Case Report

Mesenteric Meckel’s diverticulum: a real variant

Susanne G. CARPENTER[1]
Ann E. McCULLOUGH[2]
Shabana PASHA[3]
Kristi L. HAROLD[1]+

 Departments of Surgery[1], Pathology[2], Gastroenterology[3], Mayo Clinic, Phoenix, AZ, USA.

+ Kristi Harold, MD
Mayo Clinic Arizona
5777 E. Mayo Blvd.
Phoenix, AZ 85054 USA.
+1 (480) 342-2849
harold.kristi@mayo.edu

Received July 4th, 2012; accepted September 30th, 2012

Abstract
A Meckel’s diverticulum is the most common congenital abnormality of the gastrointestinal tract and can present a variety of diagnostic and surgical challenges. A longstanding surgical dictum is that a Meckel’s diverticulum must be anti-mesenteric. This study reports the case of an adult male who presented with an obscure gastrointestinal bleed and was ultimately found to have a Meckel’s diverticulum on the mesenteric intestinal border which was resected laparoscopically. Diagnostic characteristics that facilitate identification of a Meckel’s diverticulum along with reported deviations from these characteristics are reviewed in this study.

Key words | Meckel’s diverticulum | mesenteric sided Meckel’s diverticulum | Meckel’s diverticulitis | congenital gastrointestinal anomalies

Introduction
A Meckel’s diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract, and can present diagnostic and surgical challenges. Arising from failure of the omphalomesenteric duct to close properly, MD can occur in up to 2% of the population and can manifest as obscure gastrointestinal bleeding, Meckel’s diverticulitis, obstruction, and intussusception [1]. While most MDs present in childhood, adult patients are also at risk for complications, though these tend to decrease with increasing age [2, 3]. Several characteristics that facilitate identification of a Meckel’s diverticulum include location two feet proximal to the ileocecal valve, the presence of an independent vessel supplying the structure, five layers of small intestine, and ectopic mucosa of either gastric, pancreatic or another origin other than small intestine in a majority of specimens [4]. There are very few cases of mesenteric-sided MD reported in surgical literature (Table 1), and several authors have suggested that what some call a mesenteric-sided MD may in fact be an intestinal duplication cyst [4–9]. This study reports a case of what the authors believe to be a mesenteric MD and reviews the literature concerning identification and appropriate treatment of a MD in the minimally invasive era.

Case Report
A 35-year-old otherwise healthy gentleman noticed a small quantity of maroon colored stools for one week, worsening over time. He eventually reported to a local emergency department with symptoms of orthostasis and required transfusion of 2 units of packed red blood cells. Extensive gastroenterologic workup included a video-capsule endoscopy which identified blood in the ileum. A subsequent double-balloon enteroscopy indicated friable ileal mucosa with contact bleeding reportedly 120 cm from the ileocecal valve. A tattoo was placed at the point of interest. A Meckel’s scan was then performed at the outside facility and was negative.

No additional intervention was undertaken by the patient until two weeks prior to his presentation to our clinic, which was one year after his first episode. Upon further questioning the patient had used NSAIDs prior to first episode of bleeding and aspirin prior to second episode. Workup at our institution included computed tomography (CT) scanning with enterography, as well as a review of the patient’s outside capsule endoscopy. CT enterography revealed a “tubular outpouching” adjacent to the distal ileum and ascending colon that was considered consistent with the expected appearance of a Meckel’s diverticulum (Figure 1). In light of
With this information, the patient was taken to the operating room where an exploratory laparoscopy with small bowel resection and side-to-side anastomosis was performed. The initial dissection was performed using three 5 mm trochars placed along the lateral left abdominal wall. Upon examination of the small intestine, a diverticulum was noted at approximately 60 cm from the ileocecal junction. However, this was found along the mesenteric border of the ileum (Figure 3). The tattoo indicating the furthest extent of the previous outside institution double balloon enteroscopy was noted to be at least 20 cm distal to the diverticulum (Figure 4). This area was not resected. One of three 5 mm trocars was upsized to a 12 mm in order to permit use of an Endo-GIA stapler (Covidien) which was employed for the transaction of the small bowel and mesentery surrounding the diverticulum (Figure 5). The diverticulum was sent to pathology where gross examination as well as frozen and permanent sections revealed the presence of ectopic gastric mucosa (Figure 6a & b).

Final pathology revealed a 7 cm x 2.5 cm pouch-like diverticulum containing a 3.5 cm area of mucosa with a granular appearance as opposed to the tan folds of the surrounding ileum. Microscopically, hematoxylin and eosin staining revealed erosion adjacent to reactive oxyntic gastric type mucosa.

