

PANCREATIC PSEUDOCYST – ACTUAL THERAPEUTIC OPTIONS –

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PANCREATIC PSEUDOCYST – ACTUAL THERAPEUTIC OPTIONS (Abstract):

BACKGROUND: Pancreatic pseudocyst (PP) is one of the most frequent complications of acute and chronic pancreatitis; patients with these disorders often benefit from interventional treatment, or minimally invasive surgery. Progress of new minimally invasive interventional techniques (endoscopic internal drainage, external drainage guided by ultrasound / CT / laparoscopic surgery) for the treatment of pancreatic pseudocyst formed the basis for the arguments of this article. **AIM:** The purpose of this article is to analyze and highlight the above views on a series of consecutive cases of pancreatic pseudocyst. **MATERIAL AND METHOD:** We studied 46 patients diagnosed with pancreatic pseudocyst in a period of 6 years, from 2006 to 2011. **RESULTS:** 26 patients (56.52%) were treated conservatively and followed periodically by imaging (ultrasound, CT); 20 patients (43.47%) required therapeutic attitude because of symptomatic PP or lack of tendency to resorption (increase in size at successive examinations). 2 patients (4.34%) were drained externally under ultrasound/CT guidance. 10 patients (21.7%) were submitted to endoscopic drainage as follows: 2 transpapillary drainage, 5 transgastric and 3 transduodenal drainage, respectively. Surgical interventions were performed in 8 patients (17.39%), 4 cysto-gastrostomy, 3 cysto-jejunostomy and 3 external drainages (2 patients with dual localization of PP). We noted a postoperative complication after cysto-jejunostomy: upper gastrointestinal bleeding at 6th postoperative day from splenic artery hemorrhage, inside the PP. It was diagnosed by angiography and re-operation was required for hemostasis. Data from the literature concerning the therapeutic protocol in pancreatic pseudocyst were reviewed. **CONCLUSION:** The PP management depends on PP site, size and “maturity” and is individualized for each case. Different treatment options are available: external drainage under CT / ultrasound guidance, endoscopic drainage, surgical procedures. To minimize the postoperative morbidity rate, surgical internal drainage is addressed to PP mature over 6 weeks from the last episode of acute pancreatitis.

KEY WORDS: PANCREATIC PSEUDOCYST; PANCREATITIS

SHORT TITLE: Pancreatic pseudocyst

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INTRODUCTION

Pancreatic pseudocyst (PP) is a fluid collection intra or peripancreatic without epithelial coating containing pancreatic juice rich in proteolytic enzymes without clinical signs of infection. It is bordered by the scleroinflammatory tissue from surrounding anatomical structures, the wall being formed

of a fibrous and granulation tissue derived from parietal and visceral peritoneum.

Pancreatic pseudocyst is one of the most frequent complications of acute and chronic pancreatitis, patients with these disorders often benefit from interventional treatment, or minimally invasive surgery. Diagnosis of pancreatic pseudocyst has

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become much easier thanks to advanced imaging techniques and due to improved prognosis of patients with acute pancreatitis by standardizing to some extent the treatment of this "abdominal drama".

Progress of new minimally invasive interventional techniques (endoscopic internal drainage, external drainage guided by ultrasound/ CT/laparoscopic surgery) for the treatment of pancreatic pseudocyst formed the basis for the arguments of this article.

The purpose of this article is to analyze and highlight the above views on a series of consecutive cases of pancreatic pseudocyst.

MATERIAL AND METHOD

We studied 46 patients diagnosed with pancreatic pseudocyst in a period of 6 years, from 2006 to 2011. These cases represent evolutive complications of 172 cases of acute pancreatitis, admitted, treated and long-term followed in this period in our clinic. We analyzed the types of procedures in function of imagistic data and the immediate postoperative outcome of each procedure. Necessary data were collected from the general clinical observation charts of patients.

RESULTS

Reporting the number of cases of PP to the number of cases of AP results in a proportion of 26.7% as risk for a PP. Median age at diagnosis was 41 years, with a range between 22 and 63 years. The man to women ratio was 2.

