

Endoscopic management of pancreatic pseudocysts

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Received: 03-10-12
Accepted: 26-06-13

Abstract

One of the complications of acute pancreatitis, which has a high prevalence in our environment, is the formation of pseudocysts. Some pseudocysts are spontaneously reabsorbed but others require intervention. Since interventions are often surgical, both morbidity and mortality rates are high. Radiological, endoscopic and other approaches have lower morbidity and mortality rates but are less well known in our country.

This is a study of our experience with 9 cases of endoscopic management of pseudocysts. We briefly present these cases, review the subject and provide a step by step description of a drainage method that is easily applicable by physicians interested in the subject.

Key words

Pseudocyst, acute pancreatitis, endoscopy, drainage.

Pancreatic pseudocysts are the most common late complication of acute pancreatitis, chronic pancreatitis, and pancreatic trauma. A pancreatic pseudocyst consists of an accumulation of amylase-rich pancreatic fluid caused by ductal disruption arising from limited pancreatic necrosis (1-3). It is diagnosed as a pseudocyst once it has persisted for more than 6 weeks from the initial observation. Characteristically a pseudocyst is surrounded by a layer of fibrous granular tissue but has no real epithelium. This is the main difference with a true pancreatic cyst (4).

Symptoms depend on the location and extent of the collection of fluid. Symptoms include abdominal pain, early satiety, nausea, vomiting, duodenal obstruction, bile duct obstruction (jaundice), palpable mass, vascular occlusion, and fistulas (1, 5). This article reports our experience in the last year with 9 patients with pancreatic pseudocysts (table 1). Their average age was 40.1 years, the youngest was 8 years old, and the oldest was 78 years old. 55.5% of the patients were male. Most lesions were located in the pancreatic body and/or tail. They measured 119.3 mm on

average. All lesions were resolved endoscopically, and there were no cases of recurrence in 11 months of follow-up. In 2 cases the pseudocysts were drained with ERCP only, the other 7 cases used endoscopy first followed by ERCP.

INDICATIONS FOR TREATMENT

Spontaneous resolution of a pancreatic pseudocyst occurs in only 40% of the cases and usually takes 3 to 6 months. Treatment is indicated for patients who present symptoms such as early satiety, abdominal pain, pyloric syndrome, jaundice, signs of infection or increased size of the pancreatic pseudocyst after 6 weeks (regardless of the initial size) (1, 2, 4). Indications in asymptomatic patients, less than 10% of all cases, are called "prophylactic" and include compression of large vessels by the pancreatic pseudocyst, hemorrhaging of the pseudocyst itself, and pleural pancreatic fistulas. Drainage is also indicated for patients with chronic pancreatitis and those with pancreatic stones since the spontaneous resolution rate of the pancreatic pseudocyst in these cases is very low (0-9%) (6).

Table 1. Main features of pancreatic pseudocysts in the 9 patients treated in our service.

	Age	Cause	Location	Size	Septa	Drainage	Prosthesis	Evolution time
F	56	P. Chronic	Head and body	120 mm	NO	ERCP	Double pigtail 10 F	13 months
F	61	P. Severe	Tail	156 x 97 x 110	NO	EU	Double pigtail 7 F	10 months
F	19	P. Severe	Tail	75 x 45 x 31	NO	EU	NO	6 months
F	30	P. Severe	Body and tail	168 x 150 mm	NO	EU	Doble cola de cerdo 8 F	16 weeks
M	22	Trauma	Body and tail	126 x 102 x 106	NO	EU	Double pigtail 10 F	3 weeks
M	79	P. Chronic	Body	110 x 110 mm	NO	EU	Double pigtail 10 F	8 weeks
M	49	P. Chronic	Head	77 x 70 mm	NO	EU	Double pigtail 10 F	12 weeks
M	39	P. Severe	Body	139 x 82	NO	ERCP	Double pigtail 10 F #2	8 weeks
M	8	P. Severe	Body	121 mm	NO	EU	One tail 10 F	8 weeks

