DRAINAGE OF Pancreatic Abscesses AND Cysts UNDER Ultrasound CONTROL

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The aim of the study was to determine the effectiveness and efficiency of drainage of pancreatic pseudocysts and cysts under ultrasound control during acute pancreatitis.

Material and methods. During the period between 1985 and 2004, 103 patients were hospitalized at The Department of General and Vascular Surgery, Regional Specialistic Hospital in Tychy, due to pancreatic pseudocysts or abscesses. Pancreatic abscesses were observed in 36 patients, while the remaining 67 patients were diagnosed with pseudocysts. Percutaneous drainage was indicated to treat pancreatic liquid cisterns when the cistern exceeded 4-6 cm in diameter, and had no tendency towards idiopathic absorption. Drainage procedures were performed in the operating room with the use of a 3,5MHz linear probe and “Cavafix” CH 18, “Nephrofix” 10-15 or “Cystofix” 10-15 kits.

Results. Recovery following percutaneous drainage was obtained in 33 of 36 (91,7%) patients with pancreatic pseudocysts, and in 60 of 67 (89,5%) patients with pancreatic abscesses. The average duration of the drainage amounted to 19.25 days in case of pseudocysts and 30.2 days in case of abscesses. Six patients with pseudocysts and three with abscesses required surgical intervention due to inefficient inefficiency drainage. Pseudocyst infections were the most common complications observed following drainage and were seen in 12 (17.9%) patients.

Conclusions. In selected cases, drainage of pancreatic pseudocysts and cysts under ultrasound control may be an alternative to surgery. This method is highly recommended as it is less invasive, improves the patient’s life comfort and reduces treatment costs.

Key words: pancreatic pseudocyst, pancreatic cyst, drainage under ultrasound control

Liquid cisterns of the acute phase occur in approximately 40% of patients with acute pancreatitis. Nearly 50% of cisterns undergo idiopathic absorption during the initial four weeks of the disease. Unabsorbed cisterns can transform into simple or multiventricular aseptic pseudocysts. Pseudocysts can manifest symptoms of local pressure or, if infected, become pancreatic abscesses (1).

Due to the development of ultrasound and computer tomography diagnostics, management of pancreatic cysts and abscesses has changed during the past 20 years (2).

Surgical intervention is being replaced by percutaneous drainage of cysts and abscesses under USG or CT control, and internal drainage (through the stomach or transpapillar approach) with the use of laparoscopy or endoscopy. Good effectiveness, excellent tolerance of the procedure and the small number of complications are stressed when considering results obtained by treatment with the method (3).

The aim of this study was to assess the effectiveness of percutaneous drainage of pancreatic liquid cisterns.

MATERIAL AND METHODS

Between 1985 and 2004, 103 patients diagnosed with pancreatic liquid cisterns by me-
ans of ultrasound or computer tomography examinations were treated at the Department of General and Vascular Surgery, Regional Specialistic Hospital in Tychy. The study group comprised 39 women and 63 men, aged between 21 and 84 years (average age – 53 years).

On the basis of imaging and microbiological and cytological examinations of the liquid cisterns’ content, pancreatic abscesses were noted in 36 patients, while the remaining 67 patients were diagnosed with pseudocysts. In 100 patients the pancreatic liquid cisterns were associated with acute pancreatitis, and in 3 with trauma. Percutaneous drainage was indicated for pancreatic liquid cistern treatment when the cistern exceeded 4-6 cm in diameter and had no trend towards idiopathic absorption, or when the general condition of the patient deteriorated with the development of high fever, which was evidence of the cistern’s infection. In case of such patients, apart from routine examinations (biochemical, enzymes and coagulation), ultrasonography, contrast examination of the upper part of the digestive tract, and in most cases, computer tomography, were performed.

During preparation, the patients’ digestive tracts were emptied. During the operation, gastric tubes were introduced and were maintained for 3-5 days in case of transition of the drainage through the stomach (three patients).

Drainage procedures were performed in the operating room under aseptic conditions. The area of the puncture was anesthetized with a 1% Lidocaine solution. After incision of the skin, a catheter was introduced into the lumen of the cistern (using a 3.5 MHz linear probe). The “Cavafix” CH 18 kit was used initially, followed by “Nephrofix” 10-15 and “Cystofix” 10-15, manufactured by Braun Company. The bend ending in the shape of a pig’s tail, enabling stabilization of the catheter in the lumen of the cistern, and two cutaneous sutures secured it from falling out. In most cases the transition tract was outside the digestive system. The collected liquid was subjected to enzymatic, cytological and bacteriological examinations.

