MECKEL'S DIVERTICULUM

Dr. Abid Rashid

Key Contents

- Definition of meckel's diverticulum.
- Pathophysiology and clinical presentation of meckel's diverticulum.
- Investigations to diagnose meckel's diverticulum as a cause of bleeding per rectum.

Learning Objectives

- To define meckel's diverticulum
- To describe clinical presentation of meckel's diverticulum
- To explain investigations for diagnosis of meckel's diverticulum
- To discuss management of meckel's diverticulum

Key words: Meckel's Diverticulum, Lower GI hemorrhage, Diverticulectomy, Meckey's Scan.

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Introduction:
Meckel's diverticulum was first described by Fabricius Hildanus in 1598. The name derives from the German anatomist Johann Friedrich Meckel who described the embryological and pathological features in 1809 [1]. Although it generally remains silent but life threatening complications may arise making it an important structure for having a detailed knowledge of its anatomical and pathophysiological properties to deal with such complications.

EMBROLOGY.
Meckel's diverticulum is the remain of the prenatal yolkstalk (Vitellointestinal duct). The yolk sac of the developing embryo is connected to the primitive gut by the yolk stalk or vitelline (i.e. omphalomesenteric) duct. This structure normally regresses between the fifth and seventh weeks of fetal life. If this process of regression fails, various anomalies can occur. The spectrum of defects includes a Meckel diverticulum, a fibrous cord attaching the distal ileum to the abdominal wall, an umbilical-intestinal fistula, a mucosa-lined cyst, or an umbilical sinus. Of these, Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract in humans occurring in approximately 2% of the population with equal incidence in males and females [2].

It is located on the antimesentric border of the ileum 45 to 60 cm proximal to the ileocecal valve and is usually 3–5 cm long [3] [fig [fig1].1].

It possesses all the three layers of the intestinal wall and has its own blood supply from the superior mesenteric artery, which makes it vulnerable to infection and obstruction like appendix[3]. Since cell lining of vitelline duct are pluripotent, we may get heterotopic gastric mucosa (50%), pancreatic mucosa(5%) and less commonly colonic mucosa, endometriosis, hepatobiliary tissue, which are responsible for other complications like hemorrhage, chronic peptic ulceration and perforation [2,4,5].

CLINICAL PRESENTATION.
INCIDENTALLY FOUND MECKEL'S DIVERTICULUM.
Majority of the meckel's diverticulum remain silent and are diagnosed incidentally during small bowel contrast study, laparoscopy or laparotomy done for unrelated conditions, or until complications arise from the diverticulum [6-8]. A person with Meckel's diverticulum has a 4 – 6% lifetime risk of developing a complication [1,9]. The most common clinical presentation is gastrointestinal bleeding, which occurs in 25% – 50% of the patients having complication [3].

Other complications include obstruction, intussusception, diverticulitis and perforation. Age wise statistics reveals that hemorrhage is the most common presentation in children aged 2 years or younger[3,10] and intestinal obstruction being the commonest among adults[11], although some studies have found reverse [12].

Overall, the complications have been found more
common in males, with the ratios varying in
different studies from 1.8:1 to 3:1 [13-15]. The
pathogenesis of ulceration in a Meckel's
diverticulum is secondary to peptic ulceration
from heterotopic gastric mucosa. Although
colonization of Helicobacter pylori in this ectopic
gastric mucosa has been reported but its role in
pathogenesis of complication is yet to
established [16].

COMPLICATIONS.
1) **Severe Haemorrhage**: caused by peptic
ulceration painless bleeding occurs per
rectum and is maroon in colour an
operation is sometimes required for
serious progressive gastrointestinal
bleeding. When no lesion in the
stomach/duodenum can be found the
terminal 150cm of ileum should be
carefully inspected

2) **Intussusception**: In most cases the apex
of the intussusceptions is the swollen
inflamed heterotopic epithelium at the
mouth of diverticulum

3) **Meckel's diverticulitis**: may be difficult to
distinguish from the symptoms of acute
appendicitis when a diverticulum
perforates the symptoms may stimulate
those of a perforated duodenal ulcer at
operation an inflamed diverticulum
should be sought as soon as it has been
demonstrated that appendix and fallopian tubes are not at fault.

4) **Chronic peptic ulcer**: As the
diverticulum is the part of mid gut the
pain although related to meals is felt
around the umbilicus3.

5) **Intestinal obstruction**: the presence of

band b/w the apex of the diverticulum
and the umbilicus may cause
obstruction either by band itself or by a
volvolus around it.

