

Pancreatic Pseudocyst, Surgical Procedures Outcomes: Overview

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Abstract: A search was conducted through following databases, PubMed/MedLine, and Embase for relevant articles published in English language and involving only human subjects, up to December 2016. Searching through evidence was performed using MeSH terms as following: “pancreatic pseudocyst, pseudocyst drainage, cystogastrostomy, cystojejunostomy, transmural pseudocyst drainage, transpapillary pseudocyst drainage and percutaneous pseudocyst drainage”. Reference lists from eligible trials were searched for more evidence to be included and useful in our review. The aim of the current review paper was to evaluate the outcomes different surgical procedures for managing Pancreatic pseudocyst, however comparative studies on different techniques were involved in this article. Pancreatic pseudocysts are a common issue of chronic and acute pancreatitis. They are diagnosed with imaging studies. Pancreatic pseudocysts are generally handled by open surgical internal drainage. With continued improvements in medical technology, making uses of percutaneous, laparoscopic and endoscopic drain were significantly reported. Endoscopic pseudocyst drain has a high success rate and a low complication rate. Percutaneous drainage is primarily utilized for the first aid of contaminated pancreatic pseudocysts. Open internal drainage and pseudocyst resection are surgical methods with high success rates.

Keywords: Pancreatic Pseudocyst, Surgical Procedures.

1. INTRODUCTION

Pancreatic pseudocysts are amylase rich fluid collections in the peri-pancreatic tissues surrounded by a well-defined wall⁽¹⁾. There ought to be lack of necrosis or solid element in the collections. The relative proportion of chronic and acute pseudocyst varies between reports and depends on how the pseudocysts are being specified⁽²⁾. The incidence is higher in patients struggling with chronic pancreatitis. Pancreatic pseudocysts are traditionally handled by open surgical internal drainage. With continued enhancements in medical technology, less invasive options including percutaneous, laparoscopic and endoscopic drain were significantly reported. Nevertheless, trials comparing these various approaches are lacking and there is a lack in consensus on the very best technique for management of this condition⁽³⁾. The occurrence of pancreatic pseudocysts in acute pancreatitis has been reported to vary from 6% to 18.5%^(4,5). The frequency of pancreatic pseudocysts in chronic pancreatitis is 20% to 40%⁽⁶⁾. Pancreatic pseudocysts most typically occur in patients with alcoholic chronic pancreatitis (70% to 78%)⁽⁷⁾. The second most common cause is idiopathic chronic pancreatitis (6% to 16%), followed by biliary pancreatitis (6% to 8%). The medical diagnosis of a pancreatic pseudocyst is normally developed by imaging studies, among which transabdominal ultrasonography is very important as a preliminary investigation⁽⁸⁾. Computerized tomography (CT) is frequently the imaging method of option, with 82% to 100% sensitivity and 98% specificity⁽⁹⁾. For the distinction of acute fluid collections from pancreatic abscesses and acute pancreatic pseudocysts, endosonography (EUS) has the greatest sensitivity (93% to 100%) and specificity (92% to 98%)⁽⁹⁾. The diagnostic leak of a pseudocyst under EUS assistance assists differentiate cystic malignancies from pseudocysts.

A deadly lesion is more likely when the carcinoembryonic antigen (CEA) worth goes beyond 192 ng/mL when the cyst contents are highly viscous ⁽¹⁰⁾.

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2. METHODOLOGY

A search was conducted through following databases, PubMed/MedLine, and Embase for relevant articles published in English language and involving only human subjects, up to December 2016. Searching through evidence was performed using MeSH terms as following: “pancreatic pseudocyst, pseudocyst drainage, cystogastrostomy, cystojejunostomy, transmural pseudocyst drainage, transpapillary pseudocyst drainage and percutaneous pseudocyst drainage”. Reference lists from eligible trials were searched for more evidence to be included and useful in our review.

3. RESULTS

Always before surgery an accurate diagnosis of disease is very important for proper surgical treatment and beneficial outcomes, therefore before discussing the surgical treatment techniques, we should overview the diagnostic approaches for pancreatic pseudocysts.

