Treatment of oversize and recurrent pancreatic pseudocyst after an episode of acute pancreatitis: a case report and review management

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Introduction

Pancreatic cysts are being diagnosed more frequently because of the increasing usage of multiple noninvasive imaging modalities. Moreover, pancreatic pseudocysts (PPs) present a challenging problem for physicians dealing with pancreatic disorders, especially in cases where their treatment will be required.

The diagnosis of a PP needs imaging with ultrasonography, Computed Tomography (CT) scan or Magnetic Resonance Imaging (MRI). In most cases, pancreatic pseudocysts are asymptomatic and resolve spontaneously. [1-3] Asymptomatic PPs up to 6 cm in diameter can be safely observed and monitored with serial imaging.[1] If they evolve and increase in size, they become symptomatic through compression of the adjacent organs and need interven-tion.[1, 4-6]

Their management demands the cooperation of surgeons, radiologists and gastroenterolo-gists. The treatment of PPs has evolved considerably over the past decade, moving from what was once open surgical management to increasingly minimally invasive techniques, both by surgery and by endoscopy. Thus, many studies have reported successful drainage through the use of various techniques.[1, 3, 4] However, the absence of a large number of cases as well as guidelines for dealing with them raise even today dilemmas regarding the treatment of choice. Here we present a case of a large pancreatic pseudocyst and a brief review of the literature.

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Case report

A 70-year-old woman was admitted to the Intensive Care Unit [ICU] of 251 Hellenic Airforce Hospital with an episode of severe acute necrotizing pancreatitis, associated with gallstones, treated conservatively. Surgical assessment for gallbladder removal was scheduled before she was discharged.

She returned with a new episode of epigastric pain and slightly increased serum amylase [158 U/L]. Moreover, the patient complained of epigastric bloating and early satiety. An abdominal CT scan with contrast enhanced agents revealed a large pancreatic pseudocyst [12x8cm] at the body-tail boundaries compressing the stomach. No separations or evidence of hemorrhage was seen. Pancreas appeared as a thin line likely to be due to partial atrophy and compression and there were no duct dilatations, calcifications or necrosis.

Endoscopic ultrasound [EUS] guided transgastric drainage was performed with two pig-tail plastic stents [PSs] at first. A large amount of clear liquid was drained with high amylase [12000 U/L] and low [1,9 ng/ml] Carcinoembryonic Antigen [CEA] levels. These findings were consistent with a pancreatic pseudocyst. Moreover, cytologic analysis of the pseudocyst fluid did not reveal any malignant cells. Repeat EUS was done ten days later due to persistence of the collection on conventional ultrasound scan and a lumen-opposing metal stent [LEMS] [Boston Scientific, Marlborough, MA, USA] was inserted. Subsequent abdominal ultrasound scan revealed a residual pseudocyst of 3 cm. Three days after the procedure, the patient was discharged from the hospital in good clinical condition.

Two weeks later, patient presented with mild epigastric abdominal pain and fever. Subsequent endoscopy revealed partial occlusion of the stent by food material [fig. 1]. Pus discharge was noted from the previous stent, which was cleaned and washed out. Microbiological examination of the cyst fluid was performed and the patient was covered with broad-spectrum antibiotics. The patient became afebrille within three days after the initiation of the antibiotics. However, following this episode she had persistent epigastric bloating, early satiety and anorexia. At that occasion, MRI and Magnetic Resonance Cholangiopancreatography [MRCP] revealed further enlargement of the PP as well as communication of PP with the main pancreatic duct [MPD]. Endoscopic retrograde cholangiopancreatography [ERCP] confirmed this communication and thus endoscopic transpapillary drainage was also performed.

The patient remained afebrile and asymptomatic and was discharged to be reviewed in four weeks. The cyst was not visualized on subsequent ultrasound scans and stents were removed four weeks later.

