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Case Report

Perforated Meckel Diverticulum with an Unusual Clinical Presentation

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Abstract

Introduction: Meckel's diverticulum (MD), represents the most frequent inborn anomaly of the gastrointestinal tract with occurrence in approximately 2% of the population. The majority of patients with MD are asymptomatic. Hemorrhage and obstructions are the most common complications. **Case presentation:** A 16-year old male presented with ambiguous signs of an acute abdomen, which turned out to be a perforated peptic ulcer of Meckel's diverticulum as the primary cause. No bleeding into the gastrointestinal tract was noted in the preoperative period, however, blood mixture was in the intra-abdominal effusion together with the contents of the small intestine. The patient underwent laparoscopically assisted segmental resection with end-to-end anastomosis. **Conclusions**: The presented case points out the necessity of sufficient cautiousness to consider the differential diagnosis of complicated MD when dealing with an uncertain diagnosis of acute abdomen, particularly in pediatric patients.

Keywords: Diverticulum Meckeli; Ectopic Gastric Tissue; Perforation; Clinical Presentation; Laparoscopy

Introduction

Meckel's diverticulum (MD), represents the most frequent inborn anomaly of the gastrointestinal tract. It results from incomplete obliteration of the vitelline duct during embryonic development, with occurrence in approximately 2% of the population. The lesion is usually asymptomatic, with only rare manifestations mostly by hemorrhage in young individuals or obstruction in adults [1,2] and possibly other complications including inflammation, perforation and malignant transformation [3]. The lifetime risk of developing complications is about 4% [4]. The location of MD may vary among individual patients; the usual position is in the ileum within 60-100 cm of the ileocecal valve. Up to 60% of Meckel's diverticula contain heterotopic tissue, mostly gastric, less commonly colonic mucosa, pancreatic or hepatobiliary tissue [5]. Ectopic gastric mucosa is present in about 20% of MD [4]. MD account for about half of the pediatric gastrointestinal bleedings [6]. Perforation of MD is a serious complication that may present as does perforated acute appendicitis, namely with fever, chills, nausea, vomiting, right lower quadrant abdominal pain and peritoneal signs. This resemblance often results in diagnostic ambiguity [7]. Herein, we report a case of a young male who presented with protracted nonspecific abdominal pain that progressed to acute abdomen symptomatology, at surgery identified as perforated Meckel´s diverticulum.

Case

I. Hospitalization

A 16-year-old boy was admitted to the Department of Pediatric Surgery with abdominal pain and suspicion of acute abdomen. At admission the patient was afebrile, vomiting once, stool was normal without pathological findings, the general condition was without alteration. Family history and personal history were unremarkable, he reported allergy to bacitracin. He had slightly elevated CRP 23.5 mg/l, WBC 8.8x10^9/L, neutrophils 52.8%. Ultrasonography found hypoechogenic round expansion with the diameter of 23.6 mm (volume of 8.7 ml), to the right from the urinary bladder in the area of terminal ileum (Figure 1). Appendix was reported with the diameter of 4.4 mm in the visible length of 3 cm. There was 6.5 ml of free liquid in the pouch of Douglas and 7 ml infracecally, without fibrinous membranes. Identified was a calcified coprolith of 5.5x1.2x20 mm. Based on these findings a CT scan was recommended, which was realized the upcoming day with the result: Oval, well circumscribed formation with smooth contours, with the mediocaudal border leaning to the right craniolateral wall of the urinary bladder; 2.7x2.3x2.7 cm, with a hyperdense rim of 3 mm, with native density of 55-65HU. Inside of the formation, on the caudal edge of the lesion was an area 5.9x6.8x7.6 mm large with native density of 55-65HU, v.s. coprolith. In the pouch of Douglas and the right paracolic space there was free liquid of the overall volume of cca. 40 ml.

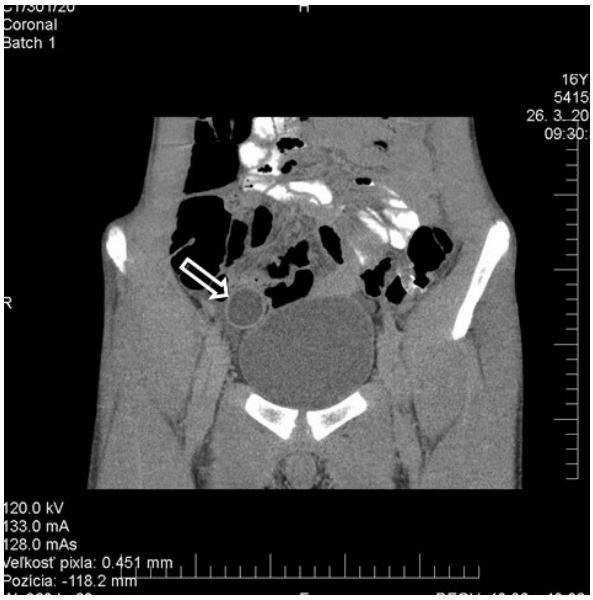

Figure 1: CT scan taken during the first hospitalization. In the right hypogastrium in the area of terminal ileum there is an oval well circumscribed formation (arrow) with smooth contours, with the mediocaudal rim leaning at the right craniolateral wall of the urinary bladder.

