

Endoscopic transluminal necrosectomy in the complex treatment of a patient with acute infected necrotizing pancreatitis. Clinical case

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This study presents a clinical case of acute pancreatitis treatment, which manifested as infected walled-off necrosis in a 49-year-old obese woman. Diagnosis and treatment were provided by a multidisciplinary team comprising surgeons, anesthesiologists, interventional radiologists, and endoscopists. The treatment strategy followed a «step-up approach», a modern technique involving gradual progression from less to more invasive methods, thereby reducing the physiological stress on the patient. This approach has demonstrated efficacy in numerous studies.

In Western countries, endoscopic transluminal necrosectomy is gaining popularity, and our clinic has been implementing it successfully since 2021. Despite its effectiveness, clinicians still encounter challenges when opting for endoscopic transluminal interventions over other minimally invasive methods. Key issues include determining the timing and frequency of interventions, choosing debridement techniques and antiseptics for walled-off necrosis, and establishing criteria for transitioning to more invasive procedures. Today, researchers handle these nuances on a case-by-case basis, relying on the expertise and proficiency of a specific specialized department, which necessitates further research.

In this case the patient achieved complete debridement of a localized fluid/necrosis collection through a step-wise approach. Initial management involved ultrasound-guided percutaneous drainage and lavage, followed by four sessions of endoscopic transluminal necrosectomy as the final minimally invasive intervention. We assess the unfavorable long-term outcomes, 2.5 years post-treatment, as negligible.

KEYWORDS

acute pancreatitis, acute necrotizing pancreatitis, acute infected pancreatic necrosis, walled-off necrosis, endoscopic transluminal/transgastric necrosectomy, direct endoscopic necrosectomy.

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Acute pancreatitis is one of the most common gastrointestinal disorders requiring acute hospitalization [22]. In most cases, AP is a relatively mild, self-limiting condition that can be managed with supportive care and has few long-term consequences. [5]. Acute necrotizing pancreatitis (ANP), a severe form of AP,

affects 10–20 % of AP patients and is characterized by extended hospitalization, multiple organ failure, infection, the need for extensive therapy and surgical interventions, complications, and repeated hospital admissions. The mortality rate associated with ANP ranges from 15 % to 39 %, depending on the presence

of infection in the necrotic area [7]. Currently, minimally invasive treatment methods for acute necrotizing pancreatitis form the basis of surgical tactics, reducing mortality and the number of complications, and, in most cases, allowing for the avoidance or postponement of open surgery [8].

Clinical case

Patient P., 49 years old woman, was delivered on November 14, 2021, by the emergency medical care team to the Kyiv City Clinical Emergency Hospital with a diagnosis of AP? perforation of a hollow organ? Upon admission: complaints of intense pain in the epigastrium, nausea, repeated vomiting of food, severe abdominal distension, lack of bowel movement and passing of gases, dryness in the oral cavity.

Medical history: according to the patient, stomach ache appeared within a day, gradually intensified, and an emergency medical team was called; the pain attack developed after alcohol and fatty food consumption. Concomitant diseases: IHD, stage 2 hypertension, class III obesity (height 172 cm, weight 118 kg); in anamnesis – extirpation of the uterus with appendages in 2016.

Objectively: the general condition of the patient is of medium severity; pulse 88 bpm, blood pressure – 200/100 mm Hg, body temperature – 37.1 °C. On palpation, the abdomen is soft, swollen, painful in the epigastric and mesogastric regions, symptoms of peritoneal irritation are weakly positive. Auscultation reveals absent bowel sounds. ASA Physical Status Classification System – 3. Total blood count: leukocytes $13.6 \cdot 10^9/l$, hemoglobin – 161 g/l. Biochemistry blood test: chylous blood. X-ray of abdominal organs: free gas, horizontal fluid levels were not detected. X-ray of the organs of the chest cavity: the pulmonary pattern is enhanced, deformed in all lung fields, the roots of the lungs are compacted, the heart is not enlarged, the sinuses are free. Ultrasound examination (ultrasound): there is free fluid in the suprahepatic space of 24 mm, in Morrison's pouch of 7 mm, between the loops of the intestine of 15 mm in certain areas; the liver: right/left lobes – 152/80 mm, respectively, echogenicity is increased, heterogeneous, liver steatosis, the pancreas is not visualized. Esophagogastroduodenoscopy (EGD): impaired gastric and duodenal motility according to the hypotonic type; no signs of perforation were detected; a nasojejunal feeding tube was installed.