On re-examination before cholecystectomy, patient reported occasional early satiety and mild postprandial epigastric pain which usually subsided automatically, without the need for any special treatment. A new CT scan was performed to reassess the patient's condition. The CT scan showed a recurrence of the pseudocyst [15x10cm] at the body-tail boundaries of the pancreas [fig. 2]. The patient underwent open cholecystectomy and Roux-en-Y- cystojejunostomy for the drainage of the pseudocyst due to its location [bulging through the transverse mesocolon] and size, without complications. Elevated amylase [13697 U/L] and low [1,85 ng/ml] [CEA] levels in cystic fluid in combination with the results of cyst wall biopsy confirmed the diagnosis.

The patient's postoperative course was uneventful and she was discharged on the 7th postoperative day. Abdominal CTs seven and thirty days postoperatively demonstrated complete absorption of the pseudocyst [fig. 3] and the patient remains asymptomatic to this day.

Discussion

Pancreatic pseudocyst [PP] is a complication

that develops in approximately 7% to 10% of cases of acute pancreatitis and 10% to 30% of chronic pancreatitis. [4, 7, 8] This cystic formation is characterized by a non-epithelialized wall, is abundant with amylase, and has no internal debris or solid component.[2, 3, 9-11] Differential diagnosis should take into account cystic pancreatic tumor whose treatment obviously differs. A cystic formation after acute pancreatitis is undoubtedly a pseudocyst. However, the presence of a cystic lesion detected by CT scan in the absence of a clear history of pancreatitis or other abnormalities of pancreatic architecture should be considered a cystic neoplasm until proven otherwise.[12, 13] Nevertheless, pancreatic pseudocysts represent more than 75% of cystic lesions of the pancreas.[6, 14, 15]
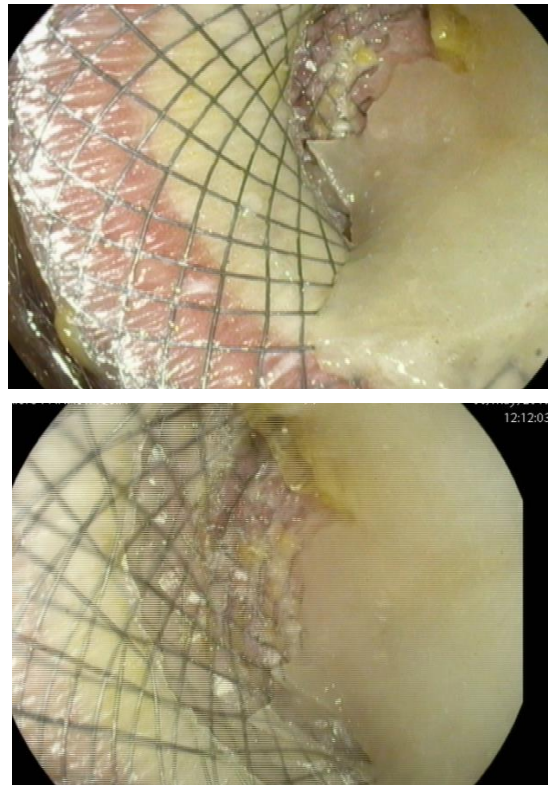
Figure 1 Endoscopic image showing partial occlusion of the stent by food material
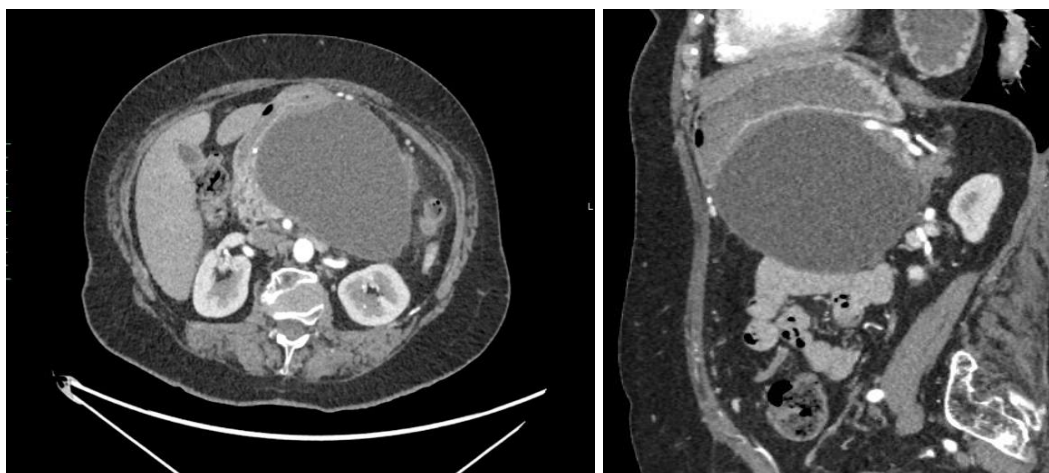
Figure 2 A.   Axial CT image - recurrence of the pseudocyst [15x10cm] at the body-tail boundaries of the pancreas; B.   Sagittal CT image – compression and displacement of the stomach and small intestine
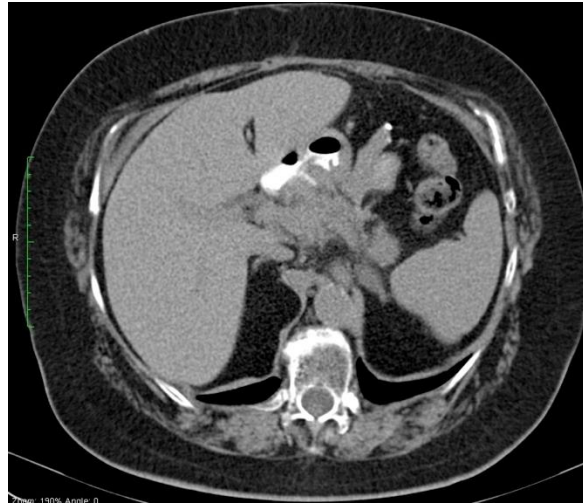
Figure 3   Computed tomography demonstating complete remission of the pseudocyst