Etiology of acute pancreatitis in cases complicated by PP was:

- alcoholic: 19 patients (41.30%);
- biliary: 14 cases (30.43%);
- metabolic: 2 patients (4.34%);
- idiopathic: 11 cases (23.91%).

In about half of the patients (47.8%, $n=22$) asymptomatic pseudocysts were diagnosed on the occasion of periodic imaging checks after the episode of acute pancreatitis. The other patients (52.2%, $n=24$) experienced different symptoms; the

most frequent were: abdominal pain (41.30%, $n=19$), nausea and vomiting (34.78%, $n=16$), palpable mass in the upper abdomen (23.91%, $n=11$), jaundice (8.69%, $n=4$). It was also noted other less frequent symptoms: weight loss, flatulence, signs of upper digestive tract hemorrhage, anemia, fever and chills.

Blood amylase level was increased in only 4 patients.

Different imagery exams were performed to confirm the diagnosis: abdominal ultrasound (100%; $n=46$), CT (91.3%, $n=42$), endoscopic ultrasound exam (34.7%, $n=16$), endoscopic retrograde cholangiopancreatography (8.69%, $n=4$). Imaging work-up identified in 5 patients suggestive signs for chronic pancreatitis.

Morphologically, in 39 patients (84.78%) PP was unique and in 7 cases (15.21%) multiple. Dimensions of PP ranged from 1.5 to 22 cm, 26 of them with dimensions of 6 cm.

The PP site was:

- pancreatic head: 30.4% ($n=14$);
- pancreatic body: 34.7% ($n=16$);
- pancreatic tail: 19.5% ($n=9$).

Of the 46 patients diagnosed with PP, 26 patients (56.52%) were treated conservatively and followed-up periodically by imagery exams (ultrasound, CT).

From these, only 22 had a pseudocyst size less than 6 cm; the other 4 have had a PP larger than 6 cm, but were oligosymptomatic and diagnosed at 1 month after the onset of acute pancreatitis and spontaneous resorption was taken into account. Patients received symptomatic treatment and broad-spectrum antibiotics prophylaxis.

20 patients (43.47%) required therapeutic attitude because of symptomatic PP or lack of tendency of resorption (increase in size at successive examinations).

Two patients (4.34%) were externally drained under ultrasound/CT guidance. In one case there was a prolonged drainage followed by a pancreatic fistula. Drainage decreased progressively after 6 weeks after surgery, and subsequently closed.

Ten patients (21.7%) were submitted to endoscopic drainage as follows: 2 transpapillary drainage, 5 and 3 transduodenal and transgastric drainage, respectively. Endoscopic drainage was effective in decreasing the size of PP leaks through the stent placed inside the cyst. To the other 6 patients endoscopic approach was tempted but it failed for different reasons: technical, collateral circulation, inhomogeneous content, thick wall, significant bleeding at puncture site. One patient required emergency surgery due to hemorrhage.

Surgical procedures were performed in 8 patients (17.39%): 4 cysto-gastrostomy, 3 cysto-jejunostomy and 3 external drainages (2 patients with double localization of PP).

We have noted a complication after cysto-jejunostomy: upper gastrointestinal bleeding at 6th postoperative day because of an erosion of the splenic artery inside the PP. It was diagnosed by angiography and needed surgical re-intervention for hemostasis.

In other 2 patients who have undergone external drainage of PP (immature wall not adequate for anastomosis) a pancreatic fistula followed with prolonged external drainage (50 and 62 days respectively).

The postoperative course was uneventful for the other patients.

DISCUSSIONS

According to Atlanta classification [1], there are 4 distinct concepts that define pancreatic collections:

- acute fluid collections occurring early in evolution of PA, without well-defined wall;
- acute pancreatic pseudocyst, which is a well established wall of granulation tissue and fibrosis, which occurs in 4-6 weeks after the onset of PA;
- chronic pseudocyst occurring in the evolution of chronic pancreatitis;
- pancreatic abscess, infection occurring through one of the three collections.

Recently described, a new entity in the classification of pancreatic collections,

namely “walled-off pancreatic necrosis” [2] tends to replace the term pancreatic abscess or infected pancreatic collection, either focal pancreatic necrosis or pancreatic pseudocyst.