Conclusion: Hypodense focus in the ileocecal area in the right hypogastrium-dif. dg. Hydrops appendicis vermicularis with a coprolith, mesenterial cyst. Lymphadenitis mesenterialis.

The acute abdomen was not confirmed during the stay in hospital, with conservative treatment (infusion therapy) the pain subsided, the patient was realimented. Oncological consultation concluded a condition not typical for malignant disease. On day 4 the patient was dismissed with recommendation of an ultrasound control in 1 month.

II. Hospitalization

On day 6 in night the abdominal pain intensified and the patient was readmitted to the hospital. He was afebrile, did not vomit, the stool was liquid, without urination problems and had no signs of another disease. Local examination showed palpation tenderness of the right hypogastrium with tension of the abdominal wall and peritoneal signs of acute abdomen. The CRP was 18.4 mg/l, other parameters of blood screen and internal environment were without pathological deviations, WBC 11,7 x10^9/L, neutrophils 63.7%. The ultrasound examination yielded the conclusion: Hypodense focus in the ileocecal area in the right hypogastrium-dif. dg. hydrops appendicis vermicularis, mesenterial cyst. Free liquid in the abdominal cavity in the right paracolic and pericecal area and the pouch of Douglas, total volume cca 61 ml. Lymphadenitis mesenterialis.

The patient underwent urgent surgery because of acute abdomen. Laparoscopic revision of the abdominal cavity was performed under general anesthesia. Omentum was retracted into the small pelvis together with a convolute of small intestine loops with signs of perityphlitis forming a block around a cyst-like formation. The liquid in the pouch of Douglas was almost clear, lightly brownish, was sucked-off and sent for microbiological and cytological evaluation (Result: Neutrophilic polymorphonuclear leukocytes; aerobic cultivation-media remained sterile, yeast-negative, N. gonorrhoe-negative). The cystic formation consisted of Meckel diverticle dilated in its distal part (Figure 2). At its basis were signs of an older perforation event (probably based on perforated ulcer). The diverticle was 50 cm orally from the ileocecal transition, on the antimesenterial side of the small intestine. The intestinal loop was exteriorized through a minilaparotomy in the right hypogastrium, the segment with the Meckel diverticle was resected and the ileum was anastomosed end-to-end and sutured in two layers. Consecutive laparoscopic appendectomy was performed. Grossly, the appendix showed catarrhal inflammatory changes. The postoperative course was without complications, the patient was covered with antibiotic therapy with ampicillin-sulbactam 3x1500 mg i.v., gentamicin 2x120 mg i.v. The peristaltics and the passage of intestines were renewed, 8 days after surgery the sutures were removed, the wound healed per primam and the patient was dismissed home from the hospital.

