

Enterocutaneous Fistula Associated with Short Bowel Syndrome, Complicated by Takotsubo Syndrome

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Abstract:

A clinical case is presented demonstrating the successful treatment of a woman with a high enterocutaneous fistula associated with short bowel syndrome, who developed Takotsubo cardiomyopathy after reconstructive surgery.

Purpose: Demonstration of a complex case of surgical management of small intestine fistulas accompanied by short small intestine syndrome and Takotsubo cardiomyopathy. It is assumed that the combination of enterocutaneous fistula, short small intestine syndrome and Takotsubo syndrome creates a complex pathological complex that aggravates the course of the disease, increases the risk of severe complications and requires an integrated approach to diagnosis and treatment.

Key words: enterocutaneous fistula; short bowel syndrome; takotsubo syndrome

Introduction

Enterocutaneous fistula (ECF) is one of the most severe postoperative complications in abdominal surgery [1-3]. The most common causes of fistula are the failure of intestinal anastomoses (30-50%), intraoperative damage to the intestinal wall [4]. Currently, ECF are subject to conservative therapy until the formation of a lipoid fistula is achieved, which usually takes at least 3 months. The most difficult situations occur in cases where ECF occurs after extensive resections of the small intestine, which inevitably leads to an imbalance of homeostasis, accompanied by severe digestive disorders, which requires constant combined nutritional treatment. This condition is interpreted as short bowel syndrome (SBS) [5]. The need for surgical removal of ECF is beyond doubt. However, even with highly qualified preparation for surgery and faultless execution, the probability of postoperative complications in these patients is quite high. In addition to surgical problems, cardiac complications may occur. One of the rare complications is Takotsubo cardiomyopathy, an acutely occurring transient left ventricular dysfunction unrelated to obstructive coronary artery disease and caused by stress—induced myocardial damage [6].

The presented clinical case demonstrates the successful treatment of a patient with high ECF associated with SBS who developed Takotsubo cardiomyopathy after reconstructive surgery.

Case Report

A 40-year-old woman was hospitalized on 10/21/2025 in the surgical department of the State Medical University named after S.S. Yudin DZM Moscow with complaints of weakness, the presence of a non-functioning ileostomy and enterocutaneous fistula.

It is known that in 2013, the patient underwent a laparotomy for a perforated duodenal ulcer. In 2020, an adhesive intestinal obstruction appeared, which required a series of relaparotomies, during which the small intestine was resected and two enterostomes (right and left) were formed. The details of the operations are not known. In 2021, enterostomes were surgically eliminated. In May 2025, an acute small intestinal obstruction developed during pregnancy (32 weeks), which led to antenatal fetal death. The patient underwent emergency surgery: visceroadhesolysis, delivery, and resection of the ileum were performed with the formation of an end-to-end anastomosis. The postoperative period was complicated by the failure of anastomotic sutures and abdominal sepsis, which required a series of operations with abdominal rehabilitation, ileostomy formation and repeated interventions for perforations of the small intestine. The postoperative period was complicated by the formation of a high ECF opening into the median wound, after which the ileostomy ceased to function. The patient was treated in the intensive care unit for a long time and received complex

intensive therapy. SBS developed, which required parenteral and special enteral nutrition. As a result, the patient was discharged for outpatient treatment, and then went to the S.S. Yudin Hospital.

Upon admission to our department on October 21, 2025, the condition was regarded as relatively satisfactory. Receives combined nutrition. Body mass index 19. Intestinal fistula losses were 1,000 ml per day; the terminal ileostomy was not functioning (Figure. 1). A few hours before hospitalization, the patient experienced cramping abdominal pain, nausea, vomiting, bloating, and stopped secreting intestinal contents from the intestinal fistula. Laboratory parameters were within the normal range. Total protein 62 g/l, albumin 27 g/l. Fistula and irrigography were performed. During oral fistulography, loops of the jejunum expanded to 36 mm with a wall thickened to 8 mm and horizontal levels were contrasted; the distance from the fistula to the Treitz ligament was 50 cm (Figure. 2, 3). Contrast in the aboral direction revealed a sharp deformation and narrowing of the intestinal lumen, distal to which, up to the ileostomy, the loops of the intestine they were sleepy. With irrigography, the contrast of the colon is without deviations from the norm. The totality of the data obtained corresponded to the picture of acute adhesive intestinal obstruction. Conservative therapy had no effect.

