

Drainage of pancreatic pseudocysts

The importance of cyst wall biopsy in the recent era

M. Ezzedien Rabie, FRCSI, FRCSEd, Ashraf H. Ghaleb, MD, Mosaed A. Al-Ghamdi, MBBS,
Mohammad S. Al-Qahtani, SCC (GS), Saeed Abu-Eshy, FRCS, FACS, Tarek S. Malatani, FRCS, FACS,
Mohammad Y. Al-Shehri, FRCS, FACS, Talal A. Al-Malki, FRCS, Mohammad H. Hosni, MD,

ABSTRACT

Objective: While open internal drainage has been the standard treatment for pancreatic pseudocysts, less invasive techniques which pay little attention to cyst wall biopsy, are becoming popular. The aim of this study is to report on our experience in draining pancreatic pseudocysts and probe the necessity or otherwise of obtaining a wall biopsy at drainage.

Methods: Operation theatre registry, operation log books and medical records at Aseer Central Hospital, Abha, Kingdom of Saudi Arabia, were reviewed to retrieve the clinical details of patients with pancreatic pseudocyst who required a drainage procedure in a 13 years period from August 1989 to November 2002.

Results: Sixteen patients were identified. Cyst wall biopsy was obtained in 10 cases, in 8 of them the diagnosis was confirmed, while a true cyst was found in the remaining 2 excluding them from further analysis. In

the remaining 14 cases (8 males, 6 females, mean age 38 years, range 4-60), pain was the main presenting feature. Open internal drainage was offered to 12 cases while one patient received external drainage under ultrasound guidance and the other received open external drainage. The type of operation was cystogastrostomy in 9 patients and cystojejunostomy in 3 patients. The recurrence rate after internal drainage was 16.7%, while after external drainage was 100%. There was no mortality in this series. A procedure-related complication occurred in 3 (21.4%) patients.

Conclusion: The mortality, morbidity and recurrence rates in this series are compared favorably with other reports. The final diagnosis of a presumed pancreatic pseudocyst should rest on the histopathologic examination of the cyst wall.

Saudi Med J 2005; Vol. 26 (2): 289-293

The 4 most common types of cystic lesions of the pancreas are pancreatic pseudocysts, serous cystadenomas, mucinous cystic neoplasms (adenomas and adenocarcinomas) and intraductal papillary mucinous tumors.¹ By far, pseudocysts are the most frequent.^{2,3} They are localized collections of pancreatic juice occurring as a result of pancreatic inflammation, trauma, or duct obstruction.⁴ At times, they are found with no

history of prior pancreatic disease.² Differentiation of various types of pancreatic cystic lesions represents a diagnostic and therapeutic challenge as the clinical presentation may be vague.⁵ It has been reported that one third of patients with neoplastic cysts were initially diagnosed and treated as pseudocysts. This is fostered by the tendency among physicians and surgeons to assume that a cyst discovered in the pancreas is pseudocyst and to

From the Department of Surgery (Rabie, Al-Ghamdi, Abu-Eshy, Al-Shehri, Al-Qahtani, Malatani, Al-Malki) College of Medicine, King Khalid University, Abha, Department of Surgery (Hosni) Aseer Central Hospital, Abha, Kingdom of Saudi Arabia, and the Department of Surgery (Ghaleb), College of Medicine, Cairo University, Egypt.

Received 24th May 2004. Accepted for publication in final form 16th October 2004.

Address correspondence and reprint request to: Dr. M Ezzedien Rabie, Department of Surgery, College of Medicine, King Khalid University, Abha, PO Box 641, Kingdom of Saudi Arabia. Tel. +966 (7) 2312662. Fax. +966 (7) 2247570. E-mail: ezzedien@hotmail.com

treat it accordingly.⁴ Histopathologically, pseudocysts are distinguished from other types of cysts by their lack of an epithelial lining.⁴ For draining a pseudocyst, 4 main treatment modalities are available. Open surgery, percutaneous drainage, laparoscopic surgery and endoscopic techniques have all been employed. A combination of techniques have also been reported.^{6,7} Currently, controversy exists as to which of these techniques should be offered to the patient as initial therapy.⁸ In our institution, open surgery has been the standard treatment when drainage is indicated. The aim of this study is to report on our experience in draining pancreatic pseudocysts. Additionally, the value of wall biopsy while draining the cyst received particular attention.