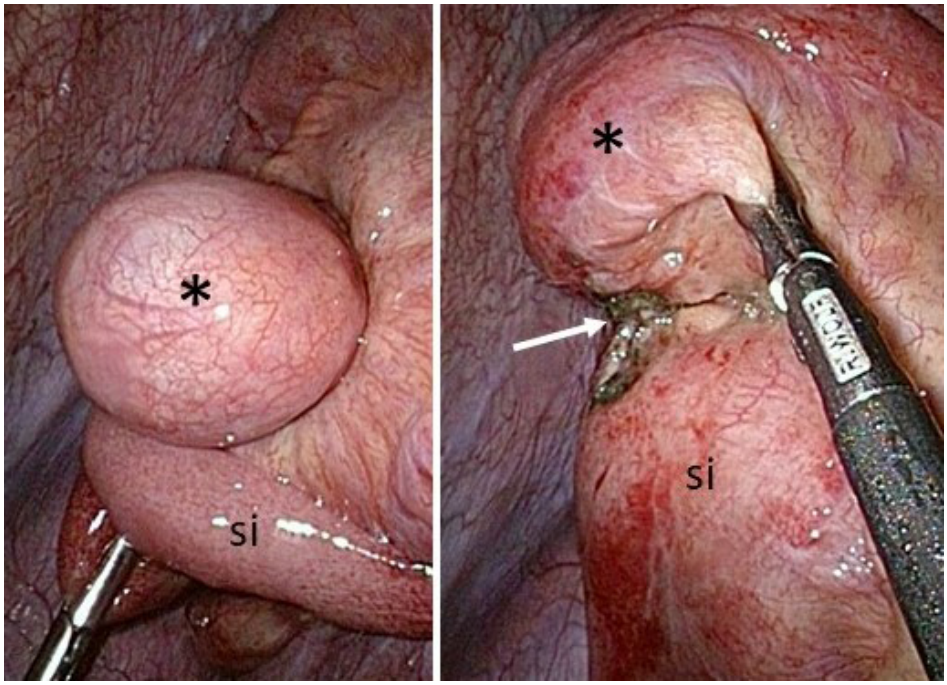

Figure 2: Laparoscopic revision of the abdominal cavity uncovered cystic dilatation of Meckel diverticulum (*) in its distal part (left) with perforation (arrow) covered with the small intestine (si), (right).

The material sent to pathology consisted of an appendix 5 cm long and 5.5 mm large, with prominent vascular pattern on serosa surface. The second material was a 4 cm long segment of small intestine with a 5 cm long protrusion ending with a spherical formation of 2.8 cm in diameter, connected through a 2 cm long channel with the intestine, the macroscopic finding was a hidden perforation of the Meckel diverticulum (Figure 3).

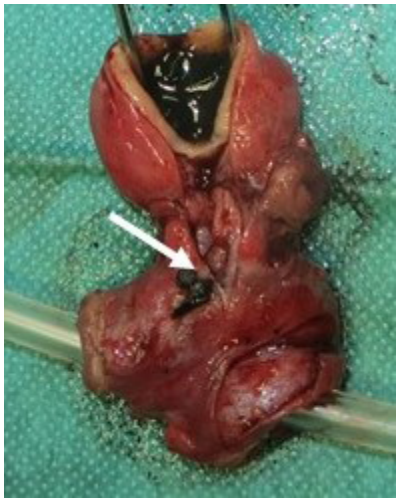

Figure 3: Surgical resection specimen of the small intestine with a protrusion ending with a spherical formation (opened after resection) corresponding to Meckel diverticulum with perforation (arrow) and bloody content in the cavity. (canyla 6 mm in diameter).

Histopathological findings were: Catarrhal appendicitis. Small intestine resection borders with normal mucosa, fibrinous serositis with one spot with coagulation necrosis reaching the subserous fat. Meckel´s diverticle with corporal gastric mucosa on vertex of the pouch. Ulceration in the transition zone of gastric to intestinal mucosa with continuation into a defect communicating into the peritoneal cavity (Figure 4). There was fibrinous peritonitis on the adjacent serosa.