DESCRIPTIONS OF CASES

Case 1

This 39 year old male patient had suffered 4 months of decreased appetite and feeling full after eating. The patient had an epigastric mass that gradually increased in size. Nine months earlier the patient had had biliary pancreatitis which required medical management. The patient was admitted to the emergency room with hematemesis. Upper endoscopy showed gastric extrinsic compression. An abdominal CT scan showed an image suggestive of a 139 x 82 mm pseudocyst without septa. Insertion of a double pigtail prosthesis was performed and patient recovered appropriately (Figure 1). 10 weeks later the prosthesis was removed. After one year of follow up there had been no recurrence.

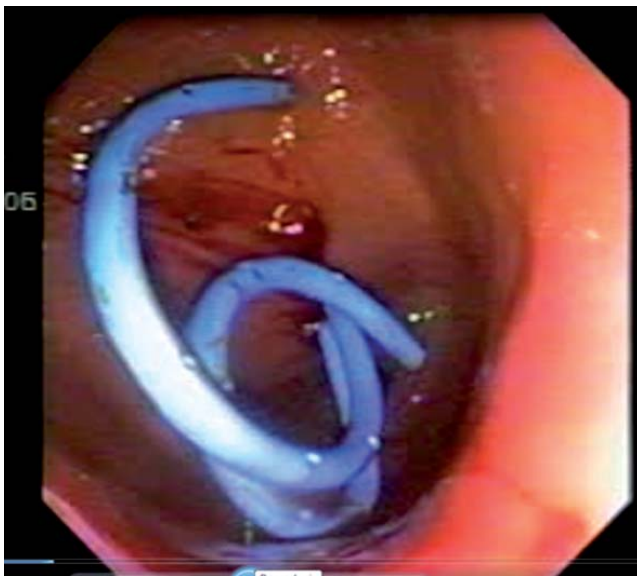


Figure 1. Patient with collection of fluid at the head of the pancreas. Pseudocyst was managed endoscopically with placement of prosthesis.

Case 2

A 19 year old woman was admitted to the emergency room with epigastric abdominal pain and emesis. Six months earlier the patient had been discharged from the hospital following a laparoscopic cholecystectomy performed because of pancreatitis. An abdominal CT scan showed a 50 mm x 45 mm x 31mm collection of fluid in the body and tail of the pancreas. It was decided to drain the pancreas with a #19 needle. Patient evolved appropriately and was discharged one day after drainage. After one year of follow up there had been no recurrence (Figure 2).



Figure 2. Image of the tail of the pancreas drained by EU needle number 19, with no recurrence. The arrow shows the site of the cyst.

Case 3

A 79 year old male patient was admitted to the emergency room with postprandial emesis, epigastric pain and gastric fullness. Patient had a history of acute biliary pancreatitis

which had been treated with a cholecystectomy two months earlier. After admission to the emergency room an abdominal CT scan was performed. It showed an image compatible with a 110 mm x 110 mm cystic lesion (Figure 3). Transgastric endoscopic ultrasound (EU) guided drainage was performed through placement of a 10 Fr double pigtail prosthesis. Patiently evolved appropriately and was discharged a day later.



Figure 3. Patient with pancreatic pseudocyst. The image shows a hypodense lesion in the pancreatic head.

Case 4

A 49 year old patient with a history of pancreatic pseudocyst compromising the pancreatic head was admitted to the emergency room for epigastric pain. A CT scan showed a 77mm x 70mm collection of fluid in the pancreatic head. Transgastric drainage (Figure 4) was performed through placement of a 10 Fr double pigtail prosthesis. Patiently evolved appropriately and was discharged two days later. After one year of follow up there had been no recurrence.

Case 5

A 22 year old male patient who had been admitted to another institution after blunt abdominal trauma was admitted with an elevated amylase level. An abdominal CT scan showed a 126 mm x 102 mm x 106 mm collection of fluid in the pancreatic body and tail (Figure 5). Gastric endoscopy showed extrinsic compression. EU guided drainage was performed through placement of a 10 Fr double pigtail prosthesis. The clinical outcome has been excellent.