An acute pancreatic pseudocyst is defined as a fluid collection containing pancreatic juice, delimited by a fibrous wall of granulation tissue without epithelium consequence of acute pancreatitis or pancreatic trauma. Chronic pancreatic pseudocyst is a fluid collection of pancreatic juice enclosed by a wall and fibrous granulation tissue that occurs in the development of chronic pancreatitis in the absence of an episode of acute pancreatitis. In general, acute and chronic pseudocysts have a different natural history, although many studies do not distinguish acute from chronic pseudocyst.

Acute pseudocysts following an episode of acute pancreatitis are called postinflammatory/postnecrotic pseudocysts as it further develops pancreatic necrosis and extravasations of pancreatic juice. They contain pancreatic enzymes and develop at more than 4 weeks from the episode of severe acute pancreatitis, a necessary time for maturation of the pseudocyst wall and appearance of granulation tissue. This acute pancreatic pseudocyst and pancreatic necrosis are differentiated pancreatic fluid collections occurring early in the evolution of acute pancreatitis. All patients with the acute pancreatic pseudocyst and pancreatic necrosis areas [3], but not all patients with pancreatic or peripancreatic necrosis will subsequently develop pancreatic pseudocyst [4].

Pancreatic pseudocysts that this evolution in size over 6 cm, persists more than 4 weeks are symptomatic, have a high risk of complications: infection, compression, rupture into the peritoneum or hollow organs, bleeding. In the literature indicated that spontaneous resolution of pseudocyst varies between 8 and 70% of patients [5-11].

The pancreatic pseudocyst persists for more than 6 weeks episode of PA with the spontaneous resolution rate decreases [12].

Also, the authors suggest that the rate of spontaneous resolution does not depend strictly on the size of PP.

The rate of spontaneous resolution of pancreatic pseudocysts depends on several factors:

- multiple pseudocysts [13];
- caudal location [14];
- wall thickness [15];
- communication with the pancreatic duct, associated proximal stricture;
- enlargement at successive examinations;
- biliary etiology of AP [16].
- chronic pancreatic pseudocyst.

The severity of acute pancreatitis and extent of pancreatic necrosis seem to influence the rate of spontaneous resolution of PP.

Chronic pseudocysts occurring during the evolution of chronic pancreatitis are called retention pseudocysts due to obstructions in the pancreatic ductal system. Morphological lesions of chronic pancreatitis (calcification) and structural changes of pancreatic duct (strictures, ductal anomalies) are criteria that suggest a lack of spontaneous resolution of these pseudocysts.

PP classification based on etiology and pancreatic duct anatomy is proposed by Nealon and Walser [17]:

- Type I: normal ductal anatomy without communication with the cyst;
- Type II: normal duct, with cyst communicating;
- Type III: pancreatic duct strictures without cystic communication;
- Type IV: strictures in the pancreatic duct and communication with the cyst;
- Type V: completely obstructed duct;
- Type VI: ductal lesions of chronic pancreatitis without communication with PP;
- Type VII: ductal lesions of chronic pancreatitis, and PP communication.

THERAPEUTIC MODALITIES

Experience gained over the years in treating these asymptomatic pseudocysts suggest that PP, which do not grow or

decrease in size, can be treated conservatively, with symptomatic medical therapy. Systematic periodic follow-up (ultrasound, CT) is mandatory for complications or adverse outcome. In these cases, appropriate treatment is necessary.

In the present, at least three therapeutic options are available for interventional treatment of these pseudocysts: guided percutaneous external drainage eco/CT, endoscopic transgastric and transpapillary internal drainage and open surgical internal drainage or laparoscopic.

These therapeutic modalities are addressed to symptomatic pseudocysts, usually those over 6 cm, manifested by pain, nausea, vomiting, jaundice, weight loss due to compression of the neighboring organs (stomach, duodenum, bile duct, colon), and some of them will evolve and the complications (bleeding, infection, fistulization). [4]

Each patient requires an individual assessment of the characteristics of PP and has chosen the best method of treatment of PP for long-term favorable results.

