

MECKLE'S DIVERTICULUM IN PATIENTS WITH ACUTE ABDOMEN

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ABSTRACT

Background: Meckle's diverticulum is not a very common cause of acute abdomen, yet occasionally it manifests itself as a life threatening condition.

We carried out this study to observe the varied clinical manifestations of Meckle's diverticulum in patients with acute abdomen.

Material and methods: This study was conducted in Agency Headquarter Hospital Wana and data collected from various surgical clinics. It was a prospective study conducted during four years from 2000-2003. All patients underwent laparotomy for signs and symptoms of acute abdomen. A total of 900 cases were studied. Of these (18 patients) 2% were found to have Meckle's diverticulum.

Results: Nine hundred patients of acute abdomen were studied. All were operated and the diagnosis confirmed by histopathologic examination. Eighteen patients (2%) were having Meckle's diverticulum. Six patients (37.5%) were symptomatic. Twelve patients (62.5%) were having Meckle's diverticulum with no signs of pathology. Of the symptomatic 6 patients, 2 patients (39%) presented with intestinal obstruction. Haemorrhage, perforation, diverticulitis, and Meckle's diverticulum having ectopic mucosa were presented each in one patient (15%).

Conclusion: Meckle's Diverticulum is a rare cause of acute abdomen. It presents with obstruction in the pediatric age group and with perforation, haemorrhage and ectopic mucosa in adults. The symptoms caused by Meckle's diverticulum are mainly due to bands or ectopic mucosa. Diverticulum found in patients less than 30 years age should be resected and in older patients resection is indicated if ectopic gastric tissue is suspected. Diverticular bands can simply be cut in these patients.

Key words: Meckle's diverticulum, Bands, Acute abdomen, Ectopic mucosa.

INTRODUCTION

It is the most common surgical abnormality of the small intestine which results from incomplete obliteration of the vitelline duct. It was originally described by Fabricius Hildanus in 1598, however it was named after Meckle who established its embryonic origin between 1800-1820. It occurs when the duct fails to obliterate. Different types of vitelline duct anomalies appear.

- A persisting vitelline duct, appearing as draining fistula at umbilicus.
- A patent vitelline sinus beneath the umbilicus.
- A fibrous band connecting the ileum to the inner surface of umbilicus.
- A vitelline duct cyst.
- An obliterated bowel portion.
- Enterocystomas, umbilical sinuses, and omphalo-ileal fistula or the other congenital anomalies seen with Meckle's Diverticulum.

Meckle's diverticulum is supplied by right vitelline artery. Usually the artery terminates in the diverticulum, but some times it has been seen continuing up to the abdominal wall. Some times these blood vessels persist in the form of fibrous remnants that run between the Meckle's Diverticulum and the abdominal wall or small bowel mesentery.

It occurs on the antimesenteric border of the ileum, nearly 60cm from the ileo-caecal junction. It is 2.99 cm long and 1.92cm wide. It is a true diverticulum containing all the layers of intestine. The heterotopic mucosa is likely to be of gastric in origin in 80% cases of Meckle's Diverticulum. It is important because it leads to ulcerations, perforation and bleeding. Mucosa of jejunal, colonic, rectal, pancreatic and endometrial origin are also reported.^{1,2}

MATERIAL AND METHODS

This study was conducted in Agency Head Quarter Hospital Wana and data was collected from various surgical clinics. A total of 900 cases were



Figure-1 & 2: Showing Meckle's diverticulum with its feeding blood vessels.

studied. All presented with acute abdomen. The main features were pain abdomen, vomiting and abdominal distention. In only one case intractable haemorrhage was noticed.

A thorough history was taken from each patient. A detailed general physical and systemic examination was performed in all the patients. Every patient had FBC, urine routine examination, blood urea, sugar, serum creatinine. Special investigations included plain X-ray abdomen, abdominal ultrasound and barium studies.

Definitive diagnosis was confirmed by performing laparotomy in every case. All resected specimens were subjected to histopathologic examination.