Case 6

A 56 year old female patient who had undergone medical treatment for pancreatitis after a CT scan showed a 120 mm

pancreatic pseudocyst, and who had improved and become asymptomatic, was admitted to the hospital after 11 months of outpatient follow-up when she presented symptoms and increased pseudocysts. Upper endoscopy showed no evidence of extrinsic gastric compression. Endoscopic ultrasound showed a 120mm diameter anechoic lesion in the pancreas which was compressing the pancreatic head and body. Transgastric drainage guided by fluoroscopy (Figure 6) was performed through placement of a 10 Fr double pigtail prosthesis. Patiently evolved appropriately and was discharged a day later. After 6 months of follow up there had been no recurrence.

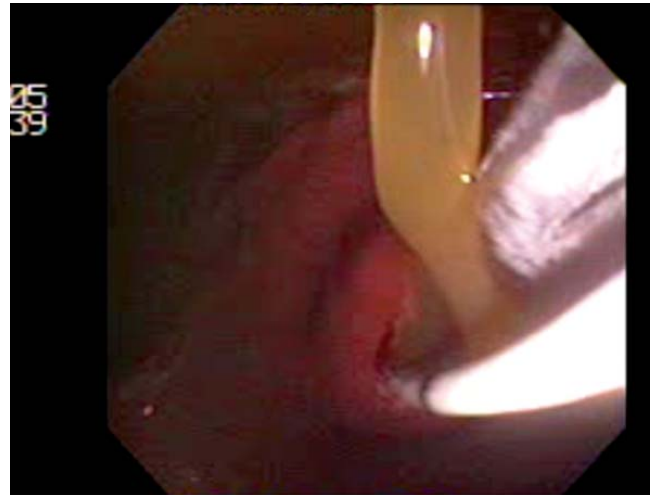


Figure 4. Patient with chronic pancreatitis with lesion in the pancreatic head. Following EU, it was drained with ERCP. Observe how the liquid starts to come out once the wall is dilated with a balloon.



Figure 5. Patient with giant posttraumatic pancreatic collection which was resolved through placement of a transgastric 10Fr prosthesis.

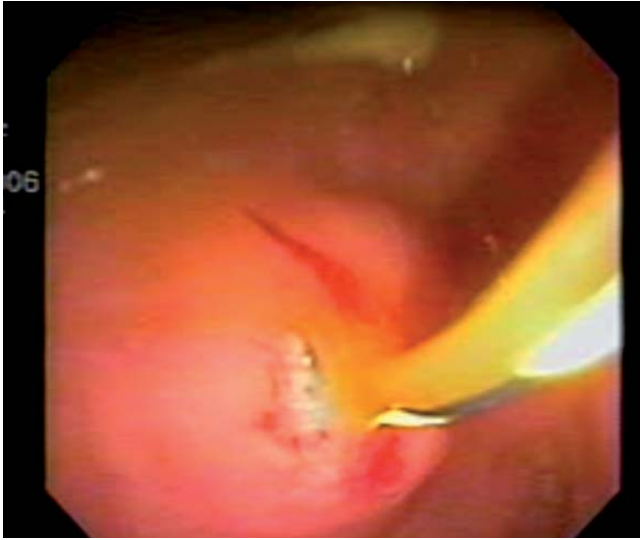


Figure 6. This image shows transgastric drainage. Observe the guide wire and the drainage of abundant pancreatic fluid without even having placed the prosthesis.

Case 7

Eight months after a 61 year old female patient had been treated as an outpatient for severe acute pancreatitis and pancreatic pseudocyst formation, it was decided to hospitalize her for drainage because of the development of epigastric pain. An abdominal ultrasound showed a 156 mm x 97 mm x 110 mm collection of fluid. Transgastric endoscopic ultrasound (EU) guided drainage was performed through placement of a 7 Fr prosthesis (no other diameters were available). Patiently evolved appropriately and was discharged two days later (Figure 7).

