The paper presents the description of the effective treatment of patients with extensive consequences of necrotizing pancreatitis. The strategy of treatment was to extend access to necrotic areas ("step-up approach"). Applied endoscopic transmural access (transgastric), percutaneous access (transperitoneal) and surgical access. The cooperation endoscopist, surgeon and interventional radiologist gave very beneficial clinical effects in patients with extensive complications of acute pancreatitis.

Key words: walled-off pancreatic necrosis, acute pancreatitis, endoscopic drainage, percutaneous drainage

Walled-off pancreatic necrosis (WOPN) occurs as a consequence of 1-9% of necrotizing acute pancreatitis (1). Inflammation of necrotic areas occurs in 70% of patients with necrotizing acute pancreatitis and is associated with high patient mortality (2).

Interventional treatment of pancreatic necrosis should be postponed until it is walled-off. The transition of early to late necrosis is associated not only with its restriction (encapsulation), but also the process is connected with necrosis liquidation (3, 4). Conservative treatment results in case of early necrosis have significantly improved in the last two decades, which enables to postpone intervention until the regression of multiorgan failure symptoms, radically reducing the risk of complications (including mortality) and improving the efficacy of treatment methods (5).

The surgical treatment of pancreatic necrosis (necrosectomy) for many years was the only therapeutic method. In the last two decades one has observed significant development of minimally invasive procedures, whose advantage over surgery include reduction in the number of systemic complications and low risk of new multiorgan lesions (6). Minimally invasive methods use different imaging techniques: fiberscopy, laparoscopy, and rigid nephoscope, access being possible by means of transperitoneal, retroperitoneal, and transmural methods (through the gastric or duodenal wall) or transpapillary (7). The choice of the access method depends on the location of necrosis and dissemination. In some patients it is necessary to use several approach methods.

Considering the presented study case the following approach methods were used: transmural, transperitoneal, and surgical.

CASE REPORT

A 53-year old male patient with a history of severe alcoholic acute pancreatitis (March, 2009) was admitted to the Department of Gas-

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troenterology and Hepatology, Medical University in Gdańsk, in May, 2009 for endoscopic management of walled-off pancreatic necrosis. The patient complained of abdominal pain, fever 38°C, and loss of appetite, lasting for a period of one month, which resulted in cachexia (BMI=17). On admission, the physical examination showed the presence of an abdominal tumor, no other pathologies were observed. Laboratory results showed leucocytosis (25 g/l) and elevated CRP level (283 mg/l). The blood culture proved negative. Contrast abdominal CT performed on admission showed three well-demarcated fluid reservoirs with gas bubbles and heterogenous content in the pancreatic field, indicating the presence of necrotic elements: the first reservoir was 74 x 235 x 76 mm in size, starting at the level of the head of the pancreas, running down the abdominal cavity and ending at the level of the right ilio-opsoas muscle; the second reservoir was 40 x 130 x 35 mm in size, starting at the level of the body and tail of the pancreas, and ending in the left iliac fossa; the third reservoir was 51 x 110 x 61 mm in size, lying ventrally in relation to the pancreatic head. Additionally, we observed communication between the reservoirs.

During hospitalization the patient was subjected to transmural endoscopic drainage. Under endoscopic ultrasound control, on top of the visible impression on the rear stomach wall, using cystostome 10Fr, the walled-off pancreatic necrosis reservoir was punctured (40 x 130 x 35 mm), observing through the stoma opening an outflow of dark-brown content with fragments of necrotic tissues. The gastropancreatic fistula which developed was dilated to 10 mm; into the lumen of the reservoir we introduced two double pigtail 7Fr and 10Fr prostheses, and a 6Fr nasal drain for lavage (200 ml of physiological saline every 4 hours). The culture of the reservoir showed the presence of Enterococcus faecalis, Enterococcus faecium, Stenotrophomonas maltophilia and Escherichia coli. Target antibiotics were used (Metronidazole, Biseptol, Ceftriaxone, Piperacillin and Tazobactam), continued for a period of 43 days after the initial procedure.

Percutaneous drainage of the largest reservoir (74 x 235 x 76 mm) was also performed twice, under scopy control, for a period of 14 and 15 days, with a two-week break. After 14 days of percutaneous drainage, regression in the size of the reservoir was observed under ultrasound control, which lead to the decision to remove the drain. After two weeks, recurrence of the reservoir was observed requiring once again percutaneous drainage for a period of 15 days (the total drainage time was 29 days).

