ECTOPIC PANCREATIC TISSUE IN MECKEL'S DIVERTICULUM

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Here we present a rare case of inflammation in the Meckel's diverticulum with the ectopic pancreatic tissue in a 18-year-old patient. Laparoscopy converted to laparotomy was performed. The inflamed Meckel's diverticulum was found during intraoperative revision, which was the reason to perform segmental resection of the affected area of the small intestine with the construction of an enteroenteric anastomosis. Pathological examination of surgical material revealed mature exocrine tissue of the pancreas without any signs of cellular atypia, which confirmed the presence of pancreatic heterotopia in the Meckel's diverticulum. The reported case demonstrates rarity of such combination of abnormalities, highlights diagnostic difficulties at the preoperative stage, and draws attention to the need for thorough intraoperative revision of the small intestine, as well as for mandatory morphological verification to establish the final diagnosis and determine further patient management tactics.

Keywords: Meckel's diverticulum, ectopic pancreas, acute abdomen, small bowel resection

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ЭКТОПИРОВАННАЯ ТКАНЬ ПОДЖЕЛУДОЧНОЙ ЖЕЛЕЗЫ В ДИВЕРТИКУЛЕ МЕККЕЛЯ

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Представлен редкий случай воспаления дивертикула Меккеля с эктопированной тканью поджелудочной железы у 18-летнего пациента. Проведена лапароскопия с конверсией в лапаротомию. При интраоперационной ревизии обнаружен воспаленный дивертикул Меккеля, что послужило основанием для выполнения сегментарной резекции пораженного участка тонкой кишки с формированием энтеро-энтероанастомоза. Патоморфологическое исследование операционного материала выявило наличие зрелой экзокринной ткани поджелудочной железы без признаков клеточной атипии, что подтвердило наличие панкреатической гетеротопии в дивертикуле Меккеля. Представленный случай демонстрирует редкость подобного сочетания патологии, подчеркивает диагностические трудности на дооперационном этапе и акцентирует внимание на необходимости тщательной интраоперационной ревизии тонкой кишки, а также обязательной морфологической верификации для установления окончательного диагноза и определения дальнейшей тактики ведения пациента.

Ключевые слова: дивертикул Меккеля, эктопированная поджелудочная железа, резекция тонкой кишки

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Соблюдение этических стандартов: пациент подписал добровольное информированное согласие на публикацию персональной медицинской информации в обезличенной форме.

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The first mention of the ileal diverticulum dates back to 1598, when Wilhelm Fabricius Hildanus, the German surgeon, described an unusual intestinal outgrowth. Later similar observations were reported by Frederik Ruysch and other authors of the 17th–18th centuries. In 1700, Alexis Littre reported the ileal diverticulum detected in the hernial sac. The detailed morphological and embryological rationale for the Meckel's diverticulum (MD) was provided by Johann Friedrich Meckelin, after whom the diverticulum later received its name, in the early 19th century [1–3].

The MD is formed due to incomplete obliteration of the vitelline duct (ductus omphalomesentericus) being an embryonic ligament between the yolk sac and the developing intestine. The duct normally reduced by week 10 of fetal development. Disruptions of this process lead to preservation of various types of abnormalities, including vitelline duct fistulas and cysts,

as well as the MD (in case of obliteration of the distal end of the duct and its separation from the abdominal wall with the preserved wide connection to the intestinal lumen) [4, 5].

The MD is classified as a true diverticulum, since its wall comprises all histological layers typical for the normal intestinal wall. The progenitor cells localized in the vitelline duct membrane are pluripotent, so this diverticulum can contain tissues of various types. The heterotopic tissue detection rate varies between 15 and 62%, and the rate of 50–60% is reported in most studies. In asymptomatic cases, heterotopic tissue is detected significantly less often (0–18.2%) [6–8].