After conducting preoperative preparation, including correction of water-electrolyte disorders and nutritional support, the patient was operated on urgently. On 10/22/2025, laparotomy was performed with excision of the postoperative scar. The loops of the intestine are fixed to each other by multiple adhesions. It has been established that ECF originates from the small intestine involved in the conglomerate of intestinal loops, at the level of which the obstruction occurred, total adhesiolysis was performed, the mobilization of the small intestine bearing the fistula, and the removal of intestinal deformity that caused the obstruction. The fistula was located 50 cm from the duodenal junction and 20 cm from the ileostomy. The edges of the fistula were excised, and the wall thickness of the small intestine was 8 mm. The intestinal defect was sutured with a double-row suture with a PDS 4/0 thread. The intestine carrying the ileostomy was isolated from the abdominal wall, after which the stump was resected for 5 cm. The cecum and the stump of the ileum, which was blocked during one of the previous operations, formed a dense infiltrate, which could not be separated. The cecum and stump of the ileum were resected. An invagination end-to-side thin-intestinal anastomosis has been formed. The laparotomy wound is sutured tightly, in layers. The duration of the operation is 5 hours and 20 minutes (Figure. 4).



Figure 1: Appearance of the anterior abdominal wall: 1 – functioning high fistula of the small intestine; 2 – non-functioning ileostomy.



Figure 2: Fistulography through the fistula of the small intestine, contrasts about 50 cm of the small intestine to the ligament of the Tracer.

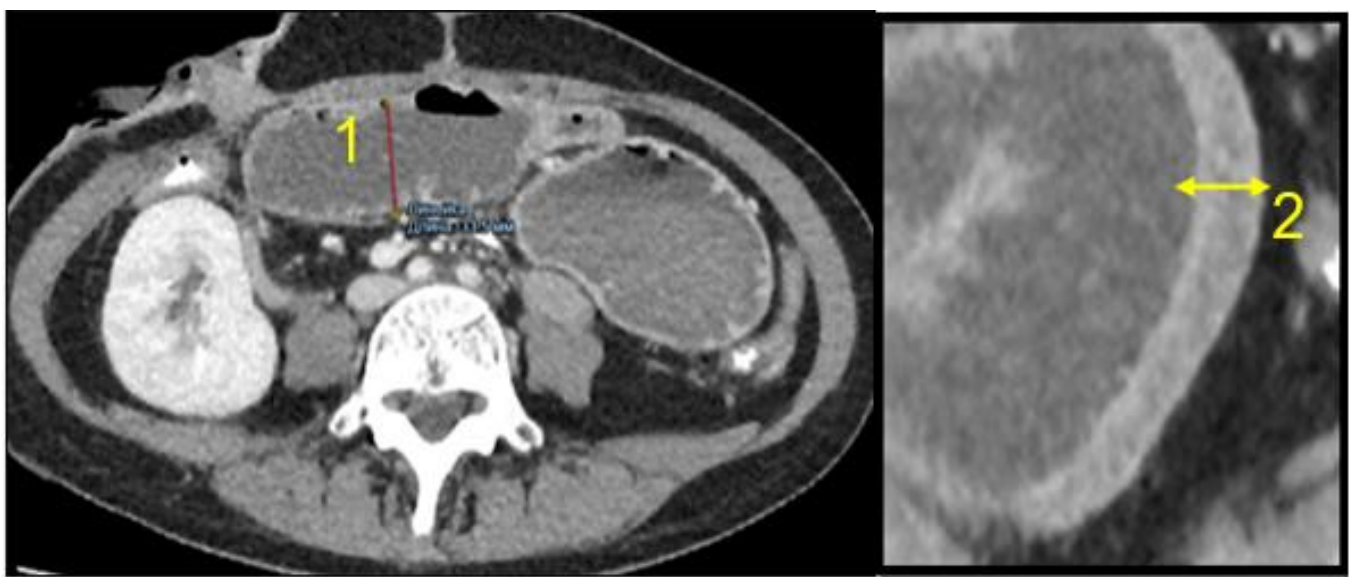


Figure 3: CT scans of abdominal organs: 1 – dilation of the loops of the small intestine up to 35 mm; 2 – thickening of the walls of the adductor small intestine up to 0.8 mm.

