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ABSTRACT

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A RARE CASE OF MECKEL'S DIVERTICULUM STRANGULATION COMPLICATED BY SMALL INTESTINE OBSTRUCTION (CLINICAL CASE)

Introduction. Meckel's diverticulum (MD) is a congenital anomaly of the gastrointestinal tract. In most cases, uncomplicated DM is silent. It is mainly diagnosed when complications arise or accidentally during diagnostic procedures or surgical interventions. A recognised effective diagnostic method is laparoscopy, which allows to assess the localisation and degree of pathological changes in the diverticulum. Treatment of complicated DM is surgical. The volume of surgery depends on the diameter of the diverticulum, the nature of complications, the prevalence of the inflammatory process at the base of the diverticulum and the ileum wall, and the spread of peritonitis. In this report, we would like to share our own successful experience of treating a patient with DM complicated by necrosis and volvulus of the small intestine.

Case report. A 42-year-old male patient was hospitalised with complaints of abdominal pain, fever up to 38°C, and nausea. During the examination, the abdomen was distended, painful in all parts, spared during breathing. In the right iliac region and in the right lateral canal, there were weakly positive symptoms of peritoneal irritation, peristalsis was weakened. Ultrasound examination of the abdominal cavity revealed free fluid in the right hypochondrium and pelvic cavity, dilatation of the small intestine loops. Plain radiography of the abdominal cavity: pneumatosis of the intestine, small intestinal fluid levels. Video laparoscopy was performed to clarify the diagnosis under endotracheal anaesthesia. During the revision of the abdominal cavity, a defect of up to 5.0 cm in the mesentery of the small intestine with a large-sized and necrotic altered DM and a wrap around it of small intestinal loops with necrosis was detected. Resection of the necrotic loops of the small intestine with DM was performed with the application of a «side-to-side» intestinal anastomosis. The postoperative period was uneventful. The patient was discharged on day 10.

Discussion. Due to the lack of characteristic symptoms, the diagnosis of DM, even in cases of complications, is sometimes established late, which entails problems in the further treatment of patients. Today, laparoscopy is the leading and most informative method in the diagnosis of DM. In some cases, it is the first stage of surgical intervention. Intestinal obstruction is one of the most common complications of DM. It is caused by small intestine torsion around a fixed diverticulum, nodule formation, and diverticulum invasion. Early diagnosis is important because delayed surgery increases mortality. We present a clinical case of complicated DM with symptoms typical of small bowel obstruction. The standard methods used at the first stage of diagnosis did not allow to establish the cause of intestinal obstruction. Only the use of laparoscopy made it possible to establish an accurate diagnosis. To date, the question of the need to remove an accidentally found DM remains unresolved. It is believed that an individual approach is advisable. In cases of complications, the choice of surgical intervention depends on the diameter of the diverticulum base, the severity of morphological changes in its wall and the wall of the small intestine.

Conclusions. The absence of specific symptoms and low informational content of routine diagnostic methods are the reason for the untimely diagnosis of DM, which often causes the development of severe complications. Laparoscopy is the only significant diagnostic and treatment method that allows for an accurate diagnosis and, in some cases, diverticulectomy. An individual approach is recommended in the treatment of DM, depending on the clinical situation.

Keywords: Meckel's diverticulum, complications, intestinal obstruction, necrosis, laparoscopy, intestinal resection.

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РІДКІСНИЙ ВИПАДОК ЗАЩЕМЛЕННЯ ДИВЕРТИКУЛУ МЕККЕЛЯ, УСКЛАДНЕНИЙ НЕПРОХІДНІСТЮ ТОНКОЇ КИШКИ (ВИПАДОК З ПРАКТИКИ)

Вступ. Дивертикул Меккеля (ДМ) є вродженою аномалією шлунково-кишкового тракту. Неускладнений ДМ в більшості випадків нічим себе не проявляє. Здебільшого його діагностують у разі виникнення ускладнень або випадково під час виконання діагностичних процедур або оперативних втручань. Визнаним ефективним діагностичним методом є лапароскопія, що дає змогу оцінити локалізацію і ступінь патологічних змін дивертикула. Лікування ускладненого ДМ хірургічне. Об'єм операції залежить від діаметра дивертикулу, характеру ускладнень, поширеності запального процесу в основі дивертикулу та стінці клубової кишки, поширеності перитоніту. У цьому звіті ми хотіли б поділитися власним успішним досвідом лікування пацієнта з ДМ ускладненого некрозом та заворотом тонкої кишки.