During subsequent endoscopic procedures the stoma opening in the gastric wall was
widened to 2 cm, two additional 7Fr and 6Fr nose drains were added, and the transmural prostheses were replaced three times. Peritoneal fluid was removed (1800 ml). After two weeks the patients clinical condition improved, fever regressed, and inflammatory parameters normalized.

During the patient’s hospitalization we observed increasing cholestasis (bilirubin level- 8.5 mg/dl), although initially, endoscopic cholangiography was not possible, due to the compression of the head of the pancreas on the descending part of the duodenum, which lead to its occlusion and lack of possibility of finding the duodenal papilla. Obstructive jaundice was caused by the inflammatory infiltration of the biliary ducts in the peri-pancreatic area, as well as compression of the walled-off pancreatic necrosis reservoir. Surgical intervention was decided upon. The patient was subjected to posterior pre-pyloric gastrojejunostomy with drainage of one of the fluid reservoirs located at the level of the head of the pancreas (51 x 110 x 61 mm). The necrotic content was also removed from the residual reservoir, being subjected to percutaneous drainage.

Due to the inflammatory infiltration and extensive adhesions, cholecystectomy was not performed. A drain was introduced into the gall-bladder with a skin opening. Drainage of the biliary ducts proved ineffective. Four days after surgery the drain was removed followed by the introduction of a new percutaneous drainage under X-ray control. During ERCP, a leader was introduced to the duodenum through the percutaneous drain, being visible on endoscopy (“rendez-vous maneuver”); using an 8 mm high-pressure balloon the main bile duct was dilated followed by implantation of two 7Fr biliary duct prostheses. The biliary duct percutaneous drain was removed, showing no bile leakage. The pancreatic duct was also subjected to prosthesis implantation-7Fr, placing two 7Fr and 10Fr prostheses through the gastric stoma. The patient’s clinical condition improved (BMI=21). After 181 days of active drainage of the fluid reservoir on the border of the head and pancreatic body, observing its regression, we decided to remove the nasal drains, maintaining the transmural and biliary prostheses, as well as the pancreatic prosthesis.

Six months after the termination of active drainage (April, 2010) control CT was performed, showing total regression of the walled-off pancreatic necrosis. During ERCP we observed spontaneous transmural and pancreatic prostheses dislocation. The biliary stents were replaced. At present the patient is undergoing biliary endotherapy, due to benign biliary ducts stenosis. The patient is in good general condition with an increased body weight (BMI=23). The patient returned to full physical fitness and everyday activities.

**DISCUSSION**

Endoscopic drainage should be the first of therapeutic methods used in case of symptomatic patients with diagnosed walled-off pancreatic necrosis (1, 5). In selected cases combined with percutaneous drainage (3), especially in case of necrosis penetration to the minor pelvis (8). In a randomized study, van Santvoort et al. demonstrated that the use of minimally invasive techniques in the treatment of acute necrotizing pancreatitis compli-
cations (“step-up approach”) significantly reduced the number of the above-mentioned (including fatal), as compared to open necrosectomy (9). The efficacy of non-surgical methods in the treatment of walled-off pancreatic necrosis (WOPN) ranged between 81-90% of cases (4, 10).

The presented study case illustrated the course of endoscopic treatment, its efficacy in the management of WOPN, as well as its limitations associated with access to the reservoir, where it becomes necessary to use additional therapeutic methods. The creation of an appropriate lavage system, which enables aggressive drainage seems to be the basis for success, considering WOPN treatment (11). Endoscopic WOPN drainage (transmural and transperitoneal are optimal) is safe and effective, especially when combined with percutaneous drainage, which create an aggressive irrigation system. Endoscopic treatment is an alternative to surgery (1, 3, 4, 6), despite the fact that surgery continues to play an important role in the management of pancreatic necrosis, especially in case of endotherapy failure (2, 3).

The interdisciplinary approach, close cooperation of the endoscopist, surgeon, and interventional radiologist increase the chance of full recovery, considering a patient with walled-off pancreatic necrosis. On the other hand, the interdisciplinary approach results in the need for treatment in specialized centers, where cooperation of different specialists is possible.

REFERENCES