Areas of gastric mucosa (62–85%) and pancreatic tissues (0–12%) are most often diagnosed, the combination of pancreatic tissue and gastric mucosa (2–4%) and the presence of the jejunal (about 2%) and duodenal mucosa or Brunner's glands (about 2%) is significantly less frequent. Such variants, as the presence of pancreatic islets, areas of the colon mucosa, endometrioid and hepatobiliary tissue, are encountered casuistically rarely [9–11].

Heterotopic (ectopic) tissue of the pancreas represents the pancreatic tissue showing no structural or vascular connections with the primary gland. It was first described by J. Schulz in 1729 and histologically verified by J. Klob in 1859. According to the autopsy data, its prevalence is 0.5–13.0%. The heterotopic pancreas can be localized in various gastrointestinal tract sections, mainly in the stomach, duodenum, and colon, less often in other organs and tissues. In most cases, it is asymptomatic and detected accidentally during instrumental or surgical interventions. Possible complications include inflammation, ulceration, bleeding, obstruction, and malignancy.

In terms of morphology, it consists of pancreatic ducts, acini, and islets of Langerhans. According to the Heinrich's classification (1909), three heterotopic pancreas types are distinguished (with a full set of pancreatic elements, predominantly acinar, and predominantly ductal), complemented by type IV (islet cells only) according to Fuentes (1973). The etiology is still unclear; the major concepts include displacement of pancreatic rudiments, endoderm metaplasia, and differentiation of totipotent cells [11].

In 95–98% of cases, the uncomplicated MD is asymptomatic. However, when there are complications, abdominal pain, bleeding, diverticulitis, and intestinal obstruction against the background of the adhesion process are observed (the disease course variants with torsion of the distal diverticulum and its mesentery have been also reported, which result in the impaired blood supply, ischemia, and inflammation, and are manifested by the typical triad: abdominal pain, vomiting, and constipation). Bleeding from ulcers in the ectopic gastric mucosa, accompanied by pallor, tachycardia, and possible collapse, is the most common complication. Occult or recurrent bleeding causing anemia is less frequent; there is usually no hematemesis. Other complications include diverticulitis (in 20% of patients with MD, it is clinically indistinguishable from acute appendicitis, which makes the diagnosis difficult) with perforation and peritonitis, iron deficiency anemia, intestinal blockage, intussusception, bacterial overgrowth, Littre's hernia, and malignancy. The diverticulum length > 2 cm increases the risk of complications [9, 12–17].

Malignant neoplasms of the MD are rare. Adenocarcinoma accounts for 12–16% of cases of MD with ectopic tissues [18], it grows primarily from the ectopic gastric mucosa; tumors arising from ectopic pancreatic tissues are extremely rare [19].

The MD is difficult to diagnose due to the lack of specific symptoms and the possibility of disguising as other diseases (appendicitis, pancreatitis, necrotizing enterocolitis in neonates). When inflammation of the diverticulum (diverticulitis) develops, the clinical features are almost indistinguishable from that of acute appendicitis, which results in high frequency of diagnostic errors at the preoperative stage. It is very difficult to diagnose MD due to the lack of pathognomonic symptoms. The Tc-99m scintigraphy allowing one to detect the ectopic gastric mucosa is the most informative method (sensitivity 85–90% in children, 60% in adults). Ultrasonography, CT, and X-ray imaging are of low information value; the capsule endoscopy or balloon enteroscopy is possible. In many cases, the final diagnosis is established during surgery. In this regard, intraoperative suspicion is of fundamental importance. When there are clinical features of tight stomach with no signs of inflammation in the appendix, there are indications for mandatory revision of the ileum aimed to rule out the MD and its complications. Such an approach makes it possible to reduce the risk of diagnostic errors and improve surgical outcomes.

Here we present a rare case of the inflamed Meckel's diverticulum with ectopic pancreatic tissue in a 18-year-old patient.

Clinical case

On January 19, 2026, the 18-year-old patient was admitted to the City Emergency Hospital (Rostov-on-Don) due to complaints of severe diffuse abdominal pain with the maximum localization in the right iliac region accompanied by nausea and two episodes of vomiting.

