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The role of laparoscopy in symptomatic Meckel's diverticulum

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Abstract. We report two cases of symptomatic Meckel's diverticulum in adults with recurrent abdominal pain and episodes of minor lower gastrointestinal bleeding. In case 1, the diagnosis was suggested by ^{99m}Tc pertechnetate scan and confirmed by laparoscopy; whereas in case 2, only diagnostic laparoscopy was performed because of suspected appendicitis. A segmental small bowel resection with attached diverticulum was performed extracorporeally after exteriorization through the umbilical port site in both cases.

Key words: Meckel's diverticulum — Laparoscopy — Small bowel resection

Meckel's diverticulum (MD) represents the most common congenital abnormality of the gastrointestinal tract. The omphalomesenteric duct usually disappears in fetal week 6–7, but remaining parts are found in 1–3% of the population [17]. The complications associated with MD include inflammation, perforation, hemorrhage, intussusception, volvulus, and intestinal obstruction. The proximal segment of MD may generate ectopic gastric mucosa; peptic ulcers of the adjacent ileal mucosa and bleeding are the most common complication in children. However, the majority of MD cases are discovered incidentally, particularly in adults, where MD often causes uncommon symptoms; gastrointestinal bleeding occurs in <10% of cases [16, 17]. Rarely, pancreatic tissue may also be found.

Thus, symptomatic undiagnosed MD may lead to mismanagement and even psychiatric treatment of these patients over many years. Diagnosis can be achieved by ^{99m}Tc pertechnetate scan or diagnostic laparoscopy, during which a proper surgical treatment can be instituted.

Case reports

Case 1

A 20-year-old man was admitted to a district hospital several times with recurrent acute abdominal pain. Two weeks before the first admission, the patient had complained of minor lower gastrointestinal bleeding; 4 months later, a second episode with melena was observed. Physical and laboratory examinations were normal. Porphyria was excluded by repeated urinary and serum analysis. The following examinations/treatment were performed during the initial admissions: upper and lower endoscopy, abdominal computed tomography, small bowel enema, intravenous urography, diagnostic laparoscopy with incomplete small bowel revision, and laparoscopic removal of a normal appendix.

At 5 months after onset of the recurrent attacks of pain, the patient was referred to specialists of psychosomatic medicine in our university hospital, where an additional ^{99m}Tc pertechnetate scan was performed. This investigation revealed an enrichment in the right lower quadrant that was suspicious for MD (Fig. 1). A diagnostic laparoscopy was then repeated in our department.

Three trocars were inserted, along with a 12-mm video port in the umbilical region and two more 5-mm ports in the left and right lower abdomen. The revision of the small bowel was started at the cecum with atraumatic grasping forceps. After 80 cm, an MD measuring 4 × 3.5 × 2 cm was detected on the antimesenteric border of the ileum without attachment to the umbilicus (Fig. 2).

Since the small bowel was dilated due to the MD, a safe tangential resection of the diverticulum with the EndoGIA was not possible, so we decided to perform a formal segmental bowel resection. The small bowel loop with the attached Meckel's diverticulum was delivered extraperitoneally through the umbilical port site enlarged to 4 cm in length. A segmental 10-cm small bowel resection with end-to-end anastomosis was performed.

Histopathological examination revealed an MD with gastric type epithelium and peridiverticular inflammation. No ulceration was detected. After an uneventful course, the patient was released from hospital in good general condition at postoperative day 5.

Case 2

A 19-year-old woman was admitted with a 3-week history of recurrent abdominal pain associated with an infection of the upper respiratory system and a fever up to 40°C. Since the physical examination revealed a painful right hypogastrium, an acute appendicitis could not be excluded. A diagnostic laparoscopy was performed using the trocars and port sites described in case 1 (Fig. 3). The laparoscopic view showed a normal appendix, which was resected with an EndoGIA (Ethicon, Spreitenbach, Switzerland). Further examination of the small bowel revealed an MD measuring 3.5 × 3.5 × 3.0 cm.

Due to the large base of the MD, we decided to resect a small bowel segment with the MD instead of doing a wedge resection with a linear stapler. The infraumbilical port site was enlarged to 4 cm to deliver the small bowel loop extracorporeally, and formal segmental bowel resection was carried out.

Histopathological examination of the MD showed normal small bowel mucosa with moderate fibrosis of the serosa. The patient recovered uneventfully and was discharged 5 days later.

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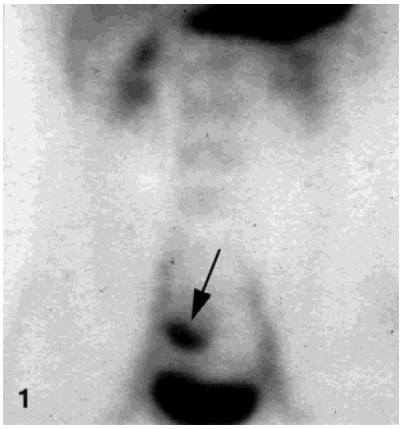