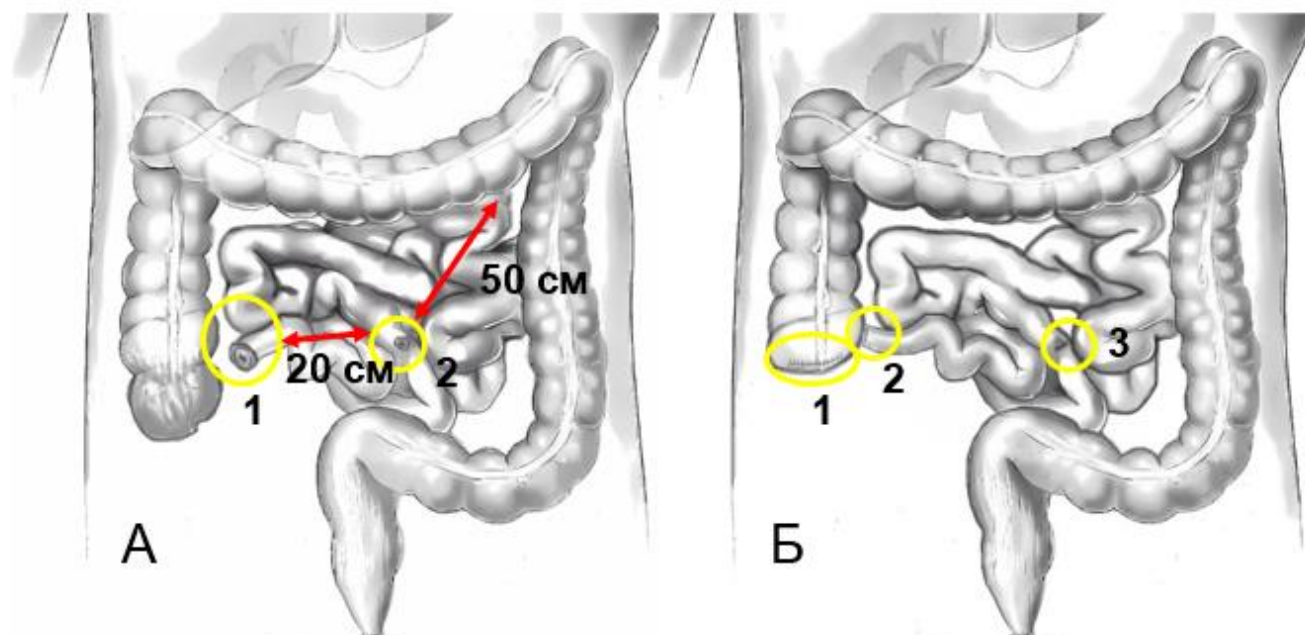


Figure 4: Intraoperative scheme before (A) and after (B) reconstructive surgery. A – 1 – ileostomy, 2 – intestinal fistula. The distance from the ileostomy to the fistula is 20 cm, from the fistula to the sacral ligament is 50 cm. B – 1 – resected cecum, 2 – formed ileoascendostomy with an invagination valve according to V.I. Onopriev, 3 – sutured intestinal fistula after marginal resection of the small intestine.

In the early postoperative period, the patient's condition was assessed as stably severe. There was persistent vasoplegia requiring constant infusion of norepinephrine at a dose of 0.05-0.15 mcg/(kg·min); hyperlactatemia with a tendency to decrease (5,8-2,0-1,6 mmol/L) and metabolic acidosis (pH 7,1-7,25-7,31); leukocytosis with a tendency to increase (7,27-12,45*10⁹/l); an increase in inflammatory markers (PCT 0.08-2.91 ng/ml; CRP 2.6-172.7 mg/l). The phenomena of multiple organ failure appeared, in the structure of which cardiovascular and cerebral prevailed in the form of encephalopathy and decreased criticism (SOFA 4 points). According to chest X-ray data from 10/24/2025, no infiltrative changes were noted. According to ultrasound of the abdominal organs from 10.26.2025, there was an accumulation of fluid in the subhepatic space up to 6 mm thick, and up to 40 mm between the loops. Empirical antibacterial therapy with piperacillin+tazobactam 3375 mg x 4/day has been initiated. A light serous hemorrhagic discharge of about 100 ml was released along the drains of the abdominal cavity. The progressive deterioration of the patient's condition required the elimination of anastomotic suture failure. On 10/27/2025, a relaparotomy was performed. The examination revealed up to 150 ml of serous fluid in the abdominal cavity without pathological impurities, no signs of failure of previously formed anastomoses, and no traumatic damage to the intestinal wall. The abdominal cavity was rinsed with an antiseptic solution, and the postoperative wound was sutured tightly. In the early postoperative period, the condition was assessed as severe and stable (SOFA 4 points). Consciousness was clear (score 15); breathing was independent; FIO₂: 21%; SPO₂: 97 %. Blood pressure 120/92, heart rate 95 /min, on the background of norepinephrine infusion 0.3 mcg / kg *min, abdomen soft, painless (on the background of epidural analgesia), diuresis sufficient (>0.5 ml/(kg·h)); laboratory without clinically significant abnormalities. Also, in the early postoperative period, data from a microbiological examination of discharge from the