6) **Tumor in Meckel,s diverticulum are rare**
with incidence of only 0.5% to 0.9%,42.
These tumor can be benign or malignant.
Lipoma, neuromasascular and vascular
hamartoma are among benign group14.
In malignant group carcinoid are most
common tumor46. Other are
mesenchymal tumor including
gastrointestinal stromal tumour,
leiomysarcoma and perinheral nerve
sheath tumor, adenocarcinoma and
desmoplastic small round cell tumor.47

INVESTIGATIONS.
1. **Technetium…99m pertechnetate
radioisotope scintigraphy**.
It has been utilized universally for the diagnosis
of bleeding meckel,s diverticulum and is at
present is investigation of choice in suspected
meckel,s diverticulum bleed. The injected
radioisotope is readily taken up by ectopic gastric
mucosa.15 diagnostic sensitivity iis 85% and
specificity is 95% and accuracy 90% in pediatric
group2. The accuracy of scanning may be
increased with use of pentagastrin and histamine
blockers.

2. **Capsule endoscopy**.
It has got some value in patient having bleeding meckel,s diverticulum, however a concluding
statement about it,s diagnostic value cannot be
made at this time.16

**Colonoscopy**.
Colonoscopy cannot diagnose bleeding meckel,s diverticulum because it cannot reach
the part of small intestine where it is located,
however it is helpful when blood is present in colon with abnormal radioisotope scan.

**ANGIOGRAPHY**
It is helpful in evaluation of adult patients with occult or intermittent GIT bleed or for localization of site of bleed and preoperative therapeutic embolization. When active haemorrhage occurring at time of angiography, luminal extravasation of contrast material will be present.17

**MANAGEMENT OF MECKLE’S DIVERTICULUM.**
Because of significant morbidity with complication rates of 8.5 to 16% associated with resection of symptomatic md, the meckel diverticulum should be excised in following conditions which increase the risk of future complications.

- Male patients18
- Patient younger than 40 or 50 years18
- Diverticula longer than 2 cm
- Presence of ectopic tissue in diverticular sac
- Presence of fibrous band.

A risk score system is then calculated by awarding points to each risk factor according to presence or absence with max. Of 10 points when all risk factors are present. Resection is suggested in asymptomatic md with risk score of 6 points or more.

In nutshell the incidentally found meckel’s diverticulum should be excised specially when risk score is more than 6 or there is future risk of becoming symptomatic or complications.

**Method of performing open diverticulectomy or segmental resection.**
The standard treatment of symptomatic meckel’s diverticulum is prompt surgical resection of diverticulum or resection of segment of adjacent ileum.

Abdomen is opened through midline and ileum is followed proximally for 2 feet from ileocaecal valve and meckel is identified. If meso-diverticulum found it should be divided and ligated between clamps. Meckel’s crushed from base and excised. Inner layer is stiched with 000 vicryl full thickness. Outer layer which is seromuscular, lambert suture applied with 000 mersilk.

Current trend is toward extramucosal single layer closure. This can be further simplified if stapling device is available1.

Indication of segmental resection are, when meckel is bleeding or base of meckel is inflamed or perforated. meckel along with 2…3 cm of adjacent ileum excised and single layer end to end anastomosis performed.

**Role of laparoscopy in management of complicated meckel’s diverticulum.**
Laparoscopy as a minimally invasive approach has emerged as both diagnostic as well as therapeutic means to deal with various surgical condition including Meckel’s Diverticulum. It’s ability to visualize whole of abdomen makes it a diagnostic choice for various undiagnosed intraabdominal pathologies. Several studies indicating safe and effective role of laparoscopy in complicated Meckel’s Diverticulum.19 It can be used in undiagnosed acute abdominal pain, in obstruction20 and perforation. It’s role in bleeding meckel is controversial because it leaves ectopic mucosa behind increasing risk of recurrence.

Some complications of meckel’s diverticulum need additional laparoscopic interventions, such
Meckel’s Diverticulum

<table>
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<tr>
<th>Risk Factor</th>
<th>Points</th>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
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<tr>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
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<tr>
<td>Age</td>
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</tr>
<tr>
<td>&lt;45</td>
<td>2</td>
</tr>
<tr>
<td>&gt;45</td>
<td>1</td>
</tr>
<tr>
<td>Length of MD</td>
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<tr>
<td>&gt;2 cm</td>
<td>2</td>
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<tr>
<td>&lt;2 cm</td>
<td>1</td>
</tr>
<tr>
<td>Presence of fibrous band</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
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Risk score

Asymptomatic MD

- Risk Score > 6
  - Resection
    - Simple Diverticulectomy is preferable
    - Wedge shape excision
      - Short broad based MD
      - Palpable mass at the base
  - No Resection
- Risk Score < 6
as management of volvulus and intussusception involve techniques like laproscopic derevolving and desussception. Similarly laproscopic approach has greatly simplified the management of littre's hernia.

Recently laproscopic assisted transumblical meckel's diverticulectomy was in practice. 10 mm trochar is inserted in open fashion, then using 10mm operative laproscope terminal ileum is exteriorized through umbilicus with a atraumatic instrument and then diverticulectomy or segmental resection can be performed.23.

REFERENCES

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