➤ Diagnostic techniques for pancreatic pseudocysts:

A range of diagnostic tools consisting of CT scanning, endoscopic and transcutaneous ultrasound, cyst and ercp aspiration, chemistry and cytology are used for the diagnostics of pancreatic pseudocysts. According to the Atlanta category a pseudocyst is characterized by existence of a specified wall of granulomatous or fibrous tissue whereas the acute fluid collection does not have that boundary. A late pancreatic necrosis may likewise have actually a partly organized encapsulated morphology and differentiation ends up being more difficult ⁽¹¹⁾. On CT imaging the capsule or wall of a pseudocyst reveals evidence of contrast improvement. A necrosis, particularly a contaminated one, can be presumed by non-enhancing zones or a heterogeneous pancreas seen on CT. Nevertheless, the last diagnosis should correlate with the clinical condition of the patient ⁽¹²⁾. However, employing imaging techniques, pseudocyst attributes like size, location, wall thickness and septa can be identified. Nevertheless, around 10% of pancreatic pseudocysts can have ill-defined functions that overlap with the characteristics of cystic tumours ^(13,14).

As transabdominal ultrasonography is a non-invasive and really inexpensive technique it must be performed as an initial step in the diagnosis of pancreatic pseudocysts. Considering that the gland can just be imagined in 80% of patients and that the technique is extremely based on the experience of the examiner, the diagnostic sensitivity of 88- 100% and the specificity of 92-- 98% are still high. The negative predictive worth (NPV) has actually been computed with only 9%, which makes transabdominal ultrasound a bad tool to exclude little pancreatic pseudocysts. If interventional treatment is to be tried, making use of a colour Doppler ultrasound, imagining blood vessels, greatly increases the security of the treatment ⁽¹⁵⁾.

Endoscopic ultrasound (EUS): Since pancreatic cystic sores are pathologically a heterogeneous group, high-resolution EUS imaging assists to identify most of cystic lesions and, for small lesions <2 cm in size, EUS seems of specific high diagnostic level of sensitivity ^(16,17). Endoscopic ultrasound was reported to be superior to CT concerning little sores (<2 cm in diameter) because of better spatial resolution ⁽¹⁵⁾. There has been some discussion about higher sensitivity of EUS in identification of debris within a pseudocyst ⁽¹⁸⁾ but literature regarding solid material within a cyst is not sufficient to give a final answer on that issue yet. Whether EUS-guided fine-needle aspiration (FNA) is clearly helpful for distinguishing between benign or malignant cystic lesion is not clear yet, as the success rate and sensitivity of this technique vary greatly in different studies. Data from 123 patients with pancreatic cystic lesions of unknown origin indicated that the combination of EUS with FNA allowed for the correct diagnosis in 97%, whereas EUS alone yielded only 73% correct diagnoses ⁽¹⁹⁾. A second study on 96 patients compared data from EUS-FNA with the results based on surgery and histology. The sensitivity of FNA was calculated with only 50% in patients with a cystic pancreatic lesion ⁽²⁰⁾. The Cooperative Pancreatic Cyst Study in 2004 reported 341 patients with cystic lesions <2 cm in diameter) because of better spatial resolution ⁽¹⁵⁾. There has actually been some discussion about higher level of sensitivity of EUS in recognition of debris within a pseudocyst ⁽¹⁸⁾ but literature relating to strong material within a cyst is not sufficient to give a final response on that concern yet. Whether EUS-guided fine-needle goal (FNA) is plainly valuable for distinguishing

between deadly or benign cystic sore is unclear yet, as the success rate and sensitivity of this strategy differ significantly in various research studies. Information from 123 patients with pancreatic cystic lesions of unidentified origin showed that the combination of EUS with FNA permitted the appropriate medical diagnosis in 97%, whereas EUS alone yielded only 73 %right diagnoses⁽¹⁹⁾. A 2nd research study on 96 patients compared data from EUS-FNA with the results based on surgical treatment and histology. The sensitivity of FNA was determined with only 50% in patients with a cystic pancreatic lesion⁽²⁰⁾. The Cooperative Pancreatic Cyst Study in 2004 reported 341 patients with cystic lesions > 1 cm on EUS. They performed EUS + FNA with CEA, CA 72-4, CA 125, CA 19-9, CA 15-3, along with cytology. The significant finding of this large multicentre research study in favour of FNA is that when CEA is discovered to be > 192 ng/ml in the cystic fluid, a deadly pancreatic sore can be presumed with a level of sensitivity of 73% and a specificity of 84 % (p<0.001)⁽¹⁴⁾.