### Table 1. Cases of mesenteric-sided MD reported in surgical literature.

<table>
<thead>
<tr>
<th>Author &amp; year</th>
<th>Presentation</th>
<th>Procedure performed</th>
<th>Distance from ICV</th>
<th>OR findings</th>
<th>Path findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segal et al. 2004, [7]</td>
<td>19-year-old, M, acute abdominal pain</td>
<td>Low transverse RLQ incision, small bowel resection, WLE mesentery</td>
<td>63.5 cm</td>
<td>Adenopathy, forshortened mesentery</td>
<td>Gastric mucosa w/ metaplasia</td>
</tr>
<tr>
<td>Manukyan et al., 2009, [9]</td>
<td>15-year-old, F, acute abdominal pain</td>
<td>Standard laparotomy</td>
<td></td>
<td>Mesenteric MD</td>
<td>Pancreatic, gastric mucosa with chronic ulceration</td>
</tr>
<tr>
<td>Sarioglu-Buke et al., 2008, [5]</td>
<td>7-month-old, M</td>
<td>Laparotomy, small bowel resection and anastomosis</td>
<td>40 cm</td>
<td>Mesenteric lymphadenopathy, 2 cm base, wide ileal connection</td>
<td>Fibrin accumulation, gastric mucosa</td>
</tr>
<tr>
<td>Seitun et al., 2011, [6]</td>
<td>65-year-old, F, RLQ abdominal pain</td>
<td>Lower midline incision, stapled transverse diverticulectomy</td>
<td>40 cm</td>
<td>Mesenteric abscess RLQ, inflamed MD</td>
<td>Heterotopic gastric mucosa w/ perforation</td>
</tr>
<tr>
<td>Carpenter et al., 2013</td>
<td>35-year-old, M, obscure GI bleed</td>
<td>Laparoscopic small bowel resection</td>
<td>60 cm</td>
<td>Mesenteric MD</td>
<td>Gastric mucosa</td>
</tr>
</tbody>
</table>

M: male; F: female; WLE: wide local excision; RLQ: right lower quadrant; ICV: ileocecal valve; OR: operating room; Path: pathology

Figure 1. CT enterography demonstrating intestinal outpouching consistent with Meckel’s diverticulum.
Discussion

Several other authors have reported MD presenting on the mesenteric border. Some argue this can only be an intestinal duplication cyst, but a case reported by Kurzbart and colleagues suggests otherwise as contrast was administered to a newborn infant of 28 weeks gestation via a fourth lumen in the transected umbilical cord [5, 7, 8]. Contrast filled the small bowel upon injection. At 3 months of age, the infant underwent an umbilical hernia repair. No residual omphalomesenteric structures were present, however a MD was found 40 cm from the ileocecal junction but adherent to the mesentery [8]. Several explanations for the reported mesenteric locations have been offered including that a shortened vitelline artery could form a mesodiverticular band from the ileal mesentery to the tip of the diverticulum which would then divert the diverticulum away from the antimesenteric border during elongation and fetal growth [5]. Another explanation is that the vitelline duct would simply adhere to the ileal mesentery [1].

Several other authors presenting cases of mesenteric-sided MD have openly pondered if they may have been dealing with an intestinal duplication cyst rather than a MD [4]. This begs the question of how one might differentiate the two. It seems that the absence of a distinct communication of a structure with adjacent intestinal lumen would favor intestinal cyst or duplication [7]. Our patient had a clear connection between lumens of his MD and the ileum. Another possible area of distinction is with ectopic gastric mucosa, which our patient demonstrated. However, ectopic gastric or pancreatic mucosa can be found in both MD (approximately 55%) and intestinal duplication cysts (approximately 16-39%) [1, 7, 10].
Some authors have asserted that the presence of a vitelline artery or a clear independent blood supply to a diverticulum is definitive evidence of MD whereas intestinal duplications share blood supply with the surrounding intestine [7, 11]. However, Kusumoto and colleagues have indicated that a distinct vitelline artery could be identified in only 10% of 776 patients with MD [12]. In the case here presented, a distinct blood supply was identified on CT scan, but attempts were not made to delineate this vessel intraoperatively or pathologically. In brief, we are left with the conclusions of previous authors that while the behavior and presentation of the lesion were more consistent with MD, we cannot definitely rule out a simple intestinal diverticulum or duplication cyst.

References