Випадок з практики. Пацієнт 42 років, госпіталізований зі скаргами на біль у животі, підвищення температури тіла до 38°C, нудоту. Під час огляду живіт здутий, болючий у всіх відділах, в акті дихання щадиться. У правій клубовій ділянці та по правому боковому

каналу визначалися слабопозитивні симптоми подразнення очеревини, перистальтика ослаблена. Ультразвукове дослідження органів черевної порожнини виявило вільну рідину в правій здухвинній ділянці та порожнині малого таза, розширення петель тонкої кишки. Оглядова рентгенографія органів черевної порожнини: пневматоз кишечника, тонкокишкові рівні рідини. Для уточнення діагнозу під ендотрахеальним наркозом виконано відеолапароскопію. Під час ревізії черевної порожнини виявлено дефект до 5,0 см у брижі тонкої кишки з защемленим і некротично зміненим ДМ великих розмірів та заворотом навколо нього петель тонкої кишки з некрозом. Виконано резекцію некротизованих петель тонкої кишки з ДМ з накладенням кишкового анастомозу «бік у бік». Післяопераційний період протікав без ускладнень. Пацієнт виписаний на 10 добу.

Обговорення. З огляду на відсутність характерних симптомів, діагноз ДМ, навіть у випадках виникнення ускладнень, іноді встановлюється несвоєчасно, що тягне за собою проблеми в подальшому лікуванні пацієнтів. У діагностиці ДМ на сьогоднішній день провідним і найбільш інформативним методом є лапароскопія. У низці випадків вона є першим етапом оперативного втручання. Кишкова непрохідність одне з найчастіших ускладнень ДМ. Її причинами є заворот тонкої кишки навколо фіксованого дивертикулу, вузлоутворення, інвагінація дивертикулу. Рання діагностика має важливе значення, оскільки затримка операції збільшує летальність. Нами представлено клінічний випадок ускладненого ДМ із симптомами, характерними для обструкції тонкої кишки. Застосовані на першому етапі діагностики стандартні методи не дали змоги встановити причину кишкової непрохідності. Тільки застосування лапароскопії дало можливість встановити точний діагноз. На сьогодні питання про необхідність видалення випадково знайденого ДМ залишається невирішеним. Вважається, що доцільно застосовувати індивідуальний підхід. У випадках розвитку ускладнень вибір методу оперативного втручання залежить від діаметра підстави дивертикулу, вираженості морфологічних змін його стінки та стінки тонкої кишки.

Висновки. Відсутність специфічних симптомів і невисока інформативність рутинних методів діагностики є причиною несвоєчасно встановленого діагнозу ДМ, що часто є причиною розвитку важких ускладнень. Лапароскопія є єдино значущим лікувально-діагностичним методом, що дає змогу точно встановити діагноз, а в низці випадків виконати дивертикулектомію. У лікуванні ДМ рекомендовано застосовувати індивідуальний підхід, що залежить від клінічної ситуації.

Ключові слова: дивертикул Меккеля, ускладнення, кишкова непрохідність, некроз, лапароскопія, резекція кишечника.

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INTRODUCTION / ВСТУП

Meckel's diverticulum (MD) is a congenital anomaly of the gastrointestinal tract, in the form of a localised bulge of the ileum resulting from incomplete closure of the omphalomesenteric duct. The prevalence of the disease ranges from 0.3 to 2.9%. The diverticulum can have a variety of shapes and is localised between 10 and 150 cm from the ileocecal angle. The diameter ranges from 0.5-2 cm to the width of the small intestine, and the length ranges from 1 to 26 cm. The majority of patients are male. According to a number of studies, the male to female ratio is from 1.5:1 to 4:1. DM is mainly

diagnosed when complications arise or accidentally during laparotomy or laparoscopy, and less frequently during X-ray examination of the intestine [1-4].

In most cases, uncomplicated DM is asymptomatic, but its presence is often the source of a number of complications and pathological processes. The complications that arise are most often associated with the anatomical features of the diverticulum wall structure [5].

Clinical symptoms are nonspecific and can be divided into 4 groups:

1. Symptoms of inflammation (diverticulitis and perforation) of the abdominal organs occur in 20% of cases. The causes of diverticulitis are enteroliths, foreign bodies in the digestive tract, parasites, peptic ulcer of the mucous membrane due to ectopic gastric mucosa, diverticular torsion. More often, there is an imitation of the clinical picture of acute appendicitis with pain and symptoms of intoxication, less often - symptoms of acute pancreatitis. Progression of the inflammatory process can lead to perforation with the development of peritonitis [2, 6-8, 19-21, 35].