RESULTS

A total number of 900 cases were subjected to this study. All presented with acute abdomen. The diagnosis was confirmed through laparotomy and biopsy in all cases. Out of these 900 patients 18 patients (2%) were having Meckle's diverticulum. Among these, 6 patients (37.5%) were symptomatic and 12 patients (62.5%) were non symptomatic. Two patients (39%) of the symptomatic patients were having intestinal obstruction. Haemorrhage, perforation, diverticulitis and ectopic mucosa were presented each in 1 patient (15%).

The non-symptomatic patients having acute abdomen were suffering from intestinal obstruction, acute appendicitis, worm infestation and abdominal tuberculosis.

The symptomatic patients were treated according to the manifestation including resection of the Meckle's diverticulum and end-to-end anastomosis. Specimens were subjected to histopathologic examination. Two patients having intestinal obstruction and the non-symptomatic patients were bearing normal morphological picture on histologi-

cal examination. Of the remaining 3 patients), 45% were having picture of acute inflammatory changes, while 1 patient (15%) was having ectopic gastric mucosa. The male to female ratio was 3:1.

DISCUSSION

Meckle's Diverticulum is not a common ailment, yet sometimes it poses difficulties both in diagnosis as well as in treatment strategies. The various manifestations has been studied by many people, however controversies still exist about the different treatment modalities. Meckle's Diverticulum occurs so infrequently that most articles have reported either small series or isolated cases.³

The diverticula were removed most often from female patients. The removal of diverticulum was incidental in 35 patients (74.5%) and symptomatic in 12 patients (25.5%). Symptomatic patients presented with obstruction in 1 and diverticulitis in 7 patients. Female patients were significantly less likely than male patients to be symptomatic (4 of 31 patients) 13% among females, and (8 of 16 patients) 50% among males ($P < 0.05$).⁴

Among patients with a symptomatic Meckle's diverticulum, male to female ratio was 3:1. Clinical or histologic features most commonly associated with symptomatic Meckle's diverticulum were patient age younger than 50 years.³ The symptoms manifest at an early age (77% in those under age 30) and predominantly in males.³ In our study the ratio of symptomatic Vs non symptomatic was symptomatic 37.5% and 62.5% respectively. This figure is supported by a study done by Bemelman WA, et al.⁵

Various modalities for the preoperative diagnosis has been devised. Their application and the results fo produced are also subject to controversies. Technetium pertechnetate scintigraphy is applied to detect ectopic mucosa in Meckle's diverticulum resulting in gastrointestinal bleeding. This is a new modality with limited application. The sen-

sitivity of scintigraphy in detecting ectopic gastric mucosa was 0.75, the specificity 1.0 and the diagnostic accuracy 0.86; the diagnostic accuracy was estimated to 0.96 for the whole material. Presence of anemia may provide guide line as to whether or not scintigraphy is indicated.⁶

In our study no such investigation was available and the diagnosis confirmed by laparotomy and histopathological examination. Our main battery of investigations was routine and radiological examinations. Despite the availability and wide use of modern imaging techniques, the diagnosis of Meckle's diverticulum is difficult. The signs and symptoms vary from none to those of an acute abdomen or gastrointestinal bleeding. We did barium studies for two patients which were inconclusive.⁷

In our study small diverticula were often concealed by overlying small bowel loops on routine small bowel barium studies.