➤ Surgical treatment procedures:

Drainage techniques;

Surgical drain of pseudocysts is traditionally carried out by the open method^(22,23). In recent years, laparoscopic pseudocyst drain is increasingly reported^(24,25). For the open approach, midline or bilateral subcostal incisions were utilized. The type of surgical drainage depended on the location of the cysts and whether it was adherent to the stomach or duodenum. When stuck to the posterior wall of the stomach, a cystogastrostomy were carried out. A Roux-en Y cystojejunostomy would be fashioned if the cyst were not adhered to the stomach or duodenum. It is acknowledged that resectional procedures are sometimes required for patients with concomitant pancreatic ductal pathologies or made complex pseudocyst⁽²⁵⁾. In laparoscopic drain treatments, different strategies have actually been described to reproduce their open equivalents^(24,25). These consist of intragastric, exogastric or transgastric techniques and they vary in the method of accessing the posterior wall of the stomach to create a cystogastrostomy. The anastomosis is usually created with a laparoscopic stapler and the enterostomy closed by laparoscopic suturing. Laparoscopic cystojejunostomy is likewise possible for pseudocysts that extend into the infracolic compartment and this is typically drained pipes by a Roux-en Y jejunal loop.

Percutaneous drain can be carried out by ultrasound or computed tomography (CT) assistance and this can be accomplished by the retroperitoneal path or transperitoneally^(26,27,28). The appropriate drainage site is first determined, followed by progressive track dilation and insertion of a (7 to 12 Fr) drainage catheter into the pseudocyst. In patients that received transperitoneal drain, a transgastric needle leak can be performed and the passage through the stomach could enable subsequent exchange of a double pigtail stent and internalization into the stomach. In patients with retroperitoneal drainage, the pigtail stents would be connected to an external bag free of charge drain^(26,27,28).

Endoscopic drain can be performed transpapillary or transmurally⁽²⁹⁾. Transpapillary drainage can be carried out if the pseudocyst communicates with the pancreatic duct on endoscopic retrograde cholangiopancreatography (ERCP) and a transpapillary stent is gone through the pancreatic duct into the pseudocyst. In patients with pancreatic ductal leak or ductal stricture, the stent might also serve to bridge the leakage or stricture site (30). Endoscopic transmural drain can be performed with or without endoscopic ultrasound (EUS) guidance^(31,32). A requirement is that the pseudocyst remains in direct consistency with the gastric or duodenal wall. When carried out under esophagogastroduodenoscopy (EGD) assistance, the area of the pseudocyst is typically determined by the presence of bulging on the stomach wall. This is then confirmed by needle leak, aspiration of the fluid and injection of contrast. A catheter and guide-wire is then entered the pseudocyst. The fistula track is dilated with a balloon catheter and 1 or 2 plastic stents would be placed. When carried out under EUS guidance, the leak site of the pseudocyst is selected far from stepping in vessels or structures. The pseudocyst is then punctured with a 19-gauge needle and a guide-wire passed to form 2 or more loops. The needle tract is dilated and plastic stents would be inserted. Just recently, the use of metal stents for draining pipes pseudocyst has also been described but results from relative studies are doing not have^(33,34).