2. The development of acute intestinal obstruction is observed in 22–50% of patients. More often, it has a strangulation character in the form of a volvulus of the small intestine around a fixed diverticulum or there is an internal strangulation of the intestinal loops. The main manifestations are abdominal pain, vomiting, flatulence [9-14, 35].

3. Symptoms of intestinal bleeding occur in 25 to 50% of patients with DM. The causes are the development of mucosal ulcers associated with the presence of ectopic gastric tissue. Bleeding is usually not intense, manifested by melena or an admixture of blood in the stool and the development of anemia of varying severity [15-18, 35].

4. Malignant transformation of a diverticulum is extremely rare (0.5–1.9%). There are cases of the development of carcinoid tumors, gastrointestinal stromal tumors, adenocarcinoma and sarcoma. Clinical manifestations include abdominal pain, bleeding, and symptoms of intestinal obstruction [22-25, 35].

Among the diagnostic methods used to detect DM, ultrasound, radiography and CT with contrast, MRI are most often used. But the sensitivity and specificity of these methods are not high enough. [1, 26-28]. More informative is the use of double-balloon and capsule endoscopy, which allows one to directly visualize the presence of the DM orifice [29-33]. In recent years, data have appeared on the use of radioisotope scanning of DM with technetium-99, aimed at identifying cells of ectopic gastric tissue in the ileum. The method has a sensitivity of 80-90% and a specificity of 95% [18, 34]. Laparoscopy is a recognised effective diagnostic method that allows assessing the location and extent of pathological changes in the diverticulum [1, 35].

Treatment of complicated DM is surgical. The scope of the operation depends on the diameter of the diverticulum, the nature of the complications, the prevalence of the inflammatory process at the base of the diverticulum along the wall of the small intestine, and the prevalence of peritonitis. Operative interventions are more often carried out by the method of video-assisted laparoscopy, less often - through laparotomy or mini-laparotomy access in the right iliac region. Appendectomy-type diverticulectomy, diverticulectomy with wedge-shaped resection of the ileum wall, ileal resection are performed. Resection of the ileum with DM and protective ileostomy is used for generalised peritonitis, pronounced paresis of the intestine and uncertainty about the integrity of the intestinal anastomosis [1, 35-39].

CASE REPORT/КЛІНІЧНИЙ ВИПАДОК

A 42-year-old patient was hospitalised with complaints of abdominal pain, increased body temperature up to 38°C, nausea, dry mouth. From anamnesis it is known that he fell ill about 8 hours ago. Objectively: condition of average severity. The skin is of normal colour. Pulse 78 beats per minute. Arterial pressure 120/80 mmHg. Tongue covered, dry. On examination, the abdomen is moderately distended, sparing in the act of breathing. On palpation it is painful in all parts. In the right iliac region and along the right lateral canal, weakly positive symptoms of peritoneal irritation were detected. Peristalsis is weakened. An examination of the rectum did not reveal any pathology: the ampulla was not dilated, and there were remains of brown feces in the rectum.

Additional examination methods were carried out. Clinical blood analysis: Hb – 128 g/l, erythrocytes – 3.8×10^{12}/l, leukocytes – 15.1×10^{9}/l, platelets – 271×10^{9}/l, ESR – 26 mm/h. Changes in biochemical blood analysis and urine analysis were not detected. There were also no changes in the blood coagulation system. An ultrasound examination of the abdominal organs revealed free fluid in the right iliac region and the pelvic cavity, dilation of the loops of the small intestine. X-ray of the abdominal organs revealed intestinal pneumatosis and single fluid levels in small intestine (Fig. 1). To clarify the diagnosis, video laparoscopy was performed under endotracheal anesthesia. On examination: in the upper abdomen there are swollen necrotically changed necrotic loops of small intestine wrapped around the axis. There is about 250-300 ml of turbid effusion on the right flank and in the pelvis. A midline laparotomy was performed. During an revision of the abdominal cavity, a defect of up to 5.0 cm was discovered in the mesentery of the small

intestine with a strangulated and necrotically changed DM of large size (10.0×5.0 cm) (Fig. 2). The wall of the small intestine is drawn into the mesenteric defect. On the side opposite to the strangulated diverticulum, the loops of the small intestine are twisted around an axis, purple-dark in color, swollen, without peristalsis (Fig. 3). The diverticulum is released from the strangulation, the intestine is deployed. The diverticulum is located approximately 1.0 m before the ileocecal angle. The length of the necrotically changed intestine is up to 1.0 m. No other pathology of abdominal cavity organs was detected. Resection of necrotic loops of the small intestine with DM was performed. A side-to-side anastomosis with double-row sutures was formed 50.0 cm before the ileocecal angle. The effusion from the abdominal cavity was evacuated. The abdominal cavity was drained in the iliac regions. The abdominal wall wound was sutured layer by layer.