Preliminary diagnosis: AP of moderate severity. Considering the severity of the patient's condition due to acute pain syndrome and local complications such as free fluid in the abdominal cavity and

unstable hemodynamics, the patient was admitted to the general intensive care unit. During the first day of hospitalization, the rule of «four catheters» by Y. M. Susak [1] was applied: the left subclavian vein and the epidural space ThIX–ThX were catheterized a nasojejunal feeding tube was installed during EGD, and a diagnostic laparocentesis with abdominal drainage was performed: about 1000 ml of brown contents were obtained (α -amylase – 849 g/h/l. On the first day of hospitalization, 5 l of crystalloid solutions were administered by intravenous infusion. On the first day, the patient's condition was stabilized (pain syndrome reduced, hemodynamics normalized to 140/90 mm Hg). The patient was then transferred to an on-call surgical department. 300–100 ml of brown, then serous fluid was secreted from the abdominal cavity drainage every day; once the debit of secretions had decreased to less than 50 ml/day, the drainage was removed on day 45.

Ultrasound as of November 24, 2021: signs of diffuse changes in the liver parenchyma characteristic of fatty hepatosis, moderate hepatomegaly, chronic calculous cholecystitis, acute necrotizing pancreatitis, parapancreatitis, free fluid in the omental bursa, infiltration of retroperitoneal tissue relative to the left lateral canal.

November 26, 2021 – drainage of the omental bursa under ultrasound control with pigtail drainage 9 Fr – 220 mm: 400 ml of brown cloudy liquid was released at one time – taken for the bacteriological examination; the cavity was washed with a 2% betadine solution. During hospitalization, the drain was washed several times a day with a saline solution and a 2% betadine solution up to 50 ml to clean the necrotic area and ensure drainage patency; the nature of the drainage content – detritus, pus, washing liquid up to 150–50 ml/day.

November 30, 2021 – the result of the microbiological examination of a punctate from the omental bursa: *Acinetobacter baumannii*, insignificant growth, sensitive to gentamicin, tobramycin.

November 29, 2021 – the abdominal CT-scan with contrast: destructive pancreatitis, pronounced parapancreatic infiltration with spread to the root of the mesentery, the omental bursa, the splenic hilum and part of the liver, along the greater curvature of the stomach, to the epigastric region and duodenum, covering the colon under the anterior abdominal wall, Gerot's fascia more on the left, paracollar tissue more on the left, and along the flanks of the abdominal cavity to the small pelvis, with the presence of free fluid infiltration along the course of 10–27 mm, including in the pelvic cavity; the state after drainage. Ascites. Calculous cholecystitis.

Infiltration of the anterior abdominal wall along the midline with a limited fluid component.

On December 3, 2021, the patient was transferred to the specialized department of surgery of the liver, bile ducts and pancreas (surgical department No 2) of the Kyiv City Clinical Emergency Hospital with a diagnosis of AP of moderate severity. Marshall Organ Failure Score at admission – 1 point (creatinine 156 µmol/l).

On December 10, 2021, taking into account complaints of difficulty breathing, the frequency of respiratory movements of 18/min, a puncture of the left pleural cavity was performed under ultrasound control. 250 ml of translucent yellowish exudate was obtained, after which an improvement in respiratory function was observed; the frequency of respiratory movements was 12/min.

December 15, 2021 – the abdominal CT-scan with contrast: the state after drainage of a fluid/necrosis collection under ultrasound control for acute necrotizing pancreatitis with extrapancreatic necrosis with the formation of multiple fluid collectors in the abdominal cavity and retroperitoneal space, taking into account the clinical pattern – with infection. Late phase. Balthazar Severity Index 4(E) Ascites. Left-sided pneumohydrothorax. Splenic infarction (Fig. 1).

December 15, 2021 – a puncture of the right and left pleural cavity under ultrasound control; 150 and 300 ml of translucent yellowish exudate were obtained, respectively, after which an improvement in respiratory function was observed. Conservative treatment was continued.