According to the patient, the above symptoms persisted for about 12 h. According to his medical history, the patient had earlier visited the emergency room of the same medical institution, where he was examined by the surgeon and assessed. Considering clinical features, the patient was offered diagnostic laparoscopy, but refused surgery.

Later, the pain severity increase was reported, due to which the patient sought care again.

Laboratory and instrumental tests revealed no significant deviation: complete blood counts, urinalysis, blood biochemistry panel were within normal. The analysis of the acid-base balance revealed no abnormalities. The patient's condition at admission was as follows:

– BP — 98/64 mmHg, HR — 84 bpm, RR — 18 bpm, subfebrile body temperature — 37.1 °C;

– abdominal and retroperitoneal ultrasonography revealed no free fluid in the abdominal cavity. There were no sonographic signs of structural alterations in the kidney, liver, and pancreas;

– plain abdominal X-ray (frontal view) in the erect position revealed no fluid levels or free gas.

The patient noted episodes of diffuse abdominal pain for a month, due to which he underwent esophagogastroduodenoscopy (EGD) and video colonoscopy (VCS):

– EGD report dated December 11, 2025: distal reflux esophagitis, erythematous gastropathy. Histological report: chronic mild superficial gastritis;

– VCS report dated December 11, 2025: mild colitis, no pathological entities in the colon.

Considering persisting symptoms and clear clinical features of the urgent abdominal disorder, it was decided to perform diagnostic laparoscopy enabling intraoperative determination of the optimal scope of intervention and patient management tactics, with the possibility of converting the approach, if necessary.

Surgical treatment

Surgery was performed on January 19, 2026.

Laparoscopy phase. In the left Lee-Huang point, the trocar puncture of the abdominal cavity was performed under the conditions of tense carboxy peritoneum.

When performing diagnostic laparoscopy, up to 30 mL of cloudy serous effusion were found in the pelvic cavity, which were evacuated using an electrical surgical suction device; biomaterial was sent for bacteriological examination. The pale pink appendix with the length of about 7 cm and diameter up to 0.5 cm was typically positioned; no signs of inflammation were detected. The liver was of normal size and color. The gray-blue gallbladder with the dimensions of about 8 × 3 × 2 cm was not tense. The anterior gastric and duodenal surface showed no apparent abnormalities. The spleen showed no features. The small intestinal loops were pink, the serous membrane was smooth and shiny; peristalsis was preserved.

When performing revision of the small intestine, the Meckel's diverticulum having a wide basis sized up to 3 × 2 cm was found at a distance of about 100 cm from the ileocecal junction. The diverticulum was hyperemic and edematous, covered with fibrin deposits and fused with the adjacent small intestinal loop. Considering the alterations detected, it was decided to convert surgery.

Laparotomy phase. Laparotomy using the low midline incision with the length up to 10 cm was performed under endotracheal anesthesia. The ileac loop with the Meckel's diverticulum was pulled through the surgical wound. The diverticulum was located at a distance of about 100 cm from the ileocecal junction, it had a wide basis going onto the intestinal mesenteric margin; the diverticulum dimensions were 4 × 3 × 2 cm. The diverticulum wall was intensely edematous and infiltrated. The adjacent area of the ileum was hyperemic and edematous; the serous membrane was perfused with vessels, fibrin deposits were noted. The enlarged, perfused lymph nodes were found in the mesentery. No other abnormality of the abdominal cavity organs was found during revision. Resection of the ileal segment together with the diverticulum was performed followed by construction of the side-to-side intestinal anastomosis. Intestinal transit was restored and preserved.

The abdominal cavity was sanitized using 1.5 L of furacilin solution and drained. Drainage was installed: PVC drainage into the pelvis on the right and rubber drainage into the anastomosis area. The surgical wound was sutured tightly layer-by-layer.

Pathological examination was performed on January 21, 2026. Macroscopic description: fragment of the small intestine sized 8 × 5 cm. The mucous membrane is sometimes rough, with granular foci.