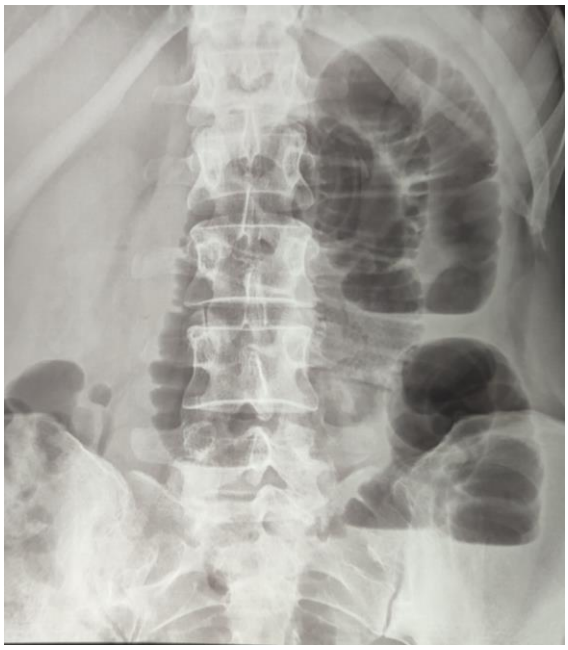

Figure 1 – Abdominal radiography: intestinal pneumatosis and fluid levels in the small intestine

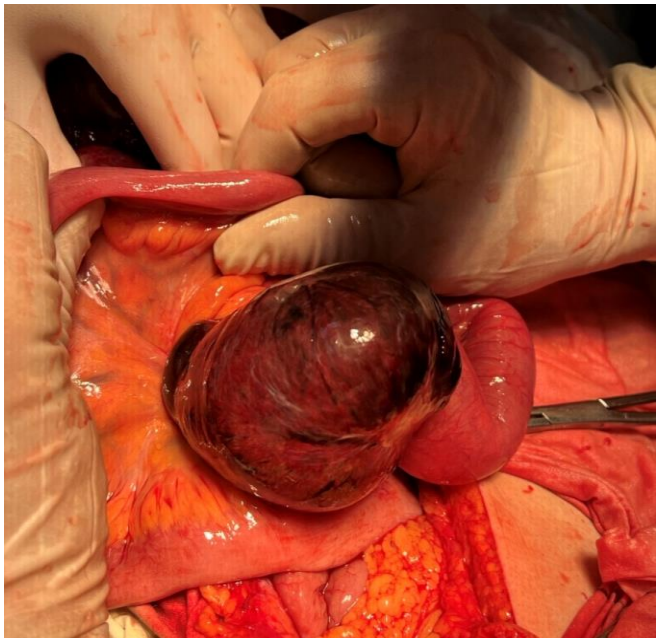

Figure 2 – Necrotically modified Meckel's diverticulum

Figure 3 – Volvulus and necrosis of the small intestine

Postoperative diagnosis: Strangulation with necrosis of a large Meckel's diverticulum. Volvulus of the small intestine with necrosis. Diffuse serous peritonitis.

Result of histological examination: revealed signs of necrosis of all layers of the wall of the diverticulum and small intestine, loss of histological structure of the mucosa and its desquamation, widespread haemorrhages and pronounced oedema (Fig. 4).

In the postoperative period, the patient received standard therapy. The postoperative period was without complications. Peristalsis was restored by the 3rd day. The drains were removed on the 4th day. The wound healed by primary intention. The sutures were removed on the 10th day. The patient was discharged in satisfactory condition.