December 16, 2021 – the result of repeated microbiological examination of secretions from the omental bursa: *Acinetobacter baumannii*, sensitive to tobramycin.

December 17, 2021 – the drainage of the omental bursa was replaced with a new one, with a larger diameter of 12 Fr. The daily three-time washing of the cavity of the necrotic collection with a saline solution and a 2% betadine solution up to 50 ml was continued to clean up the necrotic focus and ensure patency of the drainage. Debit through the drainage was 150–50 ml/day of detritus with washing liquid.

Since the patient refused the proposed open necrosectomy, conservative treatment was continued, during which the patient's condition was relatively stable.

January 10, 2022 – abdominal CT scan with contrast: the state after drainage of a fluid/necrosis collection under ultrasound control for acute necrotizing pancreatitis with extrapancreatic necrosis spreading to the root of the mesentery, gastro-omental pouch, along the anterior layer of the renal fascia,

perirenal space on the left. In comparison with the abdominal CT scan as of December 15, 2021, the size of the necrotic collector increased and CT signs of infection appeared. Ascites. Left-sided hydrothorax. Infarction of the spleen. GSD: gallstones (Fig. 2).

January 10, 2022 – EGD: moderate compression of the stomach from the outside along the back wall from the cardia to the antrum, more pronounced in the antrum, erythematous gastropathy.

Clinical diagnosis: acute infected necrotic pancreatitis, walled-off necrosis (Atlanta 2012), a course of moderate severity.

The patient was offered an alternative minimally invasive treatment – endoscopic transluminal



Figure 1. Abdominal CT scan with contrast on December 15, 2021: a fluid/necrosis collection is indicated by the black arrows; a pigtail-type percutaneous drainage is visualized in the cavity of the collection and indicated by the white arrow; the formation of the delineation and walls of the collection



Figure 2. Abdominal CT scan with contrast on January 10, 2022: a fluid/necrosis collection is indicated by the black arrows; the delineation and the wall of the collection are clearly visualized

necrosectomy — and the patient consented to the operation.

January 13, 2022 — endoscopic transgastric necrosectomy (Fig. 3), debridement and drainage of the WON cavity with No 2 plastic double pigtail stents 10 Fr — 5 cm were performed under general anesthesia. After the operation, a noticeable reduction in pain syndrome was observed, the respiratory rate normalized to 14/min, and the maximum daily body temperature gradually decreased from 38–39° to 37.5°C.

January 17, 2022 — a puncture of the right pleural cavity under ultrasound control; 200 ml of translucent yellowish exudate was evacuated.

January 19, 2022 — repeated endoscopic transgastric necrosectomy (session No 2) under general anesthesia. The postoperative period was uneventful, and the patient's condition was stable.

January 26, 2022 — repeated endoscopic transgastric necrosectomy (session No 3) under general anesthesia. Moderately positive dynamics was noted after the operation.

February 1, 2022 — repeated endoscopic transgastric necrosectomy (session No 4, Fig. 4–6) under general anesthesia. At the end of the procedure, the plastic stents installed during the first session were replaced with a new, identical stent No 1. The positive dynamics were noted after the operation: the temperature gradually decreased to 37°C, appetite and sleep normalized, and stools were regular and well-formed; subjectively, the patient felt stronger, began to get out of bed more frequently; discharge from the percutaneous drainage of the

localized necrotic collection cavity significantly decreased (less than 50 ml/day), and was removed. Fig. 7 depicts the blood leukocyte count during endoscopic transgastric necrosectomy sessions.

During the entire period of treatment, infusion therapy was carried out taking into account the patient's body weight, tolerance and hematocrit; antibiotic therapy according to the principle of escalation (empirically — levofloxacin 500 mg and metronidazole 500 mg IV twice a day; after bacteriological examination — tobramycin 80 mg IV infusion in saline solution; ceftriaxone 1000 mg + metronidazole 500