Methods. All patients with a clinically diagnosed pancreatic pseudocyst who underwent drainage at Asser Central Hospital, Abha, Kingdom of Saudi Arabia, between August 1989 and November 2002, were included in the study. To identify them, operation theatre registry, operation logbooks and medical records, were reviewed. Details of the patient, type of pancreatitis, and features of the pseudocyst were recorded. All cases were evaluated radiologically by ultrasound (US) or computerized tomography (CT) scan in the preoperative period. Cases diagnosed clinically and radiologically as pseudocysts and needed intervention, were included in the study. Histopathology review identified 2 cases with true cysts, excluding them from further analysis. ERCP was used for preoperative evaluation in 7 cases. Internal surgical drainage was performed by cystogastrostomy or cystojejunostomy according to the anatomic location of the cyst. External drainage was carried out by the open technique in the theatre or percutaneously under US guidance in the radiology suite. The indications for drainage were noted, as well as the recurrence, morbidity and mortality rates. Complications of treatment and their management were also recorded. In the follow up period, US or CT scan were carried out to detect recurrence or confirm resolution.

Results. Sixteen patients were diagnosed clinically and radiologically as having pancreatic pseudocysts which required to be drained. During surgery, cyst wall biopsy was obtained in 10 cases. Histopathologically, the diagnosis was confirmed in 8 cases while a true cyst (retention cyst in one case and serous cystadenoma in another) was discovered in the remaining 2. In the remaining 14 cases, there were 8 males and 6 females, with a median age of 38 years (range 4-60). History of acute pancreatitis was present in 9 patients (64.2%), which was biliary in 7 patients, and idiopathic in 2 patients. The cyst appeared following external trauma in 4 patients

(28.6%), while it followed an operative trauma in one patient (7.1%). Abdominal pain was the presenting feature in all patients (100%), followed by vomiting (71.4%). An abdominal mass was seen in 6 patients (42.9%) while jaundice was seen in only 2 patients (14.3%). In the majority of cases, there was only one pseudocyst (10 cases, 71.4%), while in 4 cases there were 2 or more pseudocysts. The diameter of the cyst was smaller than 6 cm in one patient, and in 5 patients (35.7%), it ranged between 6 and 10 cm, while in 8 patients (57.1%), a giant cyst (more than 10 cm) was found. In the first 6 cases of the series, endoscopic retrograde cholangiopancreatography (ERCP) was performed in only one case, thereafter it was performed in 6 cases of the remaining 8. A pseudocyst-pancreatic duct communication was seen in 3 cases, 2 of them had a complicated acute pancreatitis, while the third has a post-traumatic cyst. In 2 jaundiced patients in this series, ERCP was performed, one and 2 days before surgery. In the later case, a stent was placed to overcome an advanced jaundice. Open surgery was carried out in 12 patients while one received US guided external drainage and the other received open external drainage. Open internal drainage was in the form of cystogastrostomy in 9 patients, and cystojejunostomy in 3 patients depending on the location of the cyst. A related complication was seen in 3 patients (21.4%) wherein incisional hernia developed in 2 cases and one developed adhesive intestinal obstruction which required adhesiolysis on 2 occasions. The duration of hospital stay had a mean of 24.3 days (range 10-79 days) and the duration between the intervention and discharge had a mean of 14 days (range 6-26 days). The duration between cyst diagnosis and intervention was not specified in 4 cases. In the remaining 10 cases, it had a mean duration of 23.4 days (range 1-120 days). In the follow-up period (mean duration 437 days, range 11-2396 days), recurrence was observed in 3 patients, 2 followed external drainage by an open or percutaneous technique, while the third followed pseudocystogastrostomy. The overall recurrence rate was 21.4%, while the recurrence rate after open surgical drainage was 8.3%. There was no mortality in this series.

