found in seven (21.9%) cases and colonic mucosa was seen in three (9.4%) cases. There was no mortality in the early postoperative or in the follow-up period. There was no readmission for paralytic ileus, intestinal obstruction, incisional hernia, intraabdominal abscess or respiratory infection.

DISCUSSION

Meckel's diverticulum, though, can occur in both male and female, male predominance is seen. Lin et al., found male: female ratio between 2:1.² However in this study male to female ratio was 1.66:1. Sancar et al. report mean age of occurrence for MD was 4.99+ 3.90 years whereas in this study it was 8.34 ± 3.98 years.⁵

According to Rho et al., the chief complaints were GI bleeding and nonspecific abdominal symptoms whereas some study mentions intestinal obstruction as the major presentation.⁶⁻⁸ It is seen that bleeding and intussusception due to MD were more frequent in children under two years of age, whereas symptoms of intestinal obstruction occur more often after two years.⁹ Rattan et al., mentioned intestinal obstruction (86%) was the most common presentation for MD.¹⁰ Similarly, in this study, sixteen (50%) cases presented with features of intestinal obstruction that was due to intussusception followed by bands and volvulus. However, lower GI bleeding was diagnosed only in two (6.3%) cases. Though, Swickard et al., found 20% to 30% cases present with diverticulitis and/or perforation, in our series perforation of MD was present in nine (28.1%) cases and diverticulitis was present in five (15.6%) cases.¹¹

Making a diagnosis of MD is often difficult and most of the diagnosis is made intraoperatively either during elective or emergency surgeries for other conditions or when complications due to MD warrants a laparotomy which was seen in this study also.¹² This may be due to lack of specific symptoms that overlap with other conditions or various diagnostic modalities like USG, CT and MRI are not highly sensitive or specific to come to a conclusive diagnosis.¹ The most useful method of detection of a Meckel's diverticulum is technetium-99m pertechnetate scanning depending upon uptake by heterotopic gastric mucosa.¹³ The 99mTc-pertechnetate Meckel's scan has been reported as sensitivity as high as 85%, with a specificity of 95% but all diverticulum doesn't contain ectopic tissue to take up technetium and its availability at all centers limits its widespread use.¹³

Management of symptomatic MD should be prompt surgical intervention with resection of the diverticulum or resection of the segment of ileum bearing the diverticulum.¹⁴ In case of bleeding due to MD, the bleeding site is usually from the adjacent ileum, so segmental resection of ileum with diverticulum is required.¹⁴

Perhaps the most controversial area with regard to management of MD has been the asymptomatic patient with an incidentally discovered diverticulum.¹⁵ Previously mentioned strategies like age and sex of the patient, the length of the diverticulum and the diameter of the mouth or base of the diverticulum have been proven to be ineffective in assisting the decision to prophylactically remove this congenital developmental variant.¹⁵ Sometimes, the management involves a controversial decision about whether to surgically remove an incidentally discovered diverticulum.¹⁶ Soltero et al., recommended conservative management for incidentally detected MD as the likelihood of an MD becoming symptomatic in the adult patient was estimated to be 2% or less, and the morbidity rates from incidental removal were 12%.¹⁷ Zani et al. after analysis of 244 articles mentioned increased morbidity associated with incidental resection.¹⁸ In contrast to this, Cullen et al. incidentally found 6.4% rate of lifetime risk of development of complications due to MD and the rates of postoperative complications from prophylactic removal were low (2%).¹⁹ These complications are generally the same as that of other operations like bleeding, infection, intraabdominal abscess formation, wound dehiscence, incisional hernia and postoperative adhesive intestinal obstruction that have to be dealt in the similar ways as for other surgeries.¹⁴ In this study three (9%) cases had surgical site infection.

However, this study had some limitations. The follow-up was limited to 6 weeks postoperatively, and long-term complications were not evaluated. A larger population-based study is needed to obtain more precise results.

CONCLUSIONS

MD is a true diverticular anomaly that may remain clinically silent for a lifetime, or it may have life-threatening complications. Meckel's diverticulum and its complications should be kept as an important differential diagnosis in acute abdomen because of its nonspecific clinical features.

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