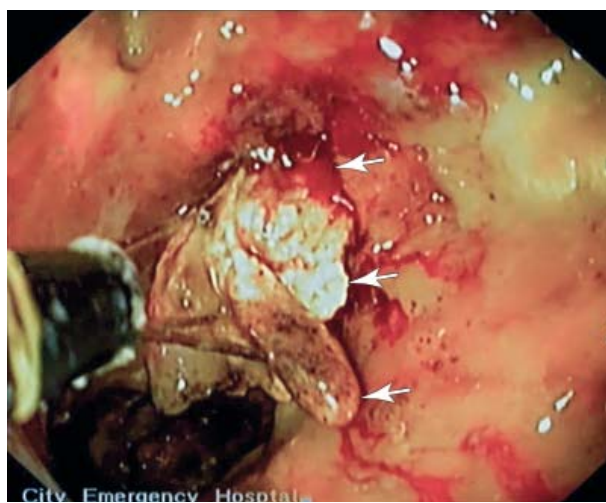


Figure 4. **Session No 4, endoscopic transluminal necrosectomy using an endoscopic tripod; necrotic sequestration is indicated by arrows**

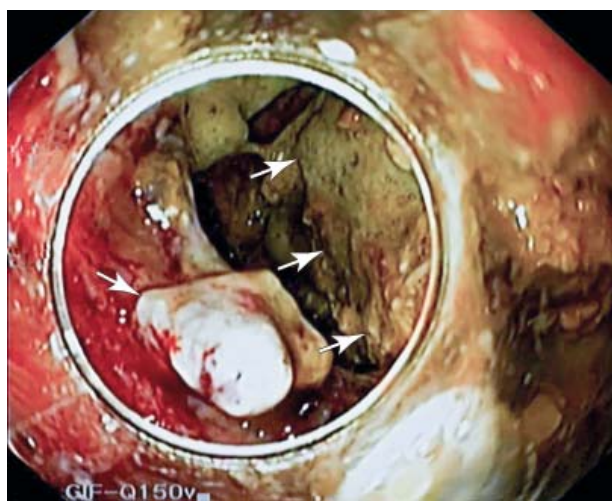


Figure 3. **Session No 1, the view of the WON cavity during the first endoscopic transluminal necrosectomy: a large number of necrotic sequestrations and pus are visualized, as indicated by arrows; on the walls of the cavity, loose granulations under fibrin, pronounced contact bleeding**

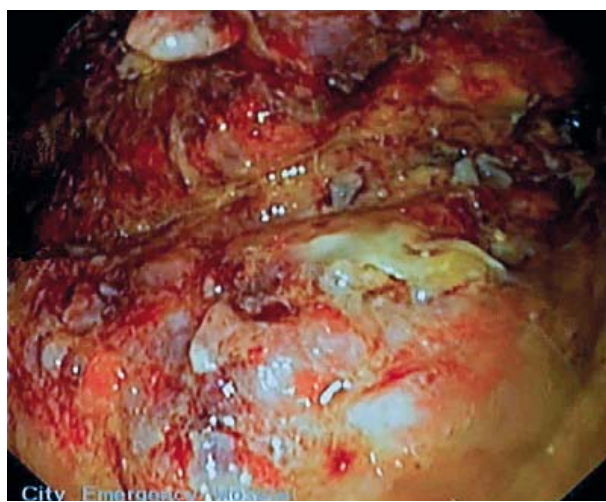


Figure 5. **Session No 4, the view of the WON cavity at the end of the 4th session of endoscopic necrosectomy: sequestrations and pus are absent, granulations have increased on the walls, and the amount of fibrin and bleeding has significantly decreased**

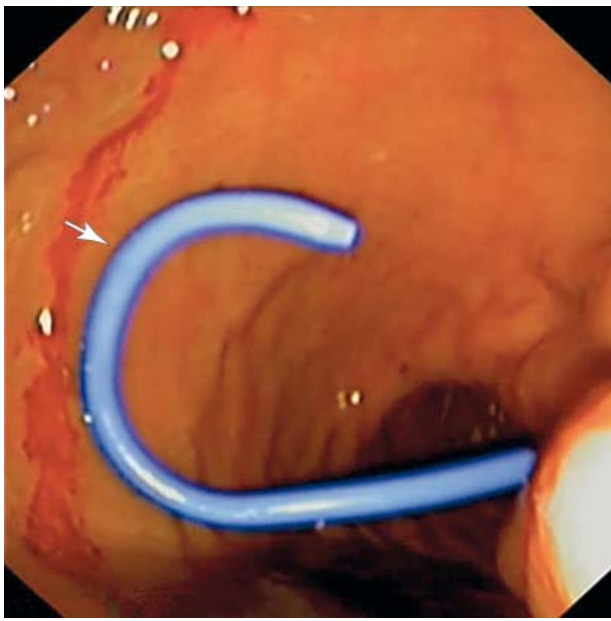


Figure 6. **Session No 4, a plastic double pigtail stent Ø 10 Fr – 5 cm installed transgastrically in the WON cavity, as indicated by the white arrow**