Discussion. The small number of cases in this series over a relatively long period, reflects the low incidence of pancreatic pseudocyst in our locality. A low incidence has also been reported in other regions of the country.⁹ Not all peripancreatic fluid collections are pseudocysts, many are acute exudative fluid collections following acute pancreatitis necessitating no active intervention, while others are cystic neoplasms demanding a totally different surgical approach. In this series, cystadenoma of the pancreas was mistakenly diagnosed and managed as a pseudocyst in one case,

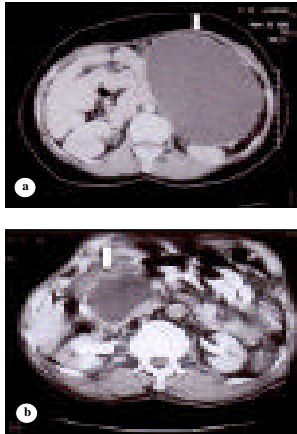


Figure 1 - Computerized tomography of the abdomen shows a) serous cystadenoma of the pancreatic tail (white arrow) b) retention cyst of the pancreas (white arrow head). Both lesions were diagnosed preoperatively and treated as pseudocyst.

while a retention cyst was treated similarly in another. The true nature was discovered only after pathologic examination of the specimen, fortunately with no serious consequences owing to the benign nature of the cyst, which was excised with the pancreatic tail in the first case and drained into the stomach in the second (Figures 1a & 1b). This situation is not a rare encounter, and despite complete evaluation, the cyst type may be difficult or impossible to be determined preoperatively.¹⁰ For this reason, cyst wall biopsy taken at the time of drainage, should not be dispensed with. Omission of this vital step might have grave consequences when malignant cystic tumors, some of them are potentially curable, are drained into the gut. A biopsy would thus spot the diagnosis either during surgery when arrangements are made for frozen section examination of the specimen,⁴ or in the immediate postoperative period after examining the permanent paraffin section. In the later case, a planned reoperation for wide local excision might be entertained.¹¹ In this regard, the absence of an epithelial lining on a limited biopsy, does not exclude the possibility of neoplasia as this lining is often discontinuous and may be absent from more than half of the lining surface.⁴ The timing of



Figure 2 - A giant pancreatic pseudocyst, with pancreatic sequestrum lying in its middle (white arrow). This needs to be excised to avoid the possibility of retroperitoneal septic complications.

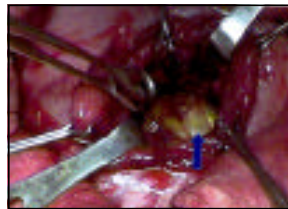


Figure 3 - Pancreatic sequestrum seen in the depth of the pseudocyst cavity, being extracted (blue arrow).

drainage has been recently a subject of debate. The current literature suggests that the old 6 cm 6 weeks criteria for intervention should be a relative rather than an absolute indicator. Asymptomatic pseudocysts regardless of size and duration can be safely observed, provided that they are carefully monitored and are not increasing in size. Intervention is mandatory only in the presence of symptoms, complications, or increase in size or if there is any doubt of malignancy.¹² Although we were, and probably still, influenced by the traditional teaching of 6 cm 6 weeks criteria, in all patients in the series had a symptomatic pseudocysts. The presence of symptoms and not the cyst size or its age, was the prime incentive for intervention. Open drainage has been the gold standard,¹² which yields excellent results.^{13,14} Exploratory laparotomy with careful assessment of the pancreas is optimal for both establishing the diagnosis and selecting the treatment.¹⁵ At laparotomy, gross findings usually help to differentiate neoplastic lesions from pseudocysts. Pseudocysts tend to adhere to adjacent visceral and the surrounding pancreas is indurated, whereas neoplastic cysts usually have a thin glistening wall and the pancreas adjacent to the cyst has a normal

texture.⁴ Performed electively, postoperative morbidity is low (28%) and recurrence is uncommon (<10%),^{14,17} with little mortality (1-5%).^{14,16} The possibility of a cystic pancreatic neoplasm can also be reliably excluded by biopsy of the cyst wall^{17,18} which should be generous⁷ or multiple, and as pancreatic cystic tumors, many of them are malignant or carry a malignant potential, have been repeatedly diagnosed and treated as pseudocysts with grave consequences at times.^{4,19,20} a cyst wall biopsy could not be overemphasized. In addition, open surgery offers the opportunity to perform pancreatic sequestrectomy which seems to prevent postoperative retroperitoneal septic complications²¹ (Figures 2 & 3). In this series, open surgery was the principal treatment, which was offered to 12 patients (85.7%). There was no mortality in the series, while morbidity and recurrence rates compared favorably with the reported Figures.^{13,14,16,17}