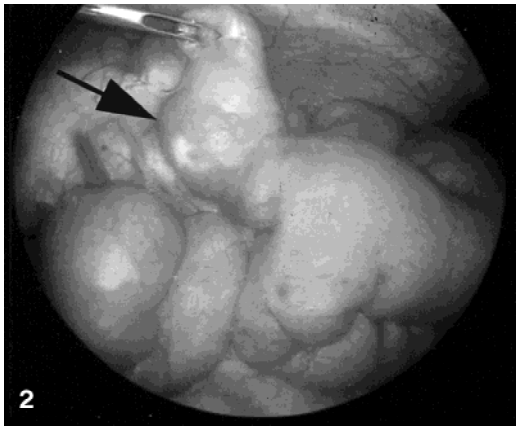

Fig. 1. ^{99m}Tc pertechnetate scan at 60 min. Ectopic uptake in the right lower quadrant, typical for a Meckel's diverticulum. The stomach, the kidneys, and the bladder are also visible.

Fig. 2. Laparoscopic view of a Meckel's diverticulum.

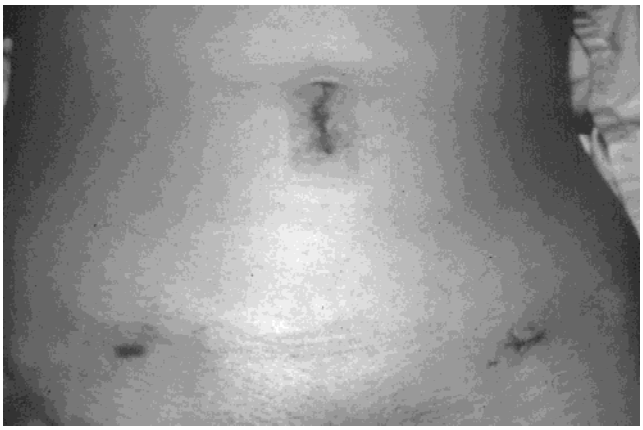

Fig. 3. Three small abdominal scars on postoperative day 3 of case 2 after laparoscopic-assisted small bowel resection.

Discussion

The preoperative diagnosis of an MD is often difficult to establish, particularly if active bleeding is absent, since there are more common diseases that may have symptoms similar to complicated MD. Ectopic gastric mucosa is present in ≤50–60% of MD and may cause inflammation, bleeding, and even perforation [17]. It is of note that the rate of ectopic mucosa is higher in symptomatic patients (>60%) than in asymptomatic patients (25%) [15]. Furthermore, acute bleeding is more common in children, whereas obstruction is more common in adults [7]. Obstruction may be the result of intussusception of the MD into the small bowel, volvulus, or torsion around a mesodiverticular band.

The ^{99m}Tc pertechnetate radionucleide scan used to detect ectopic gastric mucosa is one of the diagnostic options, but this method yields a diagnostic rate of only 54% in adults with complicated MD, based on the fact that ~50–60% of all MD show gastric mucosa [5]. Enteroclysis with barium has a diagnostic rate of 60%, and mesenteric angiography has a positive rate of 62% in complicated MD [5]. In unclear cases or suspected MD, a diagnostic laparoscopy is recommended to establish the diagnosis. Given the increasing popularity of minimally invasive surgery, the laparoscopic management of MD may well become the treatment of choice for this disease, due to the short hospitalization and rapid recovery associated with this approach.

Transverse stapler resection of asymptomatic MD has been recommended as a safe procedure without additional morbidity during open surgery for unrelated diseases [6, 11]. Following the recent development of stapler devices, laparoscopic tangential resection with a linear cutting and stapling device across the base of the diverticulum has become feasible [8, 9, 13]. However, the extent of resection is still a matter of controversy, since the surgeon has a narrow margin for safe resection; there is a risk for impinging on the lumen of the ileum or performing an insufficient resection that leaves ectopic tissue on the ileal stump. Therefore, inspection of the specimen is obligatory to ensure the complete resection of ectopic mucosa. An additional frozen section may be helpful [3].

In doubtful cases, particularly in those where the lumen is narrowed, a formal segmental bowel resection after laparoscopic proof of an MD represents a safe therapeutic alternative [1–3, 10, 12]. Using the method described in the present cases, exteriorization of the bowel to perform a segmental resection will have no major disadvantage, since only the umbilical port site requires an extension of the incision to bring the bowel loop to the skin [8, 12]. This procedure has the advantages of a less traumatic access, a shorter recovery, and less pain than a midline incision. Moreover, an intracorporal resection and anastomosis require significantly more effort than a simple extracorporal resection, and even for a laparoscopic tangential resection, a larger 12-mm port for the stapler device is needed.

An intraabdominal wedge resection of the MD or a laparoscopically assisted extracorporal bowel segment resection is clearly indicated in complicated MD. The management of MD found incidentally during laparoscopy (or open surgery)—for example, during cholecystectomy—is still controversial. It has been suggested that asymptomatic MD should be left in situ, since the overall rate of complications is low (~4%) [14]. Heinzelmann et al. recommended a laparoscopic resection of the MD in an emergency and a planned operation if no small bowel resection is necessary [4]. Sanders, however, suggests laparoscopic removal of MD only in cases that are very large (>5 cm) or have an omphalomesenteric band at risk for torsion [12].

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