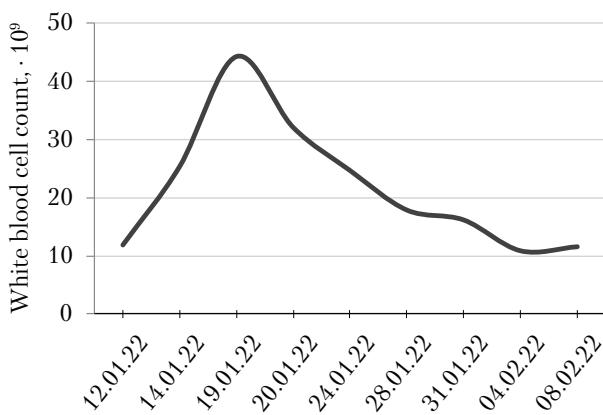


Figure 7. **Blood leukocyte count during endoscopic transgastric necrosectomy sessions**



Figure 8. **Abdominal CT scan with contrast on August 28, 2024**

mg IV twice a day; meropenem 1000 mg + amoxicil-K 1200 mg IV twice a day; cefosulbin 1000 mg + metronidazole 500 mg + levofloxacin 500 mg IV twice a day; epidural anesthesia with bupivacaine solution 5 mg/ml – 3.0 ml up to 10 ml in saline solution every 3 hours for 10 days, depending on the intensity of the pain syndrome; for enteral feeding, a saline solution was administered through the nasojejunal tube at a dose of 800 ml per day and lactulose at a dose of 80 ml per day for the first three days. Subsequently, enteral feeding mixtures, broths, and compote were provided. The transition to independent feeding was carried out as the patient developed an appetite and showed no signs of nausea.

The period from the onset of the disease to the puncture of the fluid collection in the omental bursa was 12 days; the period from the onset of the disease to the first transgastric endoscopic necrosectomy was 61 days. Bed days – 95. She was discharged for outpatient treatment in a satisfactory condition on February 16, 2022. After 2.5 years, we managed to contact the patient; she did not have any complaints related to the disease. She was asked to perform an abdominal CT scan with contrast for her follow-up.

August 28, 2024 – abdominal CT scan with contrast: the state after treatment of pancreatic necrosis with signs of infection (2021); at the time of examination, signs of pancreatitis, fluid collections in the abdominal and pleural cavities were not detected (Fig. 8).

Additionally, in September 2024, the patient underwent the SF-36 score test for assessing health-related quality of life [19]:

Physical functioning	90 %
Role limitations due to physical health	50 %
Role limitations due to emotional problems	67 %
Energy/fatigue	65 %
Emotional well-being	84 %
Social functioning	88 %
Pain	100 %
General health	50 %
Health change	100 %

Discussion

Early diagnosis, early fluid resuscitation, dynamic assessment of the clinical picture, and the selection of optimal tactics are critical aspects in the management of patients with acute pancreatitis. In the case of moderate and severe forms of AP, early enteral nutrition, antibiotic therapy for acute infected pancreatic necrosis, and the ability to perform the necessary range of minimally invasive interventions are also important. Early diagnosis is critical in order to begin infusion treatment with crystalloid solutions in an appropriate

amount as soon as possible (up to 24 hours). Among infusion solutions in AP, the Ringer-lactate solution demonstrated the greatest effectiveness up to 24–48 hours after the onset of a pain attack, lowering C-reactive protein levels (CRP), reducing persistent manifestations of systemic inflammatory response syndrome (SIRS), and organ failure [16], and is recommended as the drug of choice for primary fluid resuscitation in AP [22]. To ensure the most effective therapy, individuals with AP should be admitted to a specialized department immediately. Furthermore, in circumstances where the department's therapeutic capacities are restricted, transferring a patient with severe necrotizing pancreatitis to a specialized center with the necessary minimally invasive treatment methods should be considered [6]. The updated classification of acute pancreatitis – Atlanta 2012 [5] should be used at the time of clinic admission and in the future to determine the severity of the disease, the morphological form, and the presence/absence of acute infected pancreatic necrosis. CT/MRI and ultrasound should be conducted dynamically.