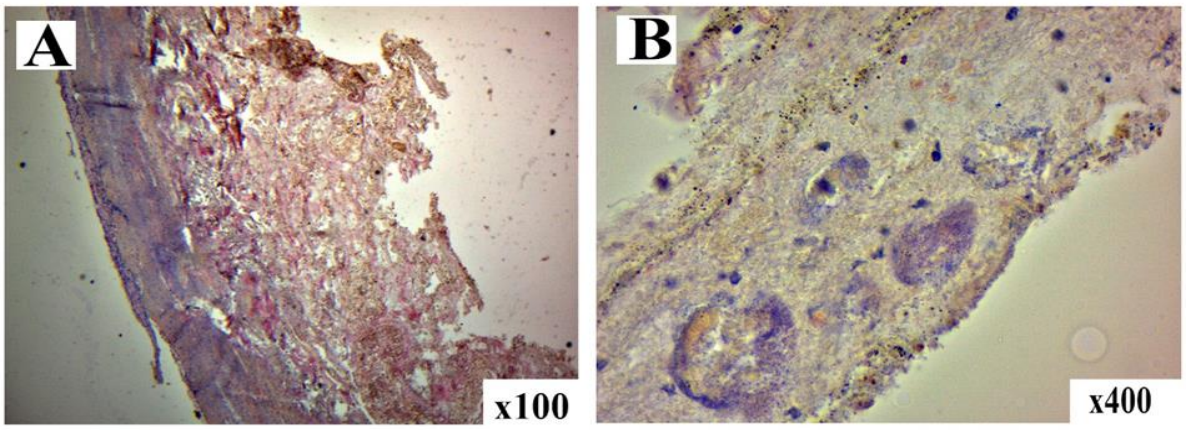

Figure 4 – Wall of Meckel's diverticulum. A – Desquamation and erosion of the mucous membrane. B – Necrosis and loss of histological structure of the diverticulum wall tissue. Hematoxylin and eosin staining. Magnification is indicated in the lower right corner of the micrographs

DISCUSSION/ОБГОВОРЕННЯ

Literary analysis of clinical cases demonstrates the low incidence of DM. The likelihood of detecting the disease before complications develop is low. According to all researchers, complications of this pathology are rare and are manifested by various unclear abdominal symptoms, which makes it difficult to differentiate them from other diseases of the abdominal cavity. Given the absence of characteristic symptoms, the diagnosis, even in cases of complications, is sometimes established untimely, which leads to problems in the further treatment of patients [1-4].

Thus, in most cases, the diagnostic search begins with such routine methods as ultrasound and radiography of the organs of the abdominal cavity, which makes it possible to exclude other pathologies rather than identify a diverticulum [1, 28, 35].

Contrast X-ray examination, CT, MRI, video capsule endoscopy, one- and two-balloon enteroscopy, and two-stage probe enterography are considered more informative. The use of these methods has significantly improved diagnostic capabilities and treatment tactics in patients with DM. However, it is worth noting that not all medical institutions have the ability to use all of the listed methods, especially in the conditions of urgent surgery. This limits the use of these methods [27-33].

We share the opinion of a number of authors that laparoscopy is the leading and most informative method in the diagnosis of DM today. The method allows to reduce the diagnostic time, to examine the entire abdominal cavity and to establish a timely diagnosis. In some cases, laparoscopy is the first stage of surgical intervention [1, 35, 37].

Intestinal obstruction is one of the most frequent complications of DM. It is caused by volvulus of the small intestine around the fixed diverticulum, nodularisation, and invagination of the diverticulum. Early diagnosis is of utmost importance, as the delay of surgery for 36 hours and more increases the mortality rate of patients from 8 to 25%. At the same time, according to the literature, the connection between the development of intestinal obstruction and DM is often established only during surgery [1, 3, 10-13, 35].

We present a clinical case of complicated DM with symptoms characteristic of small bowel obstruction. The standard methods used at the first stage of diagnosis did not allow us to establish the cause of intestinal obstruction. Only the use of laparoscopy made it possible to establish an accurate diagnosis.

To date, the question of whether it is necessary to remove an incidentally found DM remains unresolved. Like many authors, we believe that it is advisable to apply an individual approach. In cases of complications,

the choice of the method of surgical intervention depends on the diameter of the diverticulum base, the severity of changes in its wall and the intestinal wall. Diverticulectomy is most often performed. When the base of the diverticulum is wide, wedge resection is indicated. If the intestinal wall is involved in the pathological process, resection of the affected area is performed within healthy tissues along with the diverticulum and the formation of an intestinal anastomosis [1, 5, 7, 35, 37,38].

CONCLUSIONS / ВИСНОВКИ

The absence of specific symptoms and the low information content of routine diagnostic methods are the reason for the untimely diagnosis of MD, which often leads to the development of severe complications.

Laparoscopy is the only significant therapeutic and diagnostic method, allowing an accurate diagnosis and, in some cases, performing diverticulectomy. In the treatment of DM, it is recommended to use an individual approach, depending on the clinical situation.

AUTHOR CONTRIBUTIONS / ВКЛАД АВТОРІВ

All authors substantively contributed to the drafting of the initial and revised versions of this paper. They take full responsibility for the integrity of all aspects of the work.

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None.

CONFLICT OF INTEREST / КОНФЛІКТ ІНТЕРЕСІВ

The authors declare no conflict of interest.

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