Patients were under complete ultrasound control. When the liquid stopped flowing from the catheter, and ultrasonography revealed no cistern presence, the catheter was clipped for several days. If during that time, accretion of liquid in the cistern was not observed, the catheter was removed. However, when the cistern reappeared, the clip was released and cytography was performed.

In case of dense pseudocyst content, we rinsed drainage with antibiotics and Fibrolan.

RESULTS

Liquid cisterns were localized within the pancreatic head (46, 44.6% patients), pancreatic body 43 (41.7%), and pancreatic tail (14, 13.7%).

The volume of the released liquid ranged between 300 and 6000 ml, with an average amount of 800 ml.

In the patients with pancreatic pseudocysts, drainage generally proceeded efficiently. Four patients required repeated drainage due to catheter dislocation. In three recurring cysts, drainage was repeated 2-3 times. In 3 cases of prolonged leakage of pancreatic juice, a connection between the cystic lumen and the pancreatic duct was observed during radiological examinations and these patients were treated with endoscopic sphincterotomy.

The duration of pseudocyst drainage ranged between 11 and 87 days (average 19.25 days of hospitalization), and that of abscesses between 20 and 72 days (average 30.2 days of hospitalization).

Recovery after percutaneous drainage was obtained in 33 patients with pancreatic cysts (91.7%) and in 60 patients with pancreatic pseudocysts (89.5%).

Eight patients who underwent drainage required replacement of the catheter with a larger diameter (2-4 times-CH 28) under ultrasonographic control, which also enabled the removal of necrotic tissue from the cystic cavity.

Three patients with pancreatic cystic drainage required surgical treatment. One of these patients, who had multiventricular pancreatic cysts, underwent an operation 18 days after drain placement because of deteriorating general condition. Pancreatic necrosis and numerous septa of different size in the cyst’s ventricle were observed. The sequestra were removed, drainage of the cyst and peritoneal cavity was initiated, and the patient was treated by means of the “open abdomen” method. The remaining two patients were operated on the 9th and 15th days, respectively, after drainage placement. They died of septicemia.
In cases of 6 patients with ineffective drainage of the pseudocyst, internal drainage was initiated.

The most frequent complication, infection of the previously aseptic cyst, occurred in 12 (17.9%) patients. Two patients were diagnosed with slight bleeding through the catheter, which receded idiopathically. One patient developed massive bleeding that had to be controlled with conservative therapy. During computer tomography an aneurysm of the splenic artery was observed, so the patient underwent surgical intervention.

The bacteriological examination of the obtained content of the abscess' cavity revealed strains of *Staphylococcus saprophyticus*, *Escherichia coli*, *Citrobacter species*, *Streptococcus foecalis*, *Staphylococcus aureus*, and *Klebsiella species*.

**DISCUSSION**

Post-inflammatory abscesses and cysts are a frequent complication of acute and chronic pancreatitis. There are numerous classification schemes for choosing the appropriate time and method of treatment. According to the Atlanta classification, an acute pancreatic pseudocyst is a cistern of pancreatic juice surrounded by a wall of fibrin and granulocyte infiltration. Acute pseudocysts result from acute pancreatitis or trauma (1, 2, 3). Chronic pancreatic pseudocysts arise as a result of chronic inflammation and do not have any connection with acute pancreatitis.

According to the classification proposed by D'Egidio and co-workers, pancreatic pseudocysts can be divided as follows:

- **type I**: acute post-inflammatory pseudocyst. Its occurrence is connected with acute pancreatitis; it is accompanied by normal pancreatic duct anatomy and only rarely occurs as a connection between the lumen of the cyst and pancreatic duct,

- **type II**: etiologically not different from type I. However, pathological changes in the pancreatic duct occurrr (without its essential narrowing) and there is commonly a connection between the pancreatic duct and pseudocyst,

- **type III**: defined as a “retentive” pancreatic pseudocyst. Occurs most often as a result of chronic pancreatitis; the pancreatic duct assumes the shape of the so-called "chain of lakes" (numerous narrowings and widenings along its course) and there is a connection between the pancreatic duct and pseudocyst of the pancreas (4).