Although many patients with ANP may be managed conservatively (intensive therapy, combined use of antimicrobial drugs, nutritional support, with or without drainage), about 26–38% may require necrosectomy or other surgeries owing to complications [13]. Walled-off necrosis (WON) is one of the most severe complications of acute pancreatitis, with distinct borders, the presence of a wall, and fluid-necrotic contents. Secondary infection of the WON is associated with a poor patient condition and increases the risk of complications and mortality [21], necessitating antibiotic therapy and early invasive procedures [2]. Currently, there is no one accepted marker for the presence of acute infected pancreatic necrosis [20]. The presence of infection should be assessed comprehensively, taking into account the clinical picture (deterioration of the patient's state), imaging techniques (CT, MRI), microbiology of aspirate from peri-/pancreatic collections, and laboratory markers. Percutaneous fine needle aspiration (FNA) of peri-/pancreatic collections is not recommended as a routine procedure, but should be performed only when there is a suspicion of infection, an uncertain clinical picture, and unclear (non-informative) imaging results [3]. C-reactive protein, creatinine, prothrombin time, and lactate dehydrogenase show the strongest correlations with acute infected pancreatic necrosis [20]. Other indicators, such as interleukin-6 and procalcitonin, also correlate with acute infected pancreatic necrosis but are less frequently available.

The treatment of severe forms of AP is long-term and requires significant resources.

A multidisciplinary step-up approach is currently the best recommended strategy for the treatment of acute necrotizing pancreatitis [3]. It involves a gradual transition from less invasive techniques to more invasive ones to cause the least possible stress on the patient's body. There are convincing clinical data that the «step-up approach» leads to a significant reduction in the number of complications, negative long-term consequences, and mortality in acute necrotizing pancreatitis [8].

Today, surgical treatment options for complicated forms of AP include percutaneous, endoscopic transluminal, laparoscopic, and open interventions [7, 17]. Over the past 20 years, new minimally invasive techniques have appeared, including video-assisted retroperitoneal debridement (VARD) and endoscopic transluminal necrosectomy (synonyms in the English-language literature: direct endoscopic necrosectomy, DEN, endoscopic transgastric necrosectomy) as more favourable approaches. The optimal interventional tactics for patients with suspected or proven infected pancreatic necrosis are percutaneous drainage of the necrotic collection under the control of imaging techniques (ultrasound) or endoscopic transluminal drainage followed, if necessary, by endoscopic or surgical necrosectomy [22].

Among the minimally invasive interventions for complicated forms of AP, endoscopic transluminal interventions are becoming more and more frequently used [3], and since 2021 they have been successfully implemented in our clinic. The results of endoscopic transgastric necrosectomy are encouraging. A systematic review of 10 studies of endoscopic necrosectomy found complete resolution of walled-off necrosis in 76% of cases, with a total long-term adverse event rate of 27% and mortality of 5%, although patient characteristics varied between studies [9]. The Bakker randomized controlled trial showed the advantages of endoscopic transgastric necrosectomy over surgical necrosectomy with a lower risk of recurrent episodes of organ failure (0% vs. 50%), fewer pancreatic fistulas (10% vs. 70%), and lower post-procedural interleukin-6 levels ($p = 0.03$) [4]. A retrospective study by Tan confirmed that endoscopic transgastric necrosectomy had a lower complication rate and shorter hospital stay compared to surgical necrosectomy [18].

The limitations of the endoscopic approach include the necessity for multiple interventions, an inadequate endoscopic evaluation of the quantity of necrotic collections, the difficulties associated with the removal of numerous necrotic collections, the restricted feasibility of endoscopic transgastric necrosectomy in instances of retroperitoneal spread of the necrotic process, and the challenges

or impossibility of debridement of distal left-sided necrotic collections [8]. This method has technical limitations due to the lack of specialized tools, the challenge of achieving a stable confluence between the necrotic collection cavity and the hollow organ, and the difficulty of preventing damage to vital structures, such as blood vessels, within the necrotic cavity [8].