This conventional approach has been challenged by newer and less invasive methods. The simplest form is percutaneous catheter drainage. The indiscriminate use of this technique has fell into disfavor due to the higher mortality and morbidity rates and longer hospital stay compared to surgical drainage,²² in addition to the potential of missing a cystic neoplasm,²³ as no cyst wall biopsy is possible. Also, pancreatic sequestrectomy is naturally omitted. Another novel technique is the endoscopic drainage which has been reported to have high success rates with low morbidity.²⁴⁻²⁶ Again, we have the concern that a reliable cyst wall biopsy may not be possible as dictated by the small diameter of the biopsy channel. Added to this, is the omission of pancreatic sequestrectomy. Laparoscopic drainage techniques have permeated the field where laparoscopic cystogastrostomy,²⁷⁻²⁹ and cystojejunostomy^{29,30} have been performed. These techniques have the potential of providing cyst wall biopsy and performing thorough pancreatic necrosectomy. The provision of these 2 components of pseudocyst surgery, characterizes laparoscopic from the other forms of minimally invasive techniques. However, there are no standardized techniques for laparoscopic drainage. Moreover, controlled trials comparing the results of laparoscopic and open surgery have not yet surfaced and it is probable that benefits conferred to laparoscopic over open surgery are speculative at best.¹² Although the mortality, morbidity, and recurrence rates of our series are comparable to the reported figures, the length of hospital stay was unduly long. Certainly, this needs to be addressed in future cases.

Our recommendation is that, a reliable cyst wall biopsy should retain its prime position when draining what appears to be a pseudocyst of the pancreas. Advocates of minimally invasive approaches should incorporate this step in whatever technique they may use.

References

1. Yamao K, Ohashi K. Asymptomatic cystic tumours: What to do? *Journal of Pancreas (online)* 2001; 2 (5 Suppl): 330.
2. Howard JM. Cystic neoplasms of the pancreas. *Surgical Clinics of North America* 1989; 69: 651-665.
3. Yeh TS, Cheng AJ, Chen TC, Jan YY, Hwang TL, Jeng LB, et al. Telomerase activity is a useful marker to distinguish malignant pancreatic cystic tumours from benign neoplasms and pseudocysts. *Journal of Surgical Research* 1999; 87: 171-177.
4. Warshaw AL, del Castillo CF, Rattner DV. Pancreatic cysts, pseudocysts, and fistulas. In: Zinner MJ, Schwartz SI, Ellis H, editors. *Maingot's abdominal operations*. 10th ed. Connecticut: Prentice Hall International, Inc, Stamford; 1997. p. 1917-1940.
5. Schachter PP, Shimonov M, Czerniak A. The role of laparoscopy and laparoscopic ultrasound in the diagnosis of cystic lesions of the pancreas. *Gastrointest Endosc Clin N Am* 2002; 12: 759-767.
6. Obrador A, Pueyo J, Gaya J, Llompert A. Combined percutaneous-endoscopic pancreatic pseudocyst drainage- a new technique. *Endoscopy* 1998; 30: 499-503.
7. White SA, Sutton CD, Berry DP, Chhillstone D, Rees Y, Dennison AR. Experience of combined endoscopic percutaneous stenting with ultrasound guidance for drainage of pancreatic pseudocysts. *Ann R Coll Surg Engl* 2000; 82: 11-15.
8. Vosoghi M, Sial S, Garrett B, Feng J, Lee T, Stabile BE, et al. EUS-guided pancreatic pseudocyst drainage: review and experience at Harbor-UCLA Medical Center. *Med Gen Med* 2002; 4: 2.
9. Meshikhes AW. Pancreatic pseudocyst. *Saudi Med J* 2003; 24: 411-414.
10. Michael H, Gress F. Diagnosis of cystic neoplasms with endoscopic ultrasound. *Gastrointest Endosc Clin N Am* 2002; 12: 719-733.
11. Moossa GR, Stabile BE. The pancreas. In : Essential surgical practice, Cuschieri A, Giles GR, Moossa, AR, editors. 3rd edition. Oxford: Butterworth-Heinemann Ltd; 1995. p. 1238-1277.
12. Pitchumoni CS, Agarwal N. Pancreatic pseudocysts, when and how should drainage be performed. *Gastroenterol Clin North Am* 1999; 28: 615-639.
13. Ng B, Murray B, Hington G, Windsor JA. An audit of pancreatic pseudocyst management and the role of endoscopic pancreatography. *Aust N Z J Surg* 1998; 68: 847-851.
14. Bradley NG, Murray B, Hington G, Windsor JA. An audit of pancreatic pseudocyst management and the role of endoscopic pancreatography. *Aust N Z J Surg* 1998; 68: 847-851.
15. Warshaw AL, Compton CC, Lewandrowski K, Cardenosa G, Mueller PR. Cystic tumours of the pancreas: new clinical, radiologic, and pathologic observations in 67 patients. *Ann Surg* 1990; 212: 432-445.
16. Usatoff V, Brancatisano R, Williamson RC. Operative treatment of pseudocysts in patients with chronic pancreatitis. *Br J Surg* 2000; 87: 1494-1499.