In recent years, conventional surgery is outclassed by the new minimally invasive interventional techniques represented by guided endoscopic drainage, percutaneous drainage or even laparoscopic approach. These interventions are characterized by a low rate of complications and mortality, and a higher rate of success.

CT/ultrasound guided percutaneous drainage

The drainage is achieved by introducing a catheter under ultrasound guidance or tomography within PP content and removal of it. It is recommended for patients with symptomatic PP but high risk for other interventions, PP with immature walls or infected. [18-22]

This treatment method is to be avoided in case of PP communicating with pancreatic ductal system (shown by ultrasound, CT, ERCP) as the drainage becomes a pancreatic fistula with risk of infection through the drainage tube.

Short-term results of external drainage are good, with improvement of symptoms. Persistent drainage for a long time, over four weeks may require further interventional method for solving PP (fistula-digestive anastomosis, endoscopic internal drainage or surgical resection of pseudocyst).

Endoscopic drainage

Endoscopic drainage is recommended to the patients with PP closely adjacent to a digestive lumen, as an alternative to conventional or laparoscopic surgery. The approach can be achieved through the digestive wall (trans-gastric or trans-duodenal) or trans-papillary for PP communicating with the pancreatic duct, but showing strictures or stenosis as in chronic pancreatitis [23,24].

Endoscopic ultrasound appreciate pseudocyst wall thickness ("wall maturity"), distance to the cavity of PP, gastric varices and collateral circulation that prevents puncture marked by increased risk of bleeding, PP content more or less fluid that may require insertion of multiple catheters or even external naso-cystic drainage [22]. Success rate is over 90% in selected cases, with favorable effects on symptoms and minimal immediate complications: bleeding (may require emergency surgery if not resolved endoscopically), perforation with peritonitis [4]. Late complications are stent obstruction, its migration, infection of pancreatic pseudocyst [21]. These complications may require repeated drainage procedures by endoscopic or surgical approach [23].

Surgical treatment

It was for a long time the standard treatment of pancreatic pseudocyst, but its importance decreased with improving techniques of guided external or endoscopic drainage, which have a lower mortality and morbidity.

Different surgical treatment techniques were described: external drainage, internal drainage (cysto-gastrostomy, cysto-duodenostomy, cysto-jejunostomy), PP

resection (especially for the caudal PP). Some of these interventions can be performed laparoscopic, with better results and faster postoperative recovery.

External drainage is indicated when PP is infected or it is insufficiently mature wall and fit for digestive anastomosis [21]. The risk of pancreatic fistula with prolonged drainage may lead to the need for further surgery to deal with it (fistula-jejunostomy or pancreatic resection) [17].

Transgastric cysto-gastrostomy or cysto-jejunostomy using a Roux "Y" loop is the classical surgical treatment of PP. For best results it is essential that the wall of PP is suitable for an anastomosis and this is sufficiently large (at least 3cm) to prevent stenosis [25].

Pancreatic resection is possible when PP is located on the tail of the pancreas and/or it isn't possible to exclude a pancreatic cystadenocarcinoma. However intervention is difficult because inflammatory changes after acute pancreatitis [26].

Laparoscopic approach may be carried out with a cysto-jejunostomy or cysto-gastrostomy. Experience is still quite limited, with long lasting interventions, but with apparently rapid postoperative recovery [27. Teixeira J, Gibbs KE, Vaimakis S, Rezayat C, Laparoscopic Roux-en-Y pancreatic cyst-jejunostomy, Surg Endosc 2003 17:1910-1913].

CONCLUSIONS

In patients not fit for surgery or with severe comorbidities, percutaneous or endoscopic drainage can be done to improve patient status. The risk is represented by the formation of an external pancreatic fistula which may require further interventions.

There are no randomized studies to develop a therapeutic protocol for pancreatic pseudocyst; the PP management is individualized for each case depending on the morphological PP characteristics, procedures availability and team experience.

Endoscopic internal drainage is an effective therapeutic approach for selected cases with minimal complications.

Surgical internal drainage is addressed to PP mature over 6 weeks from the episode of acute pancreatitis.

CONFLICT OF INTERESTS

None to declare.

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