Today, there are two approaches to endoscopic transluminal interventions for walled-off necrosis: DEN, which involves performing necrosectomy during the first few sessions, regardless of the clinical course of acute pancreatitis, and the step-up approach, which involves performing DEN after primary transluminal drainage using a transluminal stent fails. Several studies [11, 14, 15] have demonstrated the advantage of the step-up approach in avoiding unnecessary DEN, showing that 20–90 % of patients with WON can be treated only with endoscopic drainage using plastic stents or a fully covered wide-diameter metal stent SEMS (self-expandable metal stent), including a specialized stent for these operations LAMS (lumen-apposing metal stent). Factors that may hinder the effectiveness of drainage-only tactics include the large size of WON, the small diameter of the stent, and the large number of solid sequestrations in the WON cavity [11, 14, 15]. Limitations in the choice of metal stents include a greater risk of bleeding compared to plastic ones; are subject to mandatory removal after resolution of the WON cavity (plastic stents can be left for a long time, if necessary, especially in the case of «disconnected pancreatic duct» syndrome); the high cost of such a stent (~500–1500 Euro).

In our clinic, an Olympus TJF-150 duodenoscope is used for transluminal access and transluminal stent installation. If necrosectomy is necessary, an Olympus GIF-Q150 gastroscope with a distal cap is used under general anesthesia with tracheal intubation to protect the airways from potential aspiration of infected WON cavity contents. The patient's position during the procedure is supine, which allows localizing the topographical position of WON in relation to the stomach according to imaging methods of diagnosis (CT or MRI). Depending on the WON attachment site, a cystotome is used to puncture the gastric or duodenal wall under endoscopic control for transluminal drainage. Then No. 2 plastic double pigtail stents with a diameter of 10 French – 5 cm are installed along the guidewire. If imaging diagnostic procedures reveal dense necrotic collections in the WON cavity, a direct necrosectomy is performed through the confluence between the gastric/duodenal cavity and the WON cavity, created by a dilatation endoballoon

with a diameter of 15–20 mm. Direct necrosectomy can also be performed through a SEMS stent. Removal of sequestrations and detritus is carried out with the help of a tripod, a loop, a catch basket, and lavage of the WON cavity with antiseptic solutions. In our clinic, a 2 % betadine solution and a 1 % hydrogen peroxide solution are used for lavage of the WON cavity. There is still no evidence in the literature regarding the effectiveness and benefits of specific antiseptics. Installing transnasal drainage parallel to the stents into the WON cavity for long-term lavage is one of the options for completing the procedure.

Indications for endoscopic transluminal interventions at our clinic include a localized necrotic peri-/pancreatic collection identified on abdominal CT with contrast or abdominal MRI and situated adjacent to the stomach and/or duodenum; the duration of the illness from the first painful episode is ≥ 4 weeks; evidence of external compression of the stomach and/or duodenum as per EGD findings. 50–60 % of patients with WON experience compression of the stomach/duodenum from the outside [8], which manifests as an obvious protrusion into the lumen and topographically correlates with the area of walled-off necrosis next to the corresponding hollow organ. If there is no evidence of severe portal hypertension, we can perform endoscopic transluminal interventions at the protrusion site without an endosonoscope (endoscopic ultrasound, EUS) [10, 23]. The use of an endosonoscope is preferable since it facilitates the visualization of large blood vessels within the tissues, reducing the risk of bleeding. Furthermore, if the WON cavity is located within the EUS visualization, EUS technology can reach it in up to 100 % of cases, allowing WON cavity achievement when there is no typical bulging into the stomach [3], and may shorten the procedure duration.

