

Endosonography-assisted transmural endoscopic drainage of pancreatic pseudocysts: A single center experience

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Background/aims: Management of pancreatic pseudocysts can be challenging. Endosonography-guided drainage of the pseudocysts is an important treatment modality. In this study, we evaluated the results of endosonography-guided transmural endoscopic drainage of these lesions. **Materials and Methods:** We performed drainage of the pancreatic pseudocysts through the stomach or duodenum using a linear endosonography device. The procedure steps were as follows: Determination of the best location for needle insertion, puncture of the cyst, guide insertion, creation of a window between the cyst and stomach lumen using a cystotome, and finally insertion of a double pigtail catheter. **Results:** The procedure was applied to 12 patients (8 males, 4 females, mean age: 51±15.6 years), with success achieved in 10 patients (83%), defined as complete disappearance of the cyst. The mean cyst diameter was 9 cm (range: 6-12 cm). There was only one complication (8%), as an intraabdominal abscess with an uncomplicated course after surgical drainage. **Conclusions:** Endosonography-guided drainage is an effective and safe method for the management of pancreatic pseudocysts.

Key words: Pancreatic pseudocyst, endosonography, endoscopic cystogastrostomy, endoscopic cystoduodenostomy

Pankreatik psodokistlerin endosonografi eşliğinde transmural endoskopik drenajı: Tek merkez verileri

Giriş ve Amaç: Pankreatik psodokistlerin sağaltımı problemlili olabilmektedir. Endosonografi rehberliğinde yapılan drenaj işlemleri bu konuda öne çıkan bir tedavi seçeneğidir. Çalışmamızda bu işlemi uyguladığımız hasta grubunda elde ettiğimiz sonuçları sunmayı hedefledik. **Gereç ve Yöntem:** Pankreatik psodokistlerin drenajı mide ya da duodenum yoluyla, lineer endosonografi cihazı kullanarak gerçekleştirildi. İşlem şu aşamaları kapsamaktaydı: İğne giriş yerinin belirlenmesi, kistin delinmesi, içine rehber tel gönderilmesi, kist ve mide lümeni arasında kistotom kullanılarak fenestrasyonun sağlanması, double pigtail kateter konularak sürekli drenajın sağlanması. **Bulgular:** 12 hasta (8 erkek, 4 kadın; ortalama yaş 51±15.6 yıl) çalışmaya alındı. Ortalama kist çapı 9 cm (aralık, 6-12 cm) idi. Primer sonlanım olarak kistin tamamen kaybolması alındığında işlem 10 hastada (%83) başarılı oldu. İşlem sonrası sadece bir hastada (%8) komplikasyon gelişti ve intraabdominal abse oluşan bu hasta cerrahi drenaj sonrası problemsiz seyretti. **Sonuç:** Endosonografi rehberliğinde drenaj pankreatik psodokistlerin tedavisinde etkin ve güvenli bir yöntem olarak bulunmuştur.

Anahtar kelimeler: Pankreatik psodokist, endosonografi, endoskopik kistogastrostomi, endoskopik kistoduodenostomi

INTRODUCTION

Pancreatic pseudocysts may occur as a complication of acute and chronic pancreatitis, pancreatic

trauma or pancreatic duct obstruction. Surgical treatment can be an effective method for the treat-

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ment of a symptomatic or an infected cyst, but its morbidity rate is nearly 34% and mortality rate is approximately 8.5% (1). This has encouraged the development of non-surgical approaches. Nowadays, endosonography (EUS)-guided cyst drainage is an alternative to surgery for the management of pancreatic pseudocysts (2-4). Even in cases where cysts do not bulge into the wall of the stomach or duodenum, this technique allows endoscopic transmural drainage of these lesions (5,6). The aim of this retrospective study was to evaluate the results of linear EUS-guided transmural endoscopic drainage of the pseudocysts.

MATERIALS AND METHODS

The charts of the patients seen between March 2008 and June 2010 in whom linear EUS-guided transmural drainage of a pancreatic pseudocyst was performed were reviewed retrospectively. All the procedures were carried out in the endoscopy unit of our faculty. Indications for drainage were pain, nausea and vomiting, infection of the cyst, or jaundice. All the procedures were performed after an overnight fast of 12 hours. The choice of sedation was made at the discretion of the anesthesiologist. Conscious sedation with midazolam and meperidine, monitored anesthesia with propofol or general anesthesia was preferred according to the patient's cardiovascular risk status.