The diagnosis of PPs is made by using imaging techniques in the appropriate clinical context. Diagnostic procedures should include medical history, laboratory tests, Carcinoembryonic Antigen [CEA] and Carbohydrate antigen 19-9 [CA 19-9] tests, chemical and microbiological examination of the cyst contents and modern imaging techniques which provide useful information on the size, location and walls of the cyst and its contents. There are no laboratory findings to prove the existence of a pseudocyst however, persistently high serum amylase levels, two to three weeks after complete remission of acute pancreatitis symptoms, are highly indicative and occur in up to 76% of cases.[7] This has been proven in our case as well. The most commonly used imaging procedures are transabdominal ultrasound, CT scan, Magnetic Resonance Imaging [MRI], Magnetic Resonance Cholangiopancreatography [MRCP] and Endoscopic Ultrasound [EUS].[8, 16]

Diagnostic CT scan of the abdomen is considered a particularly sensitive method for the detection of pseudocysts, as it has a sensitivity rate of detection over 95%.[2] In the CT scan the cystic capsule can be imaged, and thus can be used to measure the maturity of the collection, as well as to assess the relationship of the pseudocyst to the stomach and duodenum, elements useful in the choice of treatment. [5, 8, 17] Computed Tomography [CT] scan is also useful in the differential diagnosis between pseudocysts and walled-off necrosis, offering recognition of solid components and debris.[2, 14] Lastly, CT is able to supply information regarding the common bile duct, the pancreatic duct and the presence or absence of pancreatic necrosis.[14] Abdominal Ultrasound is a suitable radiographic modality for follow-up assessment of interval changes in size.[8, 13] Endoscopic retrograde cholangiopancreatography [ERCP] remains the gold standard technique for the diagnosis of pancreatic duct disruption, but is limited by its invasive nature and possible complications, and can be more useful for therapeutic purposes.[2, 14] Magnetic resonance imaging [MRI] and magnetic resonance cholangiopancreatography [MRCP] are the most accurate and sensitive diagnostic tools in order to evaluate the anatomy of the pancreatic duct.[2] Magnetic Resonance Cholangiopancreatography [MRCP] is also increasingly valuable in demonstrating cyst-duct relationships and communications.[2, 5] Finally, endoscopic ultrasound [EUS] has more sensitivity than CT in imaging possible solid debris, and thus excluding the presence of pseudocyst.[2]