abdominal cavity was obtained, where an increase in *Klebsiella pneumoniae* was noted, and therefore a goal-oriented correction of antibacterial therapy was performed: Polymyxin 100 mg 2/day, Tigecycline 100 mg 2/day.

Despite the absence of intra-abdominal complications, the patient continued to develop multiple organ dysfunction, which worsened acute cardiovascular insufficiency. On 10/27/2025 at 16:20, against the background of a stable severe condition, he lost consciousness, bradycardia was noted on the bedside monitor, followed by the development of asystole. The protocol of extended cardiopulmonary resuscitation was immediately initiated with the restoration of effective blood circulation after 2 minutes.

The search for reversible causes of circulatory arrest has begun. Ultrasound examination (ultrasound) of the veins of the lower extremities: no echo signs of venous thrombosis of the lower extremities were detected. Ultrasound of the pleural cavities - ULTRASOUND- signs of bilateral hydrothorax (on the right - separation of pleural leaflets along the posterior axillary line up to 58 mm; on the left - separation of pleural leaflets along the posterior axillary line up to 47 mm). R-OGK: X-ray picture of congestive changes in the vessels of the MCC; bilateral hydrothorax; dysatelectatic changes in the right lung. Echocardiography (ECHO KG): global LV myocardial contractility is reduced (LV=41% according to Simpson); impaired local contractility of the apical region of the LV (akinesis of the apical segments circularly); insufficiency of TC 2 art., MK 1-2 art.; pulmonary hypertension (Fig. 5). Laboratory data: Troponin I (0.52→10 ng/ml), IL-6 (167.2 pg/ml), UAC (Hb - 73 g/L), NT-BNP 33437 pg/ml. At the same time, according to emergency coronary angiography, no hemodynamically significant coronary artery stenoses were detected (Figure. 6).

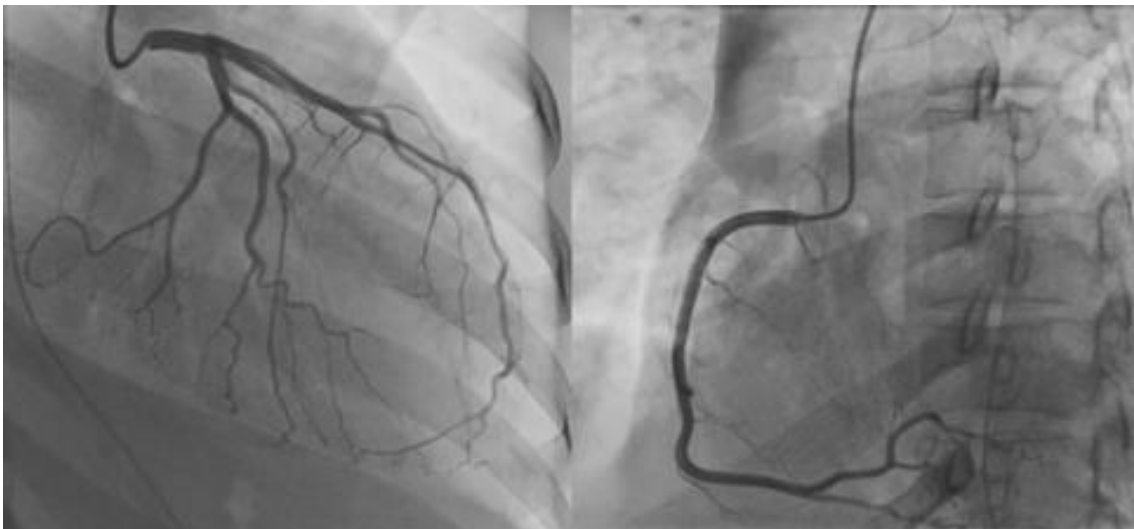


Figure 5: Coronary angiograms: the coronary arteries are passable.