➤ Outcomes Assessment of different pseudocyst drainage techniques:

A more development of the traditional surgical treatment of pancreatic pseudocysts uses a laparoscopic technique. 253 cases of laparoscopic pseudocyst drainage have been reported to date around the world up to 2016. The reported rate of technical success is 92%, with 0% death, a 9% problem rate, and a 3% recurrence rate. In 6.7% of cases, the procedure had to be converted to an open laparotomy⁽³⁵⁾ (**Table 1**). A direct contrast of surgical and interventional methods has up until now been carried out only for transcutaneous drainage, however not for endoscopic drainage⁽³⁶⁾. In general, surgical (consisting of minimally intrusive) techniques are difficult to compare with transcutaneous interventional methods,

because of an apparent choice predisposition. Because of multimorbidity are frequently dealt with interventionally, patients that have been rejected as surgical prospects.

Table 1: The laparoscopic treatment Outcomes of pancreatic pseudocysts

Reference	Number of patients	Success rate	Complete cyst drainage	Recurrence rate	Complications
Cuschieri et al. 1998 ⁽³⁷⁾	8	8 (100%)	8 (100%)	0	1 (13%)
Chowbey et al. 2001 ⁽³⁸⁾	5	5 (100%)	5 (100%)	0	0
Ramachandran et al. 2002 ⁽³⁹⁾	5	5 (100%)	5 (100%)	0	0
Park & Heniford et al. 2002 ⁽⁴⁰⁾	28	27 (96%)	28 (100%)	0	2 (7%)
Mori et al. 2002 ⁽⁴¹⁾	17	14 (82%)	17 (100%)	1 (6%)	3 (18%)
Fernandez-Cruz et al. 2002 ⁽⁴²⁾	6	6 (100%)	6 (100%)	0	0
Zhou et al. 2003 ⁽⁴³⁾	13	12 (92%)	13 (100%)	1 (8%)	0
Teixeira et al. 2003 ⁽⁴⁴⁾	8	8 (100%)	8 (100%)	0	0
Obermeyer et al. 2003 ⁽⁴⁵⁾	6	4 (67%)	6 (100%)	0	1 (17%)
Palanivelu et al. 2007 ⁽⁴⁶⁾	108	98 (91%)	107 (99%)	1 (1%)	9 (8%)

It has been consistently revealed, nevertheless, that the problem rate in the treatment of chronic pancreatic pseudocysts is lower than that of acute pancreatic pseudocysts, and that this holds true independently of the choice of restorative procedure. Currently, transcutaneous drain is indicated just as an emergency situation procedure for acute fluid retention or contaminated cysts, as the reoccurrence rate after this kind of treatment ranges as high as 70% and percutaneous fistulae are a typical complication (more than 20% of cases). The first alternative to surgery to be developed was percutaneous, endoscopically directed cyst drainage into the stomach⁽³⁸⁾. The endoscopic transpapillary approach to the pseudocyst is probably the least terrible procedure. Thus, when a pancreatic pseudocyst is found to have a connection to Wirsung's duct, the preferred treatment is often the transpapillary insertion of a stent for internal drain.

Heider et al⁽²⁶⁾ compared the outcomes of expectant treatment with percutaneous and open surgical drainage. No statistical analysis of the results was performed (no P-values given). The patients that were treated by percutaneous drainage had a re-intervention rate of 50%, adverse events rate of 67% and death rate of 9.1% and the results were even worse than surgical treatment. On the contrary, two smaller sized studies preferred the percutaneous approach. Adams noted greater risk of deaths, morbidities and re-interventions in patients that were treated with surgical drain⁽²⁷⁾. Whilst in another research study, similar dangers of mortalities and adverse events were observed in both groups however the patients that went through surgery required more subsequent re-interventions⁽²⁸⁾.

4. CONCLUSION

Pancreatic pseudocysts are a common issue of chronic and acute pancreatitis. They are diagnosed with imaging studies. Pancreatic pseudocysts are generally handled by open surgical internal drainage. With continued improvements in medical technology, making uses of percutaneous, laparoscopic and endoscopic drain were significantly reported. Endoscopic pseudocyst drain has a high success rate and a low complication rate. Percutaneous drainage is primarily utilized for the first aid of contaminated pancreatic pseudocysts. Open internal drainage and pseudocyst resection are surgical methods with high success rates.

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