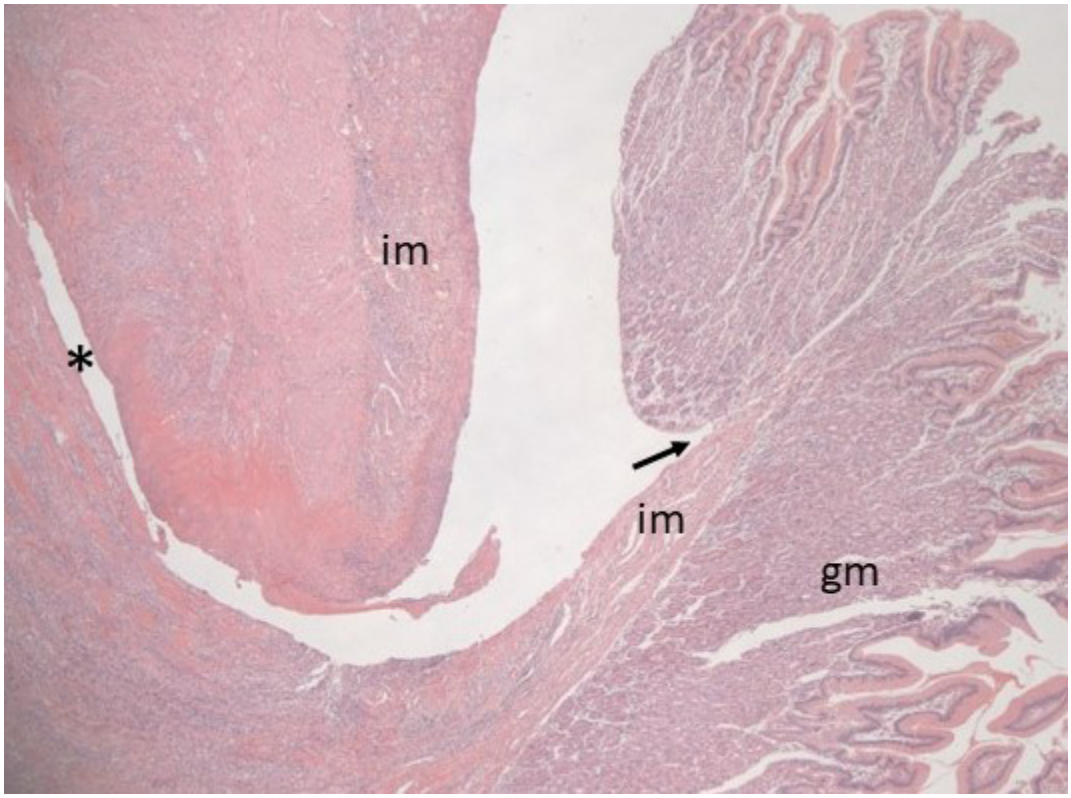

Figure 4: Histological picture of the Meckel diverticulum with perforation (*) in the intestinal mucosa (im) close to the borderline (arrow) between im and the gastric mucosa (gm). Hematoxylin and eosin, 25x

Discussion

Meckel's diverticulum (MD) is the one of the most common congenital malformations of the gastrointestinal tract and has varied clinical presentations. MD may remain clinically silent for a lifetime, or in 2% of patients it may have life-threatening complications. Gastrointestinal bleeding appears in 50% of patients and is the most frequent complication of MD, followed by intestinal obstruction, diverticulitis, and perforation as the least frequent, presenting in approximately 6% [8,9]. The gastric mucosa was linked with ulceration which can likely cause the development of diverticulitis [10]. The presence of heterotopic gastric and pancreatic mucosa within the Meckel's diverticulum, which secretes acid and highly alkaline pancreatic secretion, respectively, may cause ulceration of the adjacent ileal mucosa [8].

The pre-operative diagnostics of a patient with Meckel's diverticulum often presents a challenge to the clinician in both children and adults, since presenting symptoms can be non-specific and the differential diagnosis broad [5]. Usually, the patients have a previous history of repeated abdominal pain, blood in the stool, or other abdominal symptomatology [11]. In some cases, the only constantly present symptom is the sudden onset of periumbilical stabbing pain, without other signs of the acute abdomen [12]. This was also the case of our patient who did not even have nausea or diarrhea. The most important differential diagnosis remains acute appendicitis, which was not supported by ultrasonography in our patient and was excluded after the CT scan. The oval structure in the right hypogastrium was considered as hydrops appendicis vermicularis with a coprolith or a mesenterial cyst.

Computed tomography (CT) including CT enterography and RI scintigraphy can be used to show typical imaging features of Meckel's diverticulum and its complications. Knowledge of the clinical and radiologic findings of Meckel's diverticulum can aid in the early and accurate diagnosis of this anomaly and its complications [13].

The unclear clinical presentation in our patient required a more exact diagnostic approach to clarify the diagnosis. Laparoscopy as a minimally invasive approach has emerged as both diagnostic as well as therapeutic means to deal with various surgical conditions, including Meckel's diverticulum [11]. Its ability to investigate the abdominal cavity makes it a diagnostic choice for various undiagnosed intraabdominal pathologies. The decision to resect an incidentally discovered DM has been debated. Zani et al. report, that there was a higher postoperative complication rate following resection [14]. There are several studies indicating the effective and safe use of laparoscopy in case of complicated Meckel's diverticulum. It can be used in undiagnosed acute abdominal pain, in obstruction, and perforation of the gastrointestinal tube [8,12,11]. Wedge or segmental bowel resection should be performed in order to all ectopic gastric tissue is resected [10]. In a comparison of laparoscopic versus open resection of MD, authors concluded that laparoscopic resection of MD did not increase the risk of morbidity or the operative time. Laparoscopy was associated with decreased length of in-hospital stay. In symptomatic patients, thus, the laparoscopic approach may be preferred [6].

Conclusion

The presented case pointed at the diagnostic problem with detection of complicated Meckel´s diverticulum in case of nonspecific presentation of clinical symptoms. The presence of gastric mucosa in Meckel's diverticulum without bleeding and with a primary perforation event, appears to be very rare. It points out the necessity of sufficient cautiousness to consider the differential diagnosis of complicated MD when dealing with an uncertain diagnosis of acute abdomen, particularly in the pediatric patients.

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