Figure 6: Photo of echocardiography – akinesis of the middle, apical segments of all walls of the left ventricle, acquiring a certain shape.

Against the background of intensive therapy of post-resuscitation illness, it was possible to achieve relative stabilization of the condition, however, 16 hours after circulatory arrest, the patient developed a clinical picture of alveolar pulmonary edema, due to inotropic therapy, an infusion of dobutamine 5 micrograms / (kg · min) was initiated against the background of continued infusion of NA. According to the ECHO KG data in dynamics: PV: 28 %; CSR: 68 ml; UO: 27 ml; TAPSE = 0.8 cm ($N \geq 1.7$ cm), VTI LV = 10.7 cm ($N \geq 18$ cm); akinesis of the middle, apical segments of all walls of the left ventricle; apical ballooning pattern.

Thus, taking into account the clinical picture, echocardiography data and the exclusion of acute coronary syndrome, Takotsubo cardiomyopathy was diagnosed. Against the background of goal-oriented therapy, gradual stabilization of hemodynamics, reduction of sympathomimetics and

restoration of myocardial function were noted. By 11/01/2025, against the background of achieving satisfactory indicators of myocardial contractility, minute volume of blood circulation, and volemic status, attempts were made to activate and wean the patient off the ventilator. At this stage, asthenization came to the fore against the background of polyneuromiopathy, critical conditions, and emotional lability, which set a precedent for asynchronous ventilation and hindered activation. After consulting a psychiatrist and starting antipsychotic therapy, the patient's compliance, stabilization of the emotional background, and successful activation attempts were achieved. On 07.11.2025, the patient was transferred to independent breathing, on 09.11.2025, tracheal decanulation was performed, and ABT de-escalation was performed. Subsequently, the patient's condition improved, she was transferred to the

surgical department and discharged on 11/18/2025 in satisfactory condition.

Discussion

Enterocutaneous fistula is a pathological communication between the intestinal lumen and another organ, cavity, or external environment, leading to the release of intestinal contents through a physiologically unusual pathway [1]. In 75-85% of cases, intestinal fistulas are the result of complications of surgical interventions on the abdominal organs [2,3]. The most common causes of their development are the failure of intestinal anastomoses (30-50%) [4], intraoperative damage to the intestinal wall (up to 15-20%) [3,4], as well as suturing of intestinal defects during deserosis of the latter (up to 10-15%) [4]. Currently, patients with unformed ECF are subject to conservative treatment until a formed fistula is formed.

Pathophysiological changes in ECF are caused by a combination of local and systemic factors, including loss of intestinal contents, infection, hypercatabolism, and nutritional deficiencies [7]. Clinical studies emphasize that the severity of patients' condition is determined by the formation of a vicious circle of "sepsis - metabolic disorders - tissue failure - fistula persistence" [8].

The development of cardiac complications in patients with severe surgical diseases is of particular clinical importance. One of these rare complications is Takotsubo cardiomyopathy, an acutely occurring transient left ventricular dysfunction unrelated to obstructive coronary artery disease and caused by stress—induced myocardial damage [6]. The pathogenesis of this condition is based on hyperstimulation of beta-adrenergic receptors, apoptosis, and "stunning" of cardiomyocytes [9, 10, 11]. One of the lines of therapeutic tactics in this case is the rejection of the introduction of exogenous catecholamines.

In surgical practice, the triggers of Takotsubo syndrome are severe psychoemotional stress, surgery, systemic inflammatory reaction, sepsis, and the use of catecholamines [12]. Patients with ECF are at high risk of developing stress-induced complications due to the long course of the disease, repeated surgical interventions and chronic intoxication [13].

According to a systematic review and meta-analysis, the incidence of Takotsubo syndrome in the perioperative period is approximately 1 case per 6000-7000 surgical procedures [14]. Despite the transient nature of myocardial dysfunction, the acute period of the disease can be accompanied by severe complications, including cardiogenic shock, acute heart failure, life-threatening arrhythmias and circulatory arrest [15]. Hospital mortality in this syndrome is 4-7% and increases with the development of shock and multiple organ failure up to 40% [16].