In most cases, pancreatic pseudocysts are asymptomatic and are an occasional finding during follow-up monitoring of the evolution of acute pancreatitis.[3] They usually resolve spontaneously.[1-3] If they evolve and increase in

size, they become symptomatic through compression of the adjacent organs [stomach, duodenum and bile duct] with the main signs being postprandial epigastric bloating, abdominal pain, early satiety, nausea and vomiting. [1, 4, 5, 14] Jaundice and weight loss can also occur.[4] Complications of the PPs include infection, bleeding or rupture.[6, 18, 19]

It is generally agreed that most influential factors predicting the pseudocyst fate are type and age of pseudocyst. More specifically, pseudocysts of chronic pancreatitis have the lowest rate [0-8%] of remission compared with those of acute pancreatitis.[2-4, 16] Moreover, traumatic pseudocysts also show little chance of automatic healing.[20] The age of the pseudocyst is finally a very important prognostic factor regarding the possibility of spontaneous healing. The smaller it is, the higher the rate of decline.[4, 8, 20] According to studies, the rate of automatic regression for pseudocysts less than 6 weeks of age reaches 40%, while for pseudocysts aged 7 to 12 weeks this percentage drops to 8% and is <1% for pseudocysts older than 14 weeks. [20]

The first approach to treating pseudocyst is conservative, involving waiting, given that they clear up spontaneously with time in over half of cases.[1, 2] Moreover, even without resolution, most pseudocysts if not enlarging, rarely cause any significant symptom.[2, 14] Traditional guidelines recommend monitoring them with abdominal ultrasonography every 3 to 6 months. [1, 13] If the cyst tends to diminish, or at least not become larger, its evolution should be monitored over time. However, if it increases in size and becomes symptomatic, it should be treated to avoid the need for emergency abdominal surgery due to infection, rupture or hemorrhage. [1, 3, 6]

According to the latest data, the indications for drainage of a PP are the presence of symptoms like pain attributable to pseudocyst, discomfort, vomit, along with the development of complications like infection, bleeding or rupture.[2, 3, 8, 21] Furthermore, biliary, gastric or duodenal obstruction also call for drainage, as does the increasing size of the pseudocyst on follow-up. [2, 3, 6, 8, 21] Most researchers agree that the majority of pseudocysts less than 4 cm in diameter regress without intervention.[20, 22, 23] Moreover, Yeo and colleagues concluded that pseudocysts greater than 6 cm in diameter required surgical treatment significantly more frequently compared to pseudocysts of less than 6 cm in diameter.[22] The patient in our case required interventions due to the pseudocyst being large and symptomatic.

Historically, the open surgical approach was considered to be the gold standard treatment for symptomatic or complicated pseudocysts, but the evolution of laparoscopic and endoscopic drainage, which are minimally invasive techniques, has set a new debate about the most appropriate treatment.[3, 10, 21] Setting the different techniques aside, depending on anatomical relationships and topography, a pancreatic pseudocyst can be drained in several ways safely through the stomach, duodenum, or small intestine.[6, 15, 21, 24] Drainage may be accomplished by a surgical, endoscopic or percutaneous procedure with the third being associated with higher rates of recurrence.[1, 2, 12] Choosing the best drainage technique is often a challenge. The choice of treatment typically depends on multiple factors including size, number and location of the cyst, the presumed presence or absence of infection, the presence or absence of cyst-duct communication, the patient's general state and comorbidities, as well as the availability of specialist surgical or interventionalist expertise.[5, 14, 25]

Percutaneous Drainage [PD] is the least invasive method. However, it is associated with a high failure rate and it might also lead to infection of the cyst, given that the drainage catheter has to be left in situ for long periods and does not always ensure complete emptying of the cyst.[8, 11, 14] Contraindications include active hemorrhage into the pseudocyst and presence of communication between the pancreatic ducts and the cyst due to increased risk for a pancreaticocutaneous fistula.[2] Percutaneous

