



## Meckel's Diverticulum in Adults: A Preoperative Diagnostic Dilemma

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### Abstract:

Pre-operative diagnosis of Meckel's diverticulum may be overlooked, given the rarity of this pathology in adults. The clinical manifestations are similar to those of other abdominal pathologies. Diagnosis is further compounded by the fact that conventional imaging methods do not pick-up the obvious anomaly. We present a case of Meckel's diverticulum with fibrous umbilical band causing small bowel obstruction. Our aim of presentation is to highlight the role of diagnostic laparoscopy in preoperative diagnosis of this condition. A 32 year male, presented with acute small bowel obstruction. Laparoscopy performed achieved the diagnosis of Meckel's diverticulum with band extending from the tip of the diverticulum to the umbilicus, which was the cause of twisting of the ileal loop resulting into obstruction. The band was released from the parietes and wedge resection of the diverticulum was done. Patient recovered uneventfully. Meckel's diverticulum should be considered among the differential diagnosis for adults presenting with acute small bowel obstruction.

**Key words:** Meckel Diverticulum, Diverticulitis, Intestinal Obstruction, Technetium, Gastrointestinal Hemorrhage, Neoplasms.

### Introduction

Meckel's diverticulum is the most common congenital malformation of the gastrointestinal tract present in 2% of the population [1]. Fabricus Hildanus was the first person who described this entity in 1598. Its embryological and pathological features were described by German Anatomist Johann Friedrich Meckel in 1809 [2]. Majority of the Meckel's diverticulum in adults remain silent. In asymptomatic cases, the diagnosis is incidentally made by small bowel contrast study, laparoscopy or laparotomy for unrelated conditions. An individual with Meckel's diverticulum has a 4–6% lifetime risk of developing

a complication [3]. The common complications are lower gastrointestinal hemorrhage, intestinal obstruction, diverticulitis, perforation, vesico-diverticular fistulae and tumors.

A well-known statement of Charles Mayo, "Meckel's Diverticulum is frequently suspected, often looked for and seldom found". In children and younger patients bleeding is the most common presentation; whereas in adult's intestinal obstruction is the common mode of presentation. The diagnostic laparoscopy and the use of technetium-99m pertechnate scan

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**Received:** May 6, 2014 | **Accepted:** June 9, 2014 | **Published Online:** July 10, 2014

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**Conflict of interest:** None declared | **Source of funding:** Nil | **DOI:** <http://dx.doi.org/10.17659/01.2014.0061>

have improved the preoperative diagnosis rate. Our aim of presentation is to highlight the role of diagnostic laparoscopy in preoperative diagnosis of this condition.

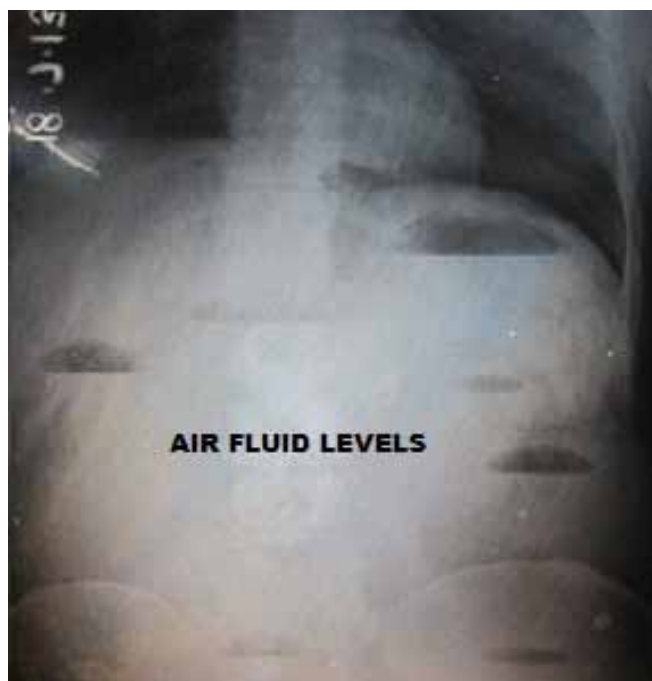
### Case Report

A 32 year male, presented with moderate to severe upper and central abdominal pain of 2 days duration associated with vomiting; and hasn't opened bowels in past 2-days. He had similar episode about a year before, for which he was hospitalized and treated conservatively. Examination of the abdomen revealed moderate distension with mild diffuse tenderness in the abdomen more so on the right side and central area. There was no guarding. Bowel sounds were high pitch and hyper-dynamic. Plain abdominal X-ray showed 6-7 gas-fluid levels. A clinical diagnosis of small bowel obstruction was made and the treatment started as per the standard surgical protocol. Blood-counts revealed

elevated white blood cell count of  $17.5 \times 10^9/L$  with 80% polymorphs. Other biochemical investigations were within normal limits. The ultrasound of the abdomen and CT scan were suggestive of small bowel obstruction.