Case 8

A 30 year old woman who was 10 weeks pregnant with more than one fetus was admitted after one month of acute pancreatitis. Patient had a progressively growing epigastric mass associated with epigastric pain and postprandial emesis. Abdominal ultrasound showed a 168 mm x 150 mm hypoechoic collection of fluid in the body and tail of the pancreas. Transgastric endoscopic ultrasound (EU) guided drainage was performed through placement of a double 8 Fr pigtail prostheses. At 26 weeks of her pregnancy the patient had a normal delivery. A CT scan taken 6 months later showed the prosthesis and no recurrence of the cyst (Figure 8).

Case 9

Two months after an eight year old child had spent three weeks in the intensive care unit with medical treatment for

blunt abdominal trauma and severe acute pancreatitis, the patient continued to suffer from early satiety and abdominal pain. A CT scan showed two giant connected 121mm collections of fluid in the head and body of the pancreas (Figure 9). Transgastric endoscopic ultrasound (EU) guided drainage was performed through placement of a single 10 Fr pigtail prosthesis. The child's development was very good, and a follow-up CT scan showed no evidence of the lesion after 3 months (Figure 10). The prosthesis was removed. After 6 months of follow up there had been no recurrence and the patient continues to be asymptomatic.

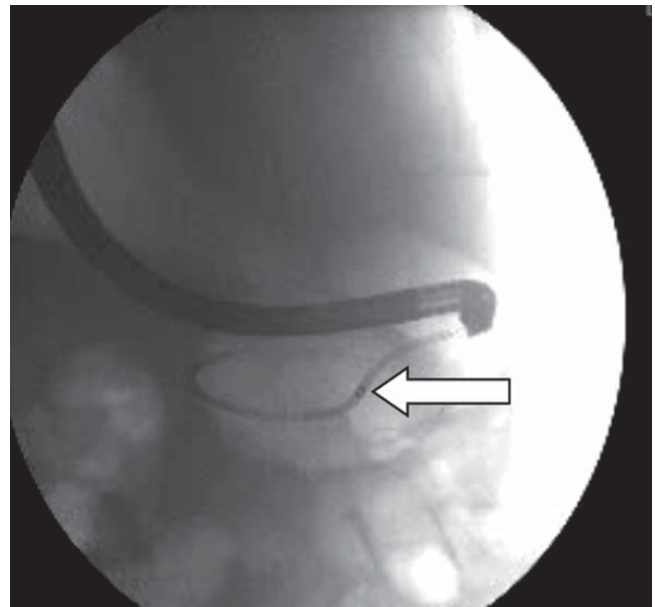


Figure 7. Fluoroscopic image showing the duodenoscope positioning the double pigtail prosthesis (arrow)

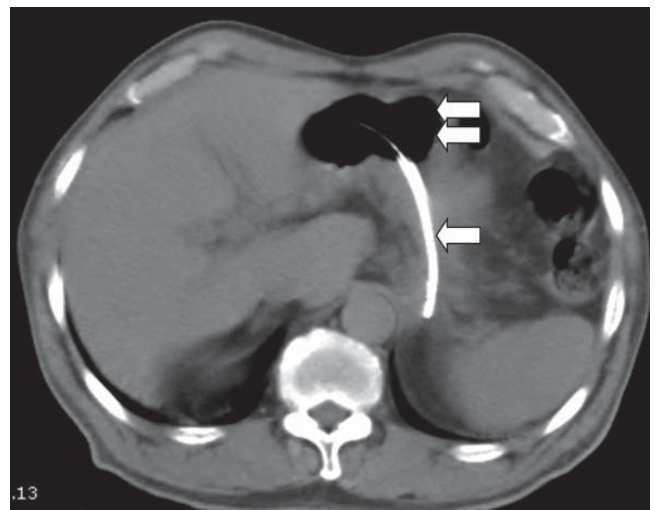


Figure 8. CT shows prosthesis (arrow), which communicates the gastric cavity (double arrow) and no longer collection.

