Pancreatology 14 (2014) 137–142

Contents lists available at ScienceDirect

Pancreatology

journal homepage: www.elsevier.com/locate/pan

Original article

Endoscopic drainage/debridement of walled-off pancreatic necrosis – Single center experience of 112 cases

M. Smoczyński [a,*], I. Marek [a], M. Dubowik [a], G. Rompa [a], J. Kobiela [c], M. Studniarek [b], J. Pieńkowska [b], K. Adrych [a]

[a] Department of Gastroenterology and Hepatology of Medical University of Gdańsk, Gdańsk, Poland
[b] Department of Radiology of Medical University of Gdańsk, Poland
[c] Department of General, Endocrine and Transplant Surgery of Medical University of Gdańsk, Poland

ARTICLE INFO

Article history:
Received 27 August 2013
Received in revised form
8 October 2013
Accepted 15 November 2013

Keywords:
Walled-off pancreatic necrosis
Acute pancreatitis
Endoscopic drainage/debridement

ABSTRACT

Background: Endoscopic drainage of the pancreatic pseudocysts has been accepted as a valid alternative to surgical and percutaneous drainage. Endoscopic treatment of the symptomatic walled-off necrosis was not, however, univocally accepted by all authors.
The aim: The aim of this study was to assessed the effectiveness and safety of the endoscopic drainage of walled-off necrosis.
Methods and material: Between 2001 and 2011 one hundred and twelve patients with symptomatic walled-off necrosis were treated in the Department of Gastroenterology and Hepatology of the Medical University of Gdansk, using endoscopic drainage. The drainage system was set up by introducing endoprostheses and drains through gastric and duodenal fistulas, transpapillary, and additionally – in cases when the necrosis was spreading outside of the lesser sac – percutaneously. The results and complications of the endoscopic treatment were assessed retrospectively.
Results: Initial success was achieved in 104/112 (92.9%) patients. Long term success was achieved in 94/112 (83.9%) patients in intention to treat analysis and 94/102 (90.4%) patients in per protocol analysis. Recurrence of pancreatic fluid collection was observed in 19/97(19.6%) patients. Procedure-related complications were observed in 29/112 patients (25.9%). Most of them were treated conservatively. Procedure-related mortality was 1.8%.
Conclusions: In a large group of selected patients with symptomatic walled-off necrosis, endoscopic drainage enables high success rate with acceptable complication rate and low procedure-related mortality.

1. Introduction

In the last decades, a significant increase in the understanding of the pathogenesis of local and systemic complications of pancreatic necrosis was observed. Results of treatment of severe acute pancreatitis have improved. Intervention can be delayed until the evolution of acute necrotic collections into walled-off necrosis (WON). During that time a varying extent of liquefaction of the necrosis takes place and, most importantly, demarcation of the necrosis from the live mesenchyme of the pancreas, thus producing WON [1,2]. This creates conditions for an intervention, with growing interest in new minimally invasive treatment methods. A common feature of all new minimally invasive treatment techniques is a direct limited access to the necrosis, which allows to remove the necrotic tissues thus facilitating the healing. Endoscopic methods are defined as the ones that involve the use of laparoscopes, nefroscopes or fiberoscopes in order to reach the necrosis transperitoneally, retroperitoneally, transmurally or transpapillarily [3–5]. Each of these methods offers a minimally invasive treatment to patients that are usually in serious condition – in many cases safer and more efficient than surgery [6].

The first description of successful endoscopic transmural drainage (performed through cystoduodeno- or cystogastrostomy) was published in 1996 by Baron et al. [7]. Since then peroral transmural endoscopic drainage have been evolving. In the first descriptions aggressive endoscopic lavage of WON was performed with the use of transmural fistulas (transgastric or transduodenal) 10–12 mm in diameter [7]. As experience grew, it appeared that it

* Corresponding author.
E-mail address: kgastro@gumed.edu.pl (M. Smoczyński).

1424-3903/$ – see front matter
http://dx.doi.org/10.1016/j.pan.2013.11.005

was safe to use fistulas 20 mm in diameter, allowing to introduce a gastroscope retroperitoneally into the necrotic area and perform a necrosectomy [8]. A comparative research assessing the effectiveness and safety of the endoscopic methods used is very difficult, mainly due to the characteristics of studied group of patients [9]. In this paper we present single center experience in the treatment of pancreatic necrosis with endoscopic transmural drainage.