Meckle's diverticulum presents in a variety of manifestations, the most common is intestinal obstruction (35%). Letter hernia in the inguinal region is common and may cause bowel obstruction secondary to strangulation or incarceration of the diverticulum within the hernial sac.⁸

The obstruction may be due to bands or intestinal volvulus resulting from rotation of the gut around the band. The other manifestations include Meckle's diverticulum full of coproliths, immersed in pus and blood. Examination of the resected diverticulum showed necrotic diverticulitis in the absence of ectopic gastric or pancreatic tissue.⁹

In other study the patient presented with multiple complications, such as: neoplasia, occult chronic bleeding, giant size Meckle's Diverticulum, partial intestinal obstruction and severe symptomatic anemia. There was complete resolution of the condition after resection and ileo-ileal anastomosis.¹⁰

Meckle's Diverticulum is relatively uncommon cause of small bowel obstruction in the adolescent population.¹¹

Ileal intussusception is another reported cause of intestinal obstruction due to Meckle's Diverticulum investigation. A case was reported by Van Hee R, Brewaeyts P et al. who found intussusception due to an invaginated Meckle's diverticulum.¹²

A case of gangrenous Meckle's Diverticulum secondary to axial torsion is reported by Malhotra S, et al.¹³ Meckle's Diverticulum containing heterotopic mucosa is reported in several cases.

Gastritis is present in many cases but the predominant pattern is that of reflux-type gastritis or gastropathy.

Chronic and chronic active gastritis is also demonstrated in a minority of cases, and those with moderate or severe activity is associated with peptic ulceration.¹⁴

The literature and this present study shows that *H. pylori* is not often associated with peptic ulceration in Meckle's Diverticulum and hence it is unlikely that it has any significant role in peptic ulceration at this site.¹⁵

Meckle's Diverticulum and intestinal duplications may cause gastrointestinal bleeding in almost any age group and require a high index of suspicion for diagnosis. Bleeding usually is painless but may be massive. The advent of technetium (Tc)^{99m} pertechnetate radionuclide scanning has greatly facilitated the diagnosis of Meckle's Diverticulum and may also be useful for intestinal duplications.¹⁶

Meckle's Diverticulum was confirmed, and histological examination of the excised specimen revealed that it was lined with ectopic gastric mucosa. It has not been satisfactory explained why the initial imaging failed to demonstrate the ectopic gastric mucosa.¹⁷

Rarely Meckle's Diverticulum presents as benign and malignant stromal tumor. Calderale SM, et al, reported a case where by the features were consistent with those of fibrosarcoma, the tumor was classified in the category of gastrointestinal stromal tumors; more specifically, it was considered malignant for the presence of spread beyond the primary site in the form of peritoneal nodules and for the high mitotic count.¹⁸

The presence of an adenomyoma in a young patient within a Meckle's diverticulum favors the view that adenomyomas are a variant of pancreatic heterotopia.¹⁹ Kusumoto H, et al reported a case in which histopathologic examination of the lesion revealed a diverticulum containing normal small bowel mucosa, ectopic normal gastric tissue, and adenocarcinoma.²⁰

Carcinoid tumor in Meckle's Diverticulum may be the cause of symptoms necessitating surgical intervention, the diagnosis is nearly never apparent till the specimen has been removed.²¹

Usually the treatment of Meckle's Diverticulum is surgical but now laparoscopic treatment is also available. All symptomatic and pathologic Meckle's Diverticulum should be removed with a segment of ileum. The use of stapling devices, with their ease of use and low complication rate, make it reasonable to remove any Meckle's Diverticulum that easily fits in the device.²²

Treatment of Meckle's diverticulum in case of intestinal obstruction entails simple bowel resection in most cases. Surgical treatment can be diffi-

cult in gastro-duodenal and colo-anal intussusceptions, some time requiring innovative technique.²³

Although uncommon, many cases of Meckle's diverticulum are quite suitable for laparoscopic diagnosis and treatment.²⁴ Meckle's diverticulum discovered incidentally at operation should be removed for most patients, regardless of the age.²⁵

CONCLUSION

Meckle's diverticulum is a rare cause of acute abdomen. Most commonly it presents with obstruction in the paediatric age group and with perforation, haemorrhage and ectopic mucosa in adults. Symptoms caused by Meckle's diverticulum are mainly due to bands or ectopic mucosa. Diverticulum found in patients less than 30 years age should be resected. In older patients resection is indicated if ectopic gastric tissue is suspected. Diverticular bands can simply be cut in these patients.

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