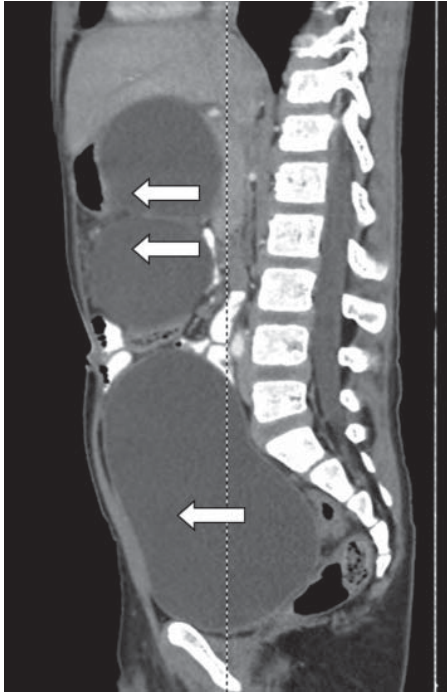


Figure 9. This image shows an eight year old patient with two interconnected collections of fluid (arrows) in the body. Below is the image of a distended bladder (arrow).

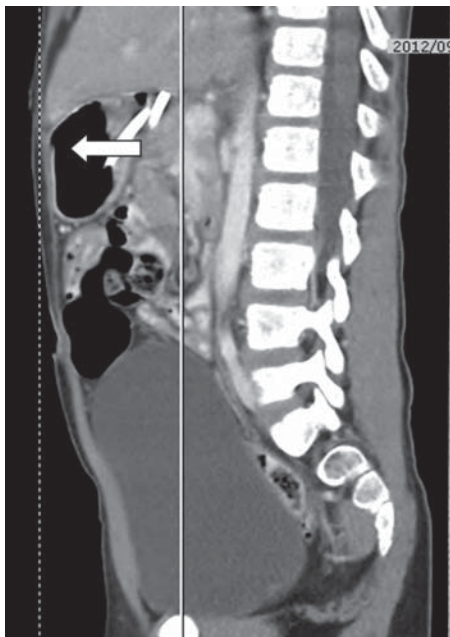


Figure 10. This image shows complete resolution of the pseudocyst (arrow) and the prosthesis inside. Interestingly, the patient's bladder is again distended by the contrast medium.

DISCUSSION

Treatment options for patients with pancreatic pseudocysts include percutaneous drainage, surgery, and endos-

copy. The latter's initial 90% success rate is the highest of the three, and 70% to 80% of these cases are resolved while the recurrence rate is between 10% and 15%. The recurrence rate could be lowered for cases of pancreatic necrosis in which the solid wastes interfere with proper drainage (6, 8, 9). There are two methods of endoscopic treatment: transmural drainage performed via the stomach or duodenum, and transpapillary drainage through the papilla. Combinations of the two methods are also possible. Drainage through the papilla has fewer complications but is less effective. It is only desirable for pseudocysts smaller than 5cm, and the pseudocyst must be connected with the pancreatic duct. This occurs in only about 40% of the cases (10). In our study this technique was not used.

Technical success is defined as the ability to insert at least an endostent between the pancreatic pseudocyst and the lumen of the gastrointestinal tract (stomach and duodenum) (10, 11), or as the resolution of the collection of fluid, although not necessarily of symptoms (12). Clinical success is defined as complete resolution of symptoms with a decrease in the size of the pseudocyst of at least 30% to 50% in the first month of treatment. All nine of our cases were 100% technically and clinically successful using the endoscopic method (11).

There are many studies that support the superiority of endoscopic treatment to surgery. One recent study that compared the two techniques showed that endoscopic treatment was superior to surgery in terms of cost, length of hospital stay, and quality of life (13). In another review that included 787 patients morbidity of the two methods was similar (13.3% vs. 16.0%, respectively), as was long-term recurrence of pseudocysts (10.7% vs. 9.8%, respectively), but endoscopic method resulted in a lower mortality rate (0.2% vs. 2.5%, respectively) (14).