2. Patients and methods

Between 2001 and 2011 in the Department of Gastroenterology and Hepatology of the Medical University of Gdańsk 112 patients with WON underwent endoscopic treatment. The etiology of acute pancreatitis was: alcoholic in 71 patients and non-alcoholic in 41 patients (37 – biliary, 3 - postoperative, 1- idiopathic). The qualification for therapy was based upon clinical symptoms and the contrast – enhanced computed tomography of the abdomen (CECT). Endoscopic ultrasound and magnetic resonance imaging were not available at the time in our center. Endoscopic procedures were performed with the use of Pentax ED 2485K and Pentax ED 3440T duodenoscopes. All the patients had the endoscopic access performed by one endoscopist. In 98 patients endoscopic pancreatography was achievable. In the remaining patients duodenum was inaccessible because of compression on GI tract. The main pancreatic duct leak was observed in 81 patients, then pancreatic sphincterotomy was performed with the use of Olympus FlowCut KD-301Q0725 sphinctrotome and a 5-10 Fr pancreatic endoprosthesis (Geenen or Zimmon Pancreatic Stent, Wilson-Cook Medical Inc.) was introduced into the main pancreatic duct. Fistula was performed on the top of the largest bulge into the gastric or duodenal wall. When the bulging was not visible the following guidelines were used: topographic data obtained from CECT, fluoroscopic image of the main pancreatic duct leak or the flow of contrast medium administered through percutaneous drain and opacification of the collection with contrast. The enterostomy was performed with a 7 Fr fistulotome (Huibregtse Triple Lumen Needle Knife HPC-3, Wilson-Cook) or a Giovannini cystotome (Cystotome CST-10, Wilson-Cook). The fluid sample was obtained from the collection to assess amylase activity and microbial culturing. The morphology of the aspirate – dark and visible necrotic debris was used as necrosis indicator. The stoma was widened with the use of "bougie" type catheters (Soehendra Biliary Dilation Catheters SBDC-8.5, SBDC-10, Wilson-Cook) alone in 60 patients and with high-pressure balloons of 8 or 20 mm in diameter (Boston Scientific) - in 33 patients (8 mm in 15 patients and 20 mm in 18 patients). Through the fistula drainage system was installed consisting of 10 Fr "double pigtail" endoprostheses (ZSO-10-5, Wilson Cook) and 7 Fr or 8.5 Fr nasocystic drains (Balton or Wilson-Cook). In the cases of clinical suspicion that the system did not drain the whole necrotic area, the positioning of the drain was altered, another fistula was made in a new location, or the drain was introduced transpapillarily through the main pancreatic duct leak. WON was irrigated with a volume of saline solution fitted to the size of the collection (60–200 ml). In the first 48 h of treatment irrigation was performed every 2 h, in the subsequent 48 h – every 4 h. All patients received antibiotics (ciprofloxacin or ceftriaxone with metronidazole) prior to the procedure. Routinely antibiotic therapy was continued for 2 weeks. In cases when clinical symptoms indicated an infection of the collection, antibiotics were prolonged or reintroduced on the basis of the microbial culture.

The resolution of WON was monitored every 7 days in majority of patients with the use of conventional ultrasonography (despite the presence of stents and some intestinal gas). CT was performed in doubtful cases or in order to confirm complete regression. Aggressive irrigation of WON was stopped when the initial success was obtained. Initial success was defined as a subsidence of clinical symptoms and resorption of the collection <3 cm in diameter. Long-term success was defined as no recurrence of clinical symptoms and collection size <3 cm in diameter.

The reappearance of a pancreatic fluid collection (PFC) >3 cm in diameter after complete desorption in the same or different location was defined as a recurrent collection.

3. Limitations of the study

Selected patient population, retrospective research conducted in a single center.

4. Statistical analysis

All the calculations were performed using Statistica software licensed for Medical University of Gdansk, Poland.

5. Results

Patients characteristics of the study population were summarized in Table 1. Eight patients did not complete the treatment. Two patients were operated on after a massive bleeding following the execution of the stoma opening (during the surgical procedure the WON was also drained). Another two patients underwent surgery due to stomach perforation. One patient with symptoms of sepsis was referred to surgical treatment. Another two patients required surgical treatment because of collection perforation, one of them died in the postoperative period because of acute coronary syndrome. One patient with a history of coronary disease and two cardiac infarctions died during aggressive drainage after a new myocardial infarction. Procedure-related mortality was 1.8% (Figs. 1 and 2).

In the case of remaining 104 patients aggressive drainage was continued for an average of 25 days (4–112 days). The average total number of procedures was 2.66 (1–6). Transmural (transgastric) access was achieved in 65 patients, transmural (transduodenal) access in 28 patients and transpapillary – in 30. Protocol of drainage was summarized in Fig. 3. Transpapillary drainage was sufficient in patients with 25–50% necrosis. Percutaneous drainage was additionally performed in 19 patients. The bulging in the stomach or duodenum prior the drainage was observed in 65 patients. The total length of hospital stay was on the average 29 days

Table 1
Patients' characteristics of the study population.

	All (n = 112)
Age, median, (range)	53.7 (28–86)
Sex, n male (%)	83 (74.1%)
Etiology, n, (%)	
Alcohol	71 (63.4%)
Non-alcohol	41 (36.6%)
WOPN size, median (range)	11.6 (4.5–26.7)
WOPN type, n	
Parenchymal necrosis alone	39
Peripancreatic necrosis alone	3
Combined type (pancreatic and peripancreatic necrosis)	70
Time from the acute bout (weeks) % of necrosis	16.3 (3–78)
25%–50%	37
50%–75%	43
>75%	32
Main indication for therapy	
Abdominal pain	109
Intestinal passage impairment	71
Jaundice	5
Body weight loss	77
Diabetes before/after treatment n	30/55