Current routine examinations indicate drainage of the pancreatic pseudocyst if its diameter exceeds 4-6 cm and the observation period exceeds 6 weeks. Furthermore, an additional indication for drainage is enlargement of the pseudocyst or development of complications (infection, bleeding, rupture) (5-7).

During the selection of the method of treatment, Endoscopic Retrograde Cholangiopancreatography (ERCP) is of great significance and enables the identification of patients with post-inflammatory abscesses that contact the pancreatic duct. In our experience we have observed that pancreatic pseudocysts (type I) have a greater chance of spontaneous idiopathic recovery because of the lack of anatomical pancreatic duct changes (4, 8).

Currently, there are 3 treatment methods for pancreatic cysts and post-inflammatory abscesses: percutaneous drainage, surgery and endoscopic drainage (1-4).

The selection of the treatment method depends on the following factors: size, number, localization and presence or absence of communication with the pancreatic duct. The percutaneous drainage techniques for pancreatic cysts and abscesses are identical. Thus, despite the tremendous differences in the clinical courses of these two conditions, treatment by means of percutaneous drainage is considered together for these two complications. Since endoscopic ultrasound (EUS) permits imaging local anatomical relations, it introduced new possibilities for performing endoscopic drainage of post-inflammatory pancreatic liquid cisterns (5, 9).

Percutaneous drainage in the case of pancreatic cysts is in 67-90% of cases the final method of treatment, which was confirmed in our study (89.5%) (1, 5, 6, 7,10-14). It should be noted that the basis for drainage removal (when the release is below 10ml/day) is the completion of fistulography via the drain. It may be suggested that percutaneous drainage is only appropriate in case of type I cysts. Octreotide therapy may be considered in case of the high release of fluid (above 1000 ml/day). Type II pseudocysts often develop as a result of the transition of acute inflammation into chronic pancreatitis.
Communication between the pancreatic duct and the lumen of the pseudocyst is found in approximately 40% of patients with type II pseudocysts. Percutaneous drainage of type II cysts is efficient only in case of simultaneous endoscopic drainage of the pancreatic duct. Used as an isolated method, percutaneous drainage might lead to the development of a highly secreting pancreatic fistula (4, 10).

The effectiveness of percutaneous drainage of the pancreatic cyst is estimated at 32 to 96%, with mortality of 15%. It is worth stressing that in selected patients, percutaneous drainage is only one of the stages of treatment (2, 16-21). During the past years constant progress in the diagnostic and procedural techniques has been observed. In addition to ultrasound and radiological examinations, magnetic resonance is gaining significance because of the possibility of better precision in defining the characteristics of the liquid space content, presence and type of tissue parts, thickness of the abscess’ walls, fistulas and additional liquid spaces. This information is very useful when assessing indications and selecting procedural techniques. Percutaneous drainage can be repeated frequently and in case of laparoscopy failure, traditional surgery may be performed.

CONCLUSIONS

1. Percutaneous drainage is a relatively simple procedure with minimal patient burden.
2. Drainage of pancreatic pseudocysts and cysts under ultrasound control is an alternative to surgical treatment.
3. Decreased invasiveness, improved patient quality of life, and reduced treatment costs combine beneficially to support the use of percutaneous drainage of pancreatic pseudocysts and cysts.

REFERENCES

Pathological fluid collections, cysts, hematomas, and abdominal cavity abscesses have routinely been drained under ultrasonographic monitoring for the past 20 years. During that period the method of drainage, including the techniques and instruments used, has been modified many times, in particular as concerns drainage of pancreatic abscesses and pseudocysts.

During the past ten years, many publications have undeniably demonstrated widespread use of ultrasonography for monitoring pancreatic abscess or pseudocyst drainage.

Its advantages include the following: simplicity, low invasiveness, repeatability, low complication rate and relatively low costs.

The present study confirmed these observations. The authors obtained high therapeutic efficacy, which is associated with both proper patient diagnosis and accurately performed procedures, for the drainages they performed.

The study confirmed the well-known fact that in all cases in which the clinical, anatomical and procedural indications necessitate drainage, such treatment of pseudocysts or pancreatic abscesses should be monitored by ultrasonography.

The study is a reliable, well-documentedsecutive publication, which discusses the usefulness and value of this therapeutic method.

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