If the pseudocyst bulges or protrudes into the gastric cavity or duodenum, it is usually considered that it can be drained without the guidance of ultrasound endoscopy which is reserved only for cases where there is no compression of the lumen. Nevertheless, our group considers that all pancreatic pseudocysts should be drained with prior EU since there is always the risk of having a vessel in the gastric wall that separates the collection of fluid. These lesions are very dynamic and are very likely to break in the course of their evolution. This can be detected by EU. This was the case when a 9 year old girl was referred to us for drainage of a pseudocyst. An MRI (Figure 11) that had been taken eight days before indicted the pseudocyst. Nevertheless, when we evaluated the patient for drainage, we observed that it had broken into the cavity resulting in pancreatic ascites. In addition, it should be noted that for drainage of small pancreatic pseudocysts (5 cm), a #19 needle guided by EU is often sufficient for complete aspiration. If we choose the endoscopic route, transduodenal drainage

is preferable to gastric drainage if both are feasible. Also, insertion of a dual 10 F pigtail prosthesis has fewer complications than insertion of a straight, and is therefore preferable. This is also the recommendation of the American Society for Gastrointestinal Endoscopy (ASGE). If it is possible, you should place two prostheses because the use of a double prosthesis has fewer recurrences than the use of only one. A follow up CT scan should be done 2 months after the procedure. If there is no evidence of collected fluid, the pseudocyst should be removed endoscopically. In our series, most patients' pseudocysts resolved within 2 or 3 months and only one patient required two prostheses.

A review of seven studies that evaluated 121 patients to compare cystoduodenostomies (transduodenal) with cystogastrostomies (transgastric) showed that long-term success was higher with the transduodenal approach than with the transgastric approach (59/71 [83.1%] vs. 32/50 [64.0%], $p=0.019$). Morbidity rates were identical (10%) (15). This may be related the fact that of cystoduodenal fistulas are more permeable than cystogastric fistulas (16-17). Nevertheless, in our experience it is more difficult to address the duodenum than the gastric cavity given the difficulty of positioning the equipment.

WHAT IS OUR TECHNIQUE?

We will describe the technique we have been using in our service for about 5 years. The patient is sedated by an

anesthesiologist and is placed in left lateral position. Then we introduce the endoscope. Next, we find the pseudocyst (Figure 11) and the wall that separates it from the gastric lumen. We evaluate it by measuring its thickness and using a Doppler signal to rule out the presence of vessels (Figure 12). Once the site chosen has been located, we mark the area with biopsy forceps (or ink), then we remove the echoendoscope and replace it with a duodenoscope which we believe provides better angulation for drainage. After introducing a guided papillotome needle with coagulation current set at 30V, the wall is perforated (Figure 13). Once entry to the pancreatic pseudocyst has been achieved, the guide wire should be advanced guided by fluoroscopy (this is not strictly necessary: we have drained some cases in the endoscopy room). The coagulation hole can now be extended to 2 or 3 mm in diameter using the same papillotome for cutting (Figure 14). This will allow passage of the prosthesis (this step can be done with a biliary dilatation balloon, but it is more expensive). The papillotome is then removed and the prosthesis is advanced (Figure 15). Then the orifice is cannulated again, and - using the same method - we place the other prosthesis. Double pigtail 10 Fr type prostheses should be placed. For 5 days following the procedure, 1.5 grams of ampicillin/sulbactam should be administered orally every 6 hours, and 1 tablet of fluconazole should be administered daily (8, 9). Because of the high rates of recurrence, prostheses should remain in situ for 8 weeks. At the point another CT scan should be



Figure 11. The image shows the pancreatic pseudocyst producing extrinsic compression in the gastric antrum (arrow).