Initially the patient was kept on conservative line of management with naso-gastric aspiration, intravenous fluids, antibiotics and supportive treatment. The patient responded to therapy and the bowels moved. Progressively the abdomen became soft and tenderness reduced. To evaluate further for the cause of obstruction; diagnostic laparoscopy was planned.

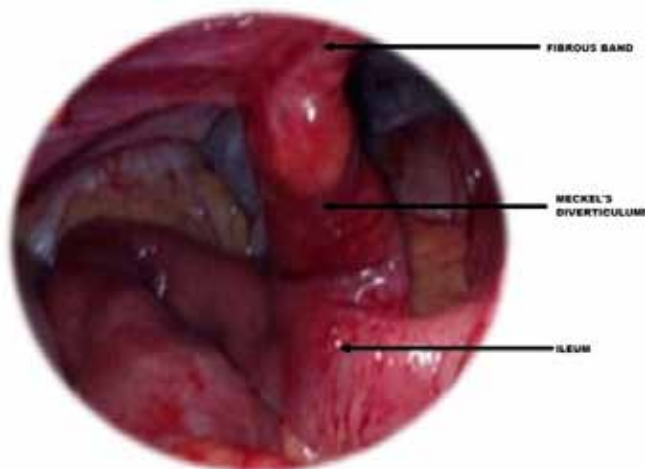
Pneumoperitoneum was created using open technique. The laparoscopic examination revealed Meckel's diverticulum with fibrous band extending from the tip (blind extremity) to the umbilicus. Proximal bowel was relatively distended and congested. The diverticulum itself appeared inflamed. Bowel walk did not reveal stricture or any other pathology. Appendix was normal. The Meckel's band had caused twisting of the ileal loop resulting into obstruction, which relieved spontaneously. The diverticulum was 6-7 cm in length, 2 cm in breadth, and situated about 50 cm from the ileo-caecal



**Fig.1:** Plain X-ray abdomen with multiple air-fluid levels in small bowel.



**Fig.2:** CT scan showing dilated small bowel loops.



**Fig.3:** Laparoscopic view of Meckel's diverticulum.

junction. Minilaparotomy incision made and wedge resection of the diverticulum was done. The bowel anastomosis was performed in double layers.

Histopathology revealed mucosal lining epithelium of the intestine with stromal edema; congested blood vessels and presence of mixed inflammatory cells with prominent lymphoid follicles, suggestive of diverticulitis. Oxyntic cells or pancreatic tissue were not seen in the histology. Post-operatively patient had an uneventful recovery and discharged from the hospital on 9<sup>th</sup> postoperative day.

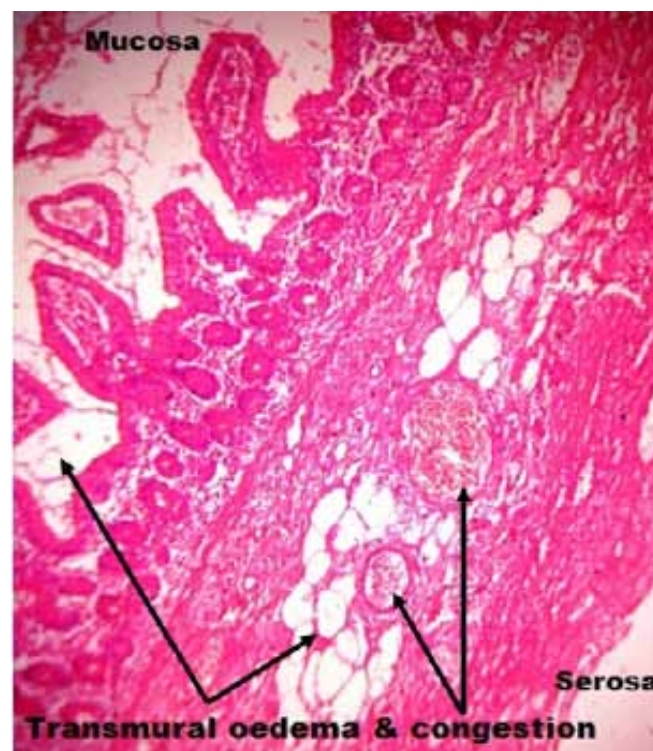
## Discussion

The Meckel's is a true diverticulum, with all layers of the bowel wall, located precisely on the antimesenteric border of the ileum [4]. The occurrence of the diverticulum is said to be equal in both sex, but the complications are frequent in males [5]. The incidence decrease with age [6].