Our patient's clinical condition was complicated by the fact that there were several types of shock: cardiogenic on the background of Takotsubo cardiomyopathy and septic on the background of generalized intra-abdominal infection. Switching to inotropic levosimendan stimulation may worsen vasoplegia, while the clinical situation suggested the withdrawal of norepinephrine due to β_1 -adrenergic effects. In order to achieve and maintain a risk/benefit balance, advanced hemodynamic monitoring using transpulmonary thermodilation (PiCCO) technology was initiated, which allowed optimizing infusion, inotropic, and vasoactive therapy. Norepinephrine, dobutamine, and levosimendan were used, followed by reduction of the catecholamine load. At the same time, antibacterial therapy was carried out, taking into account current microbiological data, correction of metabolic disorders and nutritional support (Figure. 7).

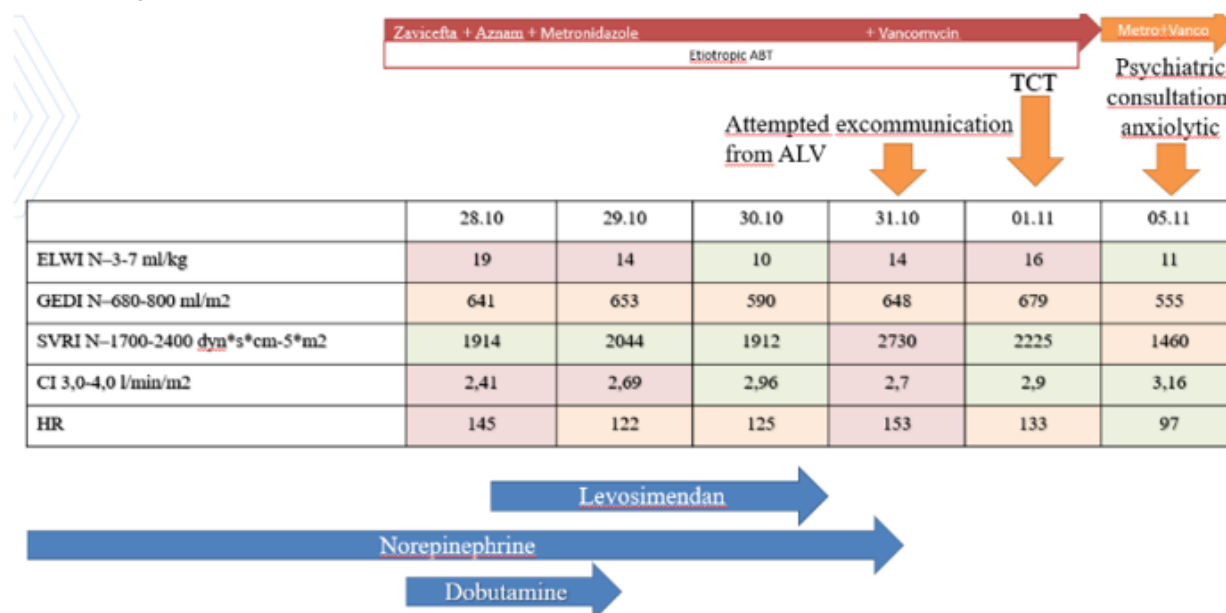


Figure 7: Advanced hemodynamic monitoring using transpulmonary thermodilation (PiCCO) technology.

Conclusion

Short bowel syndrome (SBS) is a serious condition that leads to a steady exhaustion of the patient. A high complete small intestinal fistula in almost all cases leads to the development of SBS. Further surgical treatment depends on a number of factors, but the main one is the length

of the preserved small intestine. The complexity of reconstructive operations and the risk of severe postoperative complications give grounds for refusing surgery in most surgical clinics. Often, patients with ECF have a comorbid background and require correction of chronic diseases and conditions by related specialists. The psychoemotional state

of the patient is not always given due attention, which can lead to the development of severe stress-induced cardiomyopathy, up to cardiac arrest and death.

Treatment of this category of patients, especially those with a psychoemotional background, should be carried out by a multidisciplinary team, including with the involvement of a psychiatrist and the mandatory appointment of anxiolytics to prevent the development of fatal stress-induced conditions. The risk of developing adhesive intestinal obstruction increases with each subsequent relaparotomy, however, we have not found a combination of enterocutaneous fistula, "short" bowel syndrome and adhesive intestinal obstruction in one patient in the domestic and foreign literature.

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Informed consent: The patient's written informed consent to the publication of clinical observations and anonymized images was obtained.

Conflict of interests: The authors declare that there is no conflict of interest.

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