Drainage is indicated in some specific cases where surgical drainage is not practicable, such as in patients in a very poor general condition with severe comorbidities or who refuse surgery, in rapidly evolving or infected pseudocysts still without a mature wall and in pseudocysts located in unusual places. [2, 3, 6, 8, 14, 19, 26] However, a study that compared endoscopic and percutaneous drainage of symptomatic pancreatic fluid collections concluded that endoscopic drainage was associated with higher rates of treatment success, lower rates of reintervention and shorter lengths of hospital stay. [27] Moreover, studies have demonstrated that patient treated by percutaneous approach had higher morbidity and mortality rates and also an increased duration of hospitalization as compared to patients treated with open surgery.[11, 19] Therefore, PD can be considered a safe alternative for therapeutic intervention in patients with immature infected pseudocyst or in critically ill patients who cannot tolerate surgical or endoscopic procedures.

Two endoscopic approaches [transmural and transpapillary] can be utilized to treat PPs. The choice of therapy is in part dependent on whether the cyst communicates with the pancreatic duct or is in close apposition to the gut lumen.[16]

Depending on the pseudocysts location, the access for transmural [TSM] endoscopic drainage may be obtained through transgastric or trans-duodenal approach.[10, 15, 28] The addition of endoscopic ultrasonography [EUS] for endoscopic drainage is a new development making it minimally invasive, effective and a safe approach with reduced risk associated with endoscopic drainage. [3, 10, 18] Current literature shows similar success rates for endoscopic and surgical interventions. [10, 11, 16, 18, 21, 29] Moreover, in a recent randomized trial in 2013, comparing efficacy of endoscopic and surgical cystogastrostomy for pancreatic pseudocyst drainage, both methods were to be of similar efficacy. However, endoscopic treatment was associated with shorter hospital stays, better

physical and mental health of patients and with a lower cost. [29] Therefore, being a minimally invasive technique, endoscopic drainage could be an appropriate alternative to surgery in the management of PPs. Indeed, it should be the first choice in appropriate clinical settings. [3, 8, 14, 18, 28] Moreover, Udeshika and colleagues suggested endoscopic guided internal drainage as a primary treatment method for giant pseudocysts although multiple repeated endoscopy might be needed. [1] We applied this strategy to our case because of the location and size of the pseudocyst but also our experience in endoscopic drainage.

When the pseudocyst communicates with the main pancreatic duct or one of its side branches it may be drained via transpapillary insertion of a stent. [5, 10, 28] The stent is meant to bridge the main pancreatic duct or a disrupted side branch. Moreover, transpapillary drainage [TPD] is also indicated in cysts that are too distant [>1 cm] from the gastrointestinal lumen to allow safe TSM drainage. [2]

Initial studies demonstrated improved outcomes observed in patients treated with combined transmural and transpapillary approaches compared to transmural drainage alone, mainly in patients with partial PD disruption [14, 30]. We applied this practice to our case with ambiguous results. Besides, a recent multicenter retrospective study concluded that there was no difference in the long-term rates of symptomatic resolution or complete radiological resolution between transmural and combined approaches. [31] Therefore, combined approaches could be considered if the patient has an obstructive process in the PD [e.g., stone or stricture] to treat the underlying obstructive abnormality. [3]

Another important, yet unresolved, issue when draining PPs is the duration of stenting. In theory, keeping the stent will maintain patency of the cystenterostomy tract and prevent PP recurrence, but there are no data to confirm the long-term safety of leaving these stents in place. Prolonged stent placement [using PSs] was shown to be superior to protocolized stent