In our case, Meckel's diverticulum presented with small bowel obstruction which is an uncommon cause of obstruction. The various mechanisms of obstruction in these cases are intussusception, torsion around the omphalo-diverticular band [7], inflammatory



**Fig.4:** Exteriorized Meckel's diverticulum after the separation of the band from umbilicus.



**Fig.5:** Histopathology section of the diverticulum with transmural edema and congestion.

adhesions, and incarceration in a hernia or meso-diverticular band. Scout film of the abdomen, ultrasonography and CECT abdomen done; all revealed features of small bowel obstruction without unfolding the precise cause. Fewer than 10% of symptomatic cases of Meckel's diverticulum are diagnosed preoperatively on conventional investigations [8]. CT and ultrasonography have limitations because distinction between a diverticulum and intestinal loop is usually difficult [9]. Further small bowel barium enema is a risky proposition in acute surgical situations.

Technetium scan is a useful test to diagnose Meckel's diverticulum as the tracer has propensity to concentrate in ectopic gastric mucosa, found in 50% of cases [10]. The other diagnostic methods that may be useful are Tc 99m RBC labeled scan, and angiography, but only in cases of active bleeding from the diverticulum. Angiography shows positive results when the bleeding rate is  $> 0.5$  mL/min [11]. But the widespread availability and feasibility of these tests, especially in emergency is an issue.

The patient had obstruction relieved on conservative management. In view of the recurrent episode of obstruction, presumptive diagnosis was tubercular stricture which is quiet common in India, or inflammatory/congenital adhesions. One of the options was to wait for 1-2 weeks to allow the bowel activity return to normal and then do contrast bowels study to evaluate the cause for obstruction. Another option was diagnostic laparoscopy, in fact as done by us in the same hospital admission. It did reveal the presence of Meckel's diverticulum with a band running from the tip of the diverticulum to the umbilicus. The proximal gut was relatively congested & distended indicating probably the small bowel volvulus. Occurred around the band, that spontaneously resolved leading to improvement in clinical condition. Chowbey *et al.* in a large series of 253 patients with recurrent small bowel obstruction did laparoscopy and diagnose the exact cause in

all but 3 of the cases. 7% of these cases were due to Meckel's diverticulum [12].

Diverticulectomy was done after mini-laparotomy and exteriorization which is an acceptable approach. Altinli *et al.* reported extracorporeal transumbilical resection of the Meckel's diverticulum with hand-sewn anastomosis [13]. Saggarr *et al.* described with the laparoscope, both extracorporeal (LATUM i.e. laparoscopic-assisted transumbilical Meckel's diverticulectomy) and intracorporeal resection of Meckel's diverticulum [14].

This case highlights the role of laparoscopy as a useful minimally invasive approach for the diagnosis; and treatment of Meckel's diverticulum. It offers advantages over conventional investigations in terms of being swift, accurate and offering therapeutic value in the same sitting. If the surgeon chooses for total laparoscopic or lap-assisted diverticulectomy; it offers definite advantages in terms of decreased postoperative pain, early return of bowel function, and reduced adhesion formation. However a single case report is not sufficient to allow generalization about the role of laparoscopy in the management of small bowel obstruction, it nevertheless exemplifies the potential utility of laparoscopy as an approach to small bowel obstructions with undiagnosed causes. It further offers the flexibility of the techniques in adapting to unusual findings.

However, there are certain limitations of the laparoscopic approach in dealing with the complicated Meckel's diverticulum. If one confronts with gangrenous segment of bowel, it may require conversion [15]. Otherwise also it requires advanced laparoscopic skills and may be costly stapler devices if one has to do a total laparoscopic procedure. Hospitals where such procedures can be accomplished are limited, especially in the developing countries. A safe, efficient and cost-effective method which even a basic laparoscopic surgeon can perform, is to exteriorize the diverticulum via a minilaparotomy incision, and then



either do a wedge or a segmental resection with hand sewn anastomosis of bowel.

## Conclusion

Meckel's Diverticulum usually presents in adults as small bowel obstruction. It should be considered in the differential diagnosis of intestinal obstruction in adults. A diagnostic laparoscopy is a good tool for pre-operative evaluation and diagnosis; and diverticulectomy can be safely performed by exteriorization technique.

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