17. Tsiotos GG, Sarr GM. Management of Fluid Collections and necrosis in acute pancreatitis. *Current Gastroenterology Reports* 1999; 1: 139-144.
18. Moran B, Rew DA, Johnson CD. Pancreatic pseudocyst should be treated by surgical drainage. *Ann R Coll Surg Eng* 1994; 76: 54-58.
19. Patel VG, Fortson JK, Weaver WL, Hammami A. Solid pseudopapillary tumour of the pancreas masquerading as a pancreatic pseudocyst. *Am Surg* 2002; 68: 631-632.
20. Scott J, Martin I, Redhead D, Hammond P, Garden OJ. Mucinous cystic neoplasm of the pancreas: imaging features and diagnostic difficulties. *Clinical Radiology* 2000; 55: 187-192.
21. Oria A, Ocampo C, Zandalazini H, Chiappetta L, Moran C. Internal drainage of giant pseudocysts: the role of video-assisted pancreatic necrosectomy. *Arch Surg* 2000; 135: 136-140.
22. Heider R, Meyer AA, Galanko JA, Behrns KE. Percutaneous drainage of pseudocysts is associated with a higher failure rate than surgical treatment in unselected patients. *Ann Surg* 1999; 229: 681-687.
23. Boggi U, Di Candio G, Campatelli A, Pietrabissa A, Mosca F. Nonoperative management of pancreatic pseudocysts. Problem in differential diagnosis. *Int J Pancreatol* 1999; 25: 123-133.
24. Libera ED, Siqueira ES, Morais M, Rohr MR, Brant CQ, Ardengh JC, et al. Pancreatic pseudocysts transpapillary and transmural drainage. *HPB Surg* 2000; 1: 333-338.
25. Dohmoto M, Rupp DK. German experience with endoscopic transmural drainage for pancreatic pseudocysts. *Digestive Endoscopy* 2001; 13: 137-141.
26. Beckingham JJ, Krige JEJ, Borman PC, Terblanche J. Transmural endoscopic drainage of pancreatic pseudocysts. *British Journal of Surgery* 1999; 86: 422-423.
27. Smadja C, Badawy A, Vons C, Giraud V, Franco D. Laparoscopic cystogastrostomy for pancreatic pseudocyst is safe and effective. *Journal of laparoendoscopic and Advanced Surgical Techniques* 1999; 9: 401-403.
28. Chowbey PK, Soni V, Sharma A, Khullar R, Baijal M, Vashistha A. Laparoscopic intragastric stapled cystogastrostomy for pancreatic pseudocyst. *Journal of Laparoendoscopic and Advanced Surgical Techniques* 2001; 11: 201-205.
29. Park AE, Heniford BT. Therapeutic laparoscopy of the pancreas. *Ann Surg* 2002; 236: 149-158.
30. Hapogian EJ, Teixeira JA, Smith M, Steichen FM. Pancreatic pseudocyst treated by laparoscopic Roux en Y cystojejunostomy. Report of a case and review of the literature. *Surg Endosc* 2000; 14: 967.