removal by a prospective trial that randomized 28 patients to removal of the stents 2 weeks after Pancreatic Fluid Collection [PFC] resolution or to keeping them in place. [32] At 14 months, the recurrence rate was 38% in the stent removal group compared to no recurrence in the long-term stent group, with no complications experienced by patients with prolonged stenting.[32] However, the patients who should benefit from prolonged transluminal stenting are those with a viable body or tail of the pancreas with "disconnected pancreatic duct syndrome [DPDS]".[10, 29, 32] In this syndrome, pancreatic secretions from the disconnected body and/or tail leak from the disrupted PD, resulting in persistence or recurrence of a pseudocyst. In this circumstance, long-term drainage via a cyst-gastrostomy fistula tract is necessary, in which case indefinite PS placement is recommended. [29, 32-34] Moreover, the majority of studies recommend removing transmural and transpapillary stents after three to four weeks if complete resolution of the pancreatic pseudocyst is demonstrated, which is monitored by CT, or preferably ultrasound, performed at 4-week intervals after the initial endoscopic drainage. [8, 13] In addition, some concerns have been raised about increased risks of delayed bleeding from a collapsed walled-off necrosis [WON] collection when a metal stent is in place, which is why stent removal after the PFC resolves, if a metal stent is in place, is recommended. [3, 35, 36] Finally, we agree with other authors who pointed out that further investigation is needed to determine the duration of stents. [10, 29]

Surgical drainage was the only form of therapy in the past comprising of internal drainage [in the form of a cystogastrostomy, cystoduodenostomy or a Roux-en-Y- cystojejunostomy], external drainage or excision of the cyst. [4, 10, 13, 14, 16] Indications for classic open surgical management include complicated pancreatic pseudocysts that form in the setting of acute pancreatitis, pancreatic pseudocysts associating a pancreatic duct stricture impossible to treat by transpapillary approach, cases in which the diagnosis cannot be certainly established and a cystic neoplasm cannot be excluded, cases of intracystic hemorrhage caused by erosion of the pancreatic pseudocyst into the splenic or gastroduodenal artery, with a failed attempt of angiographic hemostasis, recurrent PPs and finally when minimal invasive treatment fails. [2, 8, 14] The latter one was the indication for surgical management of our patient.

The choice of surgical procedures depends upon the size, number and location of the cyst and may be open or laparoscopic.[10] Cystojejunostomy is preferred in pseudocysts not adhering to the posterior gastric wall in any location in the pancreas as well as in pseudocysts that bulge through the transverse mesocolon. [4, 8] Moreover, Johnson and colleagues reported four patients with giant pseudocysts treated by cystogastrostomy who developed postoperative complications as a result of incomplete emptying of the cyst and concluded that cystogastrostomy might not be appropriate for the treatment of giant pancreatic pseudocysts. [37] We performed a Roux-en-Y-cystojejunostomy for the drainage of the pseudocyst due to its location [bulging through the tranverse mesocolon] and large size.

As far as we are concerned about the adverse events of each separate treatment, recent studies demonstrated that there was not a statistical difference between the patients treated endoscopically and those treated surgically. [6, 10, 18] Events unrelatable to drainage occurred mainly in the surgical group. Most common complications were incisional hernias and abdominal wall infection. [10] According to Farias et al [18], Zhao et al [10] and Teoh et al [11] there were not discrepancies between the two groups not only for therapeutic success rates and adverse events, but also odds of recurrence. Moreover, Redwan et al. [6] reported that endoscopic drainage revealed significantly lower blood loss, operative time, opioid requirement and hospital stay compared to open

and laparoscopic drainage. The endoscopic treatment seems to overtake surgical for quality of life, cost effectiveness, operative time and days of hospitalization, but surgical treatment seems to be favorable for patients with unfavorable anatomy. [10, 11, 29]

Finally, according to recent data [3, 6, 10, 16], endoscopic drainage has become the preferable approach for the management of symptomatic PPs at various centers, with fewer adverse events, higher cost effectiveness, shorter hospital stays and similar efficacy when compared with surgery, followed by laparoscopic or open surgical techniques. Most authors suggest percutaneous drainage as the last option to be considered due to the potential risks and complications, being nevertheless the only feasible technique for selected cases. [19]

Conclusion

Over the years, the therapeutic approach to pancreatic pseudocyst has evolved into minimally invasive drainage methods. Nevertheless, surgical drainage continues to occupy an important and reliable place in the therapeutic treatment algorithm, mainly in large, complicated and recurrent pseudocysts or for cases in which the other modalities of treatment have failed. The selection of the appropriate treatment method requires the cooperation of Radiologists, Gastroenterologists and Surgeons. A multidisciplinary approach to management is key to improving outcomes.

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