Microscopic description: the mature differentiated pancreatic tissue represented by acini and ducts is found in the small intestinal wall (submucosa, muscular layer, subserosa). There are no signs of cellular atypia, mitotic activity or invasive growth. Hypertrophy of surrounding muscle fibers is reported. Conclusion: morphological features correspond to the extopic pancreatic tissue (exocrine variant) localized in the Meckel's diverticulum.

Histological specimen revision

Revision of the hematoxylin and eosin-stained histological slides confirmed the presence of mature differentiated pancreatic tissue in the small intestinal wall. Acinar structures and ducts without any signs of atypia surrounded by hypertrophic muscle fibers can be seen in the submucosa, muscular layer, subserosa. Morphological features correspond to the extopic pancreatic tissue without any signs of neoplasia.

The patient was discharged on day 14 after surgery with clinical improvement.

On February 18, 2026, the patient independently underwent abdominal magnetic resonance imaging without contrast enhancement. According to the MRI data, there is a small amount of free fluid (up to 2–3 mm) along the contour of the liver. The liver is of normal size; a cystic mass up to 3 mm in diameter corresponding to the clear cyst is visible in the S7 segment. There is no dilation of intrahepatic and extrahepatic bile ducts. The gallbladder is of normal size, the kink-type contour deformities are reported, along with no wall thickening. There are no structural alterations in the pancreas; the duct of Wirsung up to 2 mm is not dilated. The spleen, adrenal glands, and kidney are normal. There is no lymphatic node enlargement.

MRI report: MR pattern of a small cyst in the right liver lobe. Gallbladder contour deformation. No data suggesting postoperative complications were acquired.

Clinical case discussion

When there is heterotopic pancreatic tissue in the MD, clinical symptoms usually result from complications. It is assumed that the acinar structure secretory activity can contribute to local inflammation, mucosal ulceration, infiltration of the diverticulum wall, and adhesions with intestinal loops. In a number of cases, episodes of gastrointestinal hemorrhage or clinical features of tight stomach are reported, which can mimick acute appendicitis or other inflammatory disorder of the abdominal cavity organs.

Here we demonstrate a rare case of complicated MD associated with the presence of ectopic pancreatic tissue. The disease clinical pattern was manifested by symptoms of acute abdominal syndrome localized primarily in the right iliac region, which initially could have corresponded to the suspected acute appendicitis. However, diagnostic laparoscopy showed that the appendix was normal, while revision of the small intestine revealed the inflamed MD.

It should be noted that preoperative diagnosis of the complicated MD remains a challenging task. Standard imaging methods, such as ultrasonography or computed tomography, not always allow one to reliably establish the diagnosis. In most cases, the final diagnosis is made during surgery, and the presence of ectopic tissue is confirmed during pathological examination of the resected specimen.

The surgical tactics for the complicated MD involves resection. The scope of surgery can be selected based on morphological features and the extent of inflammation: diverticulectomy, wedge or segmental resection of the small intestine with the intestinal amastomosis construction. In the reported clinical case, severe inflammatory alterations in the diverticulum wall and adjacent area of the ileum resulted in the need to perform resection of the small intestine with the construction of enteroenteric anastomosis.

CONCLUSION

The reported case is of considerable clinical and scientific value due to rarity of the combination of MD with ectopic pancreatic tissue, it demonstrates features of the diagnosis and surgical tactics for this disorder.

In the reported clinical case, the MD with ectopic exocrine pancreatic tissue manifested by the acute abdominal syndrome in the right iliac region, which mimicked acute appendicitis, represents the most typical disease manifestation scenario. The final diagnosis was established during surgery, when performing diagnostic laparoscopy with the small intestine revision, and morphological assessment of the resected material revealed heterotopia. The case emphasizes the clinical importance of thorough intraoperative assessment of the small

intestine in patients having clinical features of tight stomach when there are no abnormalities of the appendix, as well as the fact that morphological verification is necessary for detection of rare heterotopic tissue variants.

The timely surgical intervention involving resection of the small intestine and construction of enteroenteric anastomosis enabled effective elimination of the source of inflammation and prevention of possible complications.

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