WON cavity debridement requires 3 to 6 endoscopic transluminal sessions [7]. The number of sessions depends on the volume of WON, the extent of the necrotic process, and the consistency of the content. In some cases, the contents of the WON cavity are almost homogeneous, «cheesy», and can be easily washed out. However, in most cases, in addition to fluid, there are large sequestrations that spread in the form of honeycombs, can be attached quite tightly, and require gradual removal over several sessions as they detach into the lumen of the WON cavity. Aggressive removal of sequestrations can cause massive bleeding. To date, there are no unequivocal criteria regarding the number of necessary sessions for debridement and the time periods between interventions. In the study by Qing Liu

[12], no significant correlation was found between the interval of endoscopic necrosectomy and the following parameters, including general information about the patient, etiology of pancreatitis, biochemistry blood test (leukocyte count, neutrophil percentage, C-reactive protein), preoperative fever, distribution and size of WON, type and number of stents, and initial (empirical) necrosectomy. However, there were significant differences between necrosectomy interval and Modified CT Severity Index (MCTSI) ($p < 0.001$), WON solid/liquid ratio ($p < 0.001$) before intervention, postoperative fever ($p = 0.038$), increased C-reactive protein ($p = 0.012$) and fever before re-intervention ($p = 0.024$) [12]. In the clinical case presented by us, repeated interventions (sessions) were carried out with an interval of 6–7 days and were justified by the presence of the dense sequestrations, which could not be removed in the previous endoscopic transgastric necrosectomy session, and by the lack of significant improvement in the patient's general condition, hyperthermia, and leukocytosis. Today, it remains uncertain which cases should continue with endoscopic transluminal procedures to achieve complete debridement of WON, and which ones should transition to more invasive methods such as laparoscopic procedures. These decisions are made individually in each specific case, taking into account the clinical picture and the experience of the medical center.

We successfully achieved complete debridement of WON during 4 sessions of endoscopic transluminal necrosectomy in the clinical case we presented. We generally assessed the long-term negative consequences 2.5 years after endoscopic minimally invasive treatment of acute infected pancreatic necrosis in this patient as insignificant, using the «SF-36 score» test as our guide.

DECLARATION OF INTERESTS

The authors declare that they have no conflicts of interest.

AUTHORS CONTRIBUTIONS

Conception and design — N. V. Puzyr; acquisition of data — A. Y. Tkachenko, M. V. Maksymenko, V. V. Volkovetskii; drafting the article — N. V. Puzyr; critical revision of the article — A. Y. Tkachenko, L. O. Pererva, Y. M. Susak.

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Ендоскопічна транслюмінальна некрозектомія у комплексному лікуванні пацієнтки з гострим інфікованим некротичним панкреатитом. Клінічний випадок

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Представлено клінічний випадок лікування гострого панкреатиту, що набув морфологічної форми інфікованого обмеженого некротичного скупчення у жінки віком 49 років з ожирінням. Для діагностики та лікування застосовано мультидисциплінарний підхід із залученням лікарів-хірургів, анестезіологів-реаніматологів, радіологів, інтервенційних лікарів УЗД, інтервенційних ендоскопістів. У тактиці хірургічного вибору використано «step-up approach» — сучасний покроковий підхід, що передбачає поступовий перехід від менш інвазивних методів до більш інвазивних для якнайменшого стресу для організму пацієнта. Його ефективність доведено в численних дослідженнях.

Ендоскопічну транслюмінальну некрозектомію нині дедалі частіше виконують у західних країнах. Із 2021 року її успішно впроваджено в нашій клініці. Невирішеними залишаються питання щодо вибору ендоскопічних транслюмінальних втручань серед інших малоінвазивних методів, часових інтервалів між втручаннями, їх кількості, способу та режиму промивання порожнини обмеженого некротичного скупчення, вибору антисептика для промивання, критеріїв переходу до інвазивніших методів лікування, що потребує подальших досліджень. Нині для вирішення цих питань застосовують індивідуальний підхід із урахуванням можливостей та досвіду певного спеціалізованого відділення. У наведеному клінічному випадку в пацієнтки вдалося досягти повної санації обмеженого рідинно-некротичного скупчення комбінацією черезшкірного дренивання під ультразвуковим контролем із лаважем (перший етап) та чотирьох сесій ендоскопічної транслюмінальної некрозектомії як основного методу малоінвазивного лікування. Віддалені негативні наслідки через 2,5 року після лікування у цієї пацієнтки оцінені нами в цілому як несуттєві.

Ключові слова: гострий панкреатит, гострий некротичний панкреатит, гострий інфікований панкреатичний некроз, обмежене некротичне скупчення, ендоскопічна транслюмінальна/трансгастральна некрозектомія, пряма ендоскопічна некрозектомія.

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