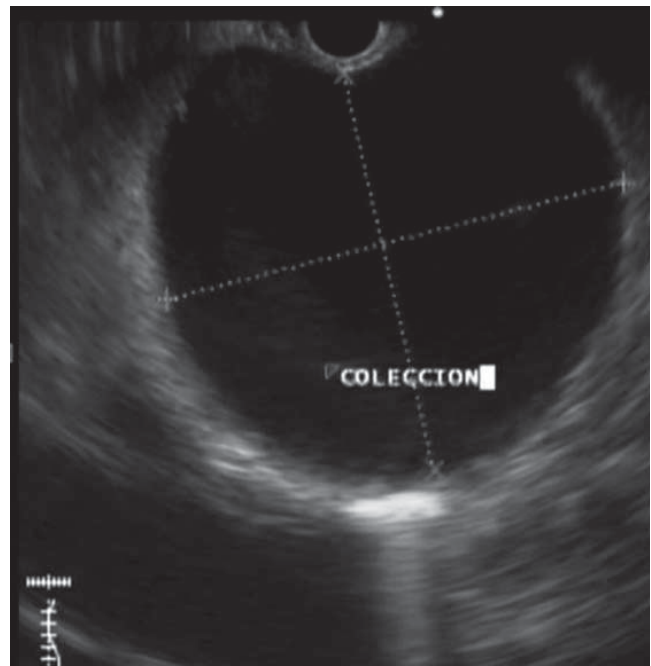


Figure 12. The figure shows an image without septa or vessels, an echoic which is compatible with a pseudocyst.



Figure 13. This image shows the papillotome needle with which the cut in the gastric wall is made (arrow).

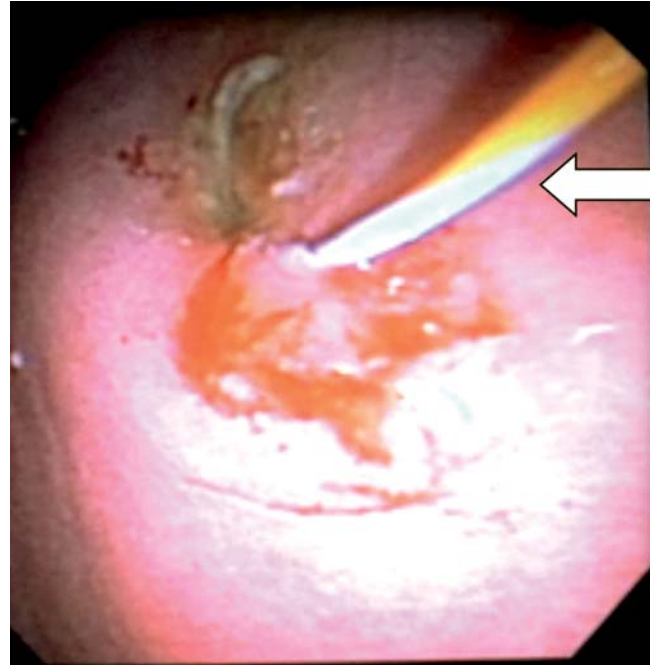


Figure 14. The image shows the cut made with the papillotome needle and then the guide wire within the pancreatic pseudocyst (arrow).



Figure 15. The double pigtail prosthesis has been released and the image shows drainage of the collection of fluid.

performed. If there are no residual lesions, the prostheses should be removed (4).

Complications can arise during the procedure or insertion of the prostheses. Bleeding, one of the most feared complications, may require sclerotherapy or surgery. Complications of transpapillary drainage are related to performance of ERCPs. They include pancreatitis, bacteremia and the formation of abscesses. The primary complications related to prostheses are occlusion and migration (9).

In conclusion, endoscopic therapy for drainage of pancreatic pseudocysts is a safe, effective and minimally invasive procedure which can even be performed on an outpatient basis. In our series there were no complications or recurrences in the follow-up period, so we believe that this is the procedure of choice for management of these patients. Surgery should be reserved only for cases in which endoscopy fails and for cases for which this procedure is contraindicated.

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