Endoscopic Appearance of Meckel’s Diverticulum

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Abstract

Meckel’s diverticulum is a remnant of the omphalomesenteric duct located in the ileum. Although typically asymptomatic, it may cause rectal bleeding in children. Owing to improved endoscopic techniques for the small bowel, it is increasingly also recognized as a potential bleeding site in adults. Endoscopic appearance is characterized by two lumina, a thickened bridge, ulcer, and occasionally direct visualization of ectopic gastric mucosa. This article is part of an expert video encyclopedia.

Keywords

Capsule endoscopy; Gastric heterotopia; Meckel’s diverticulum; Mid-GI bleeding; Small bowel; Standard endoscopy; Ulcer; Video.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70095-5

Techniques

- Video capsule endoscopy.
- Single-balloon enteroscopy.
- Double-balloon enteroscopy.

Materials

- Video capsule endoscopes
  - Given PillCam SB1/SB2 Given Imaging, Yoqneam, Israel.
- Balloon enteroscopes
  - Olympus SIF-Q180 Single-balloon enteroscope, Olympus, Tokyo, Japan.
  - Fujinon EN-450T5 Double-balloon enteroscope, Fujifilm, Tokyo, Japan.

Background and Endoscopic Findings

Meckel’s diverticulum (MD) is a remnant of the embryonic vitelline or omphaloenteric duct. It is typically located at the antimesenteric site of the ileum, approximately 40–100 cm proximal to the ileocecal valve, with a prevalence of 1.2%. Complications associated with MD are typical for a disease of childhood. In children it is a well-known cause of acute, painless intestinal bleeding. With the advent of advanced methods for small-bowel endoscopy, such as capsule endoscopy and balloon enteroscopy, the diagnosis is also increasingly made in adults.

Therapy is surgical resection. In most cases, MD is asymptomatic. Removal of an MD incidentally detected at surgery has been calculated to have a higher perioperative mortality than long-term mortality associated with leaving the MD in situ. Often, gastric heterotopia is found in MD, in a series in 25 out of 140 cases. This is the basis of Technetium (Tc) scintigraphy (Meckel scan) demonstrating ectopic gastric mucosa. Less frequently, pancreatic heterotopia is present. MD may contain enteroliths, can be inverted, or may be associated with tumors.

Several cases of diagnosis made with capsule endoscopy have been reported. The typical finding is a second lumen. However, this may be confused with viewing both directions of a normal loop when the capsule is located in a bend. The diagnostic clue is a thickened bridge between the two lumina, especially if an ulcer is present. The diverticulum may be seen as an impression bulging into another loop passed by the capsule at another time. Often passage of the capsule is delayed in the region of an MD. Occasionally the capsule drops into the diverticulum, showing a mucosa with reduced peristalsis, partial villous atrophy, and absent fold. Rarely, ectopic gastric mucosa within the MD can be directly visualized as a polypoid mass with reddish mucosa without villi. In case of active bleeding, the diverticulum itself may be missed. Localization of bleeding in the ileum should prompt for further diagnostic tests, including computed tomography (CT) angiography in frank bleeding.

In young patients with acute mid-GI bleeding, retrograde balloon enteroscopy can be considered even after normal
capsule endoscopy, as some cases have been reported where capsule endoscopy missed the diagnosis.\textsuperscript{1,2}

**Tips and Tricks**

- Double lumen seen at capsule endoscopy is an uncertain finding unless accompanied by a thickened bridge or ulceration.
- Capsules may drop into an MD and stay for a longer time.
- Capsule transit can be delayed in the region of an MD.
- The diverticulum may cause a bulging into another adjacent small-bowel loop visualized at a different time.

**Key Learning Points**

- MD is a remnant of the omphalomesenteric duct, located in the ileum.
- It is asymptomatic in most cases, but may cause rectal bleeding, typically in childhood.

**Complications and Risk Factors**

Retention of a video capsule within an MD has been reported.\textsuperscript{15,16} However, in case of detecting the source of bleeding, this event might be considered as a diagnostic aid rather than a complication.

**Alternatives**

Meckel scan using Tc tracer for scintigraphy is easy to apply and often recommended as a routine diagnostic test, especially in children.\textsuperscript{15} However, diagnostic yield is low in adults.

Enteroclysis, CT enterography, or CT scans occasionally reveal MD, but are especially helpful in the diagnosis of complications.\textsuperscript{16}

**Scripted Voiceover**

<table>
<thead>
<tr>
<th>Time (min:sec)</th>
<th>Voiceover text</th>
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<tbody>
<tr>
<td>00:00</td>
<td>Meckel’s diverticulum is typically located 40 to 100 cm proximal to the ileo-cecal valve.</td>
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<tr>
<td>00:05</td>
<td>Capsule endoscopy in this 23-year-old patient with mild iron deficiency anemia shows the entrance of a Meckel’s diverticulum. The bridge between small bowel lumen and entrance is thickened with ulceration. The capsule presses against the entrance of the diverticulum with short glances into the lumen.</td>
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<tr>
<td>00:42</td>
<td>In this 21-year-old patient capsule endoscopy had shown active bleeding in the distal ileum. Consecutive retrograde single balloon enteroscopy demonstrated a Meckel's diverticulum. When partially intubating the long diverticulum with the endoscope an ulcer was seen. Gastric mucosa was not detected, although diagnosed in the resected specimen.</td>
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<tr>
<td>01:15</td>
<td>This 75-year-old on clopidrogel for coronary heart disease suffered from severe anemia. Capsule endoscopy showed an ulcer with elevated margins and two lumina in the ileum for more than one hour.</td>
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<tr>
<td>01:30</td>
<td>Retrograde double balloon enteroscopy confirms the ulcer opposite to the orifice of the diverticulum.</td>
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<tr>
<td>01:44</td>
<td>A very thin circular ulceration around the orifice is seen as well.</td>
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<tr>
<td>01:52</td>
<td>Now the tip of the endoscope has entered the diverticulum without evidence of ulceration.</td>
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<tr>
<td>02:05</td>
<td>Contrast medium installed through the working channel shows the diverticulum without filling defects. The presentation of an ulcer opposite the diverticulum is unusual.</td>
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<td>02:20</td>
<td>The next 41-year-old patient presented with massive rectal bleeding. Capsule endoscopy shows the entrance of the diverticulum.</td>
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<td>02:34</td>
<td>The capsule now temporarily drops into the diverticulum. Here, small bowel mucosa with minimal peristalsis, partially atrophic villi and missing folds is seen on the left side of the image. On the right side, heterotropic gastric tissue is visible.</td>
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<tr>
<td>02:54</td>
<td>These elevated nodular and polypoid lesions have a more reddish mucosa without villi. Meckel scan was negative. Again, endoscopic findings were confirmed at surgery.</td>
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**References**