Pentax EG-3830UT linear EUS and Hitachi EUB-525 F ultrasound (Tokyo, Japan) devices were used in these procedures. Doppler ultrasound was employed to ensure that there were no intervening vessels at the puncture site. Following determination of the location of the entrance by EUS and endoscopic view, cyst fluid was aspirated via a 19-gauge needle (Echotip, Wilson-Cook, Winston-Salem, NC). After placement of a needle in the appropriate location, a 0.035 tight guide-wire was placed and 19-gauge needle was replaced by a 10F cystotome. Following application of two-level electrocautery with cystotome, cystotome was removed and the procedure was finalized with placement of a 10F-10cm double pigtail stent (Figure 1 A-C and 2A-D).

RESULTS

Endoscopic cyst drainage was performed in a total of 12 patients (8 males, 4 females). The mean age of the patients was 51 ± 15.6 (range: 18-73) years. While endoscopic cystogastrostomy was performed in 10 patients (83%), endoscopic cystoduodenos-

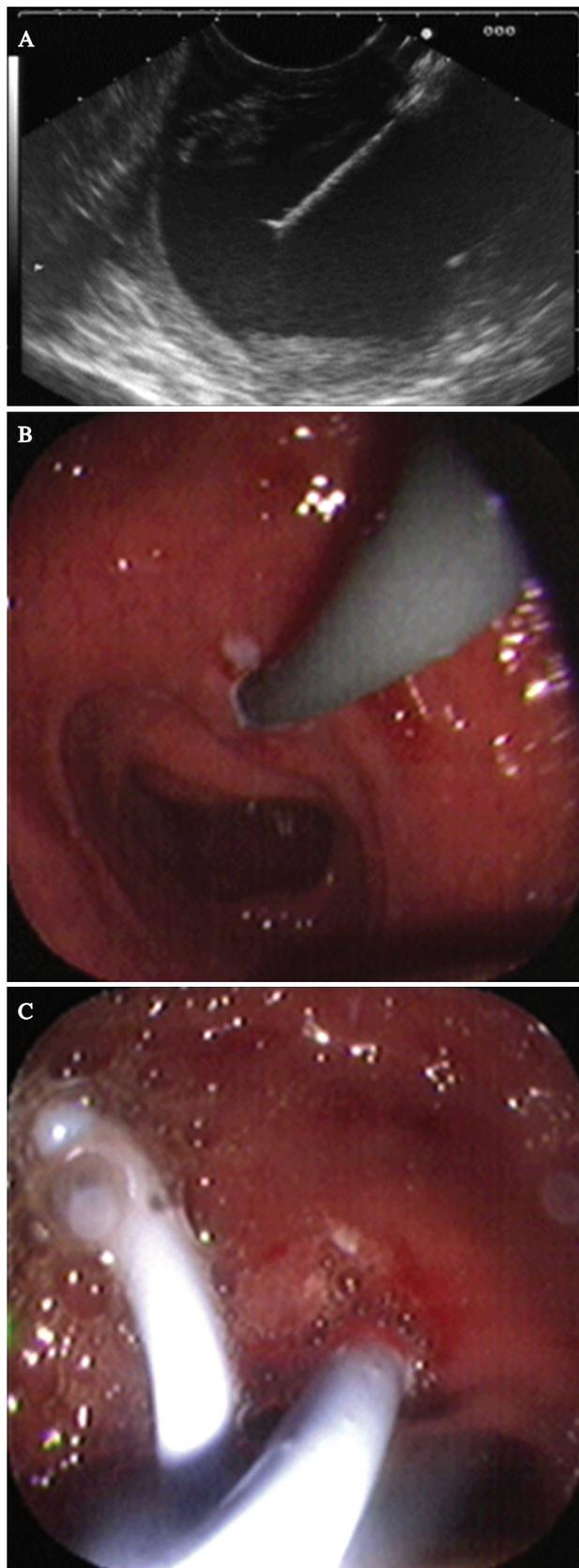


Figure 1. A. Entrance into the pseudocyst with 19 gauge-needle under guidance of linear EUS. B. Placement of 10F cystotome into the cyst minimally bulging into the duodenum. C. Image of the double pigtail stent.

tomy was performed in 2 cases (17%). In 1 patient, cystogastrostomy was repeated because of cyst recurrence. Etiological factors were as follows: acute biliary pancreatitis (n=6, 50%), alcohol-induced chronic pancreatitis (n=3, 25%), alcohol-induced acute pancreatitis (n=1, 8.3%), idiopathic acute pancreatitis (n=1, 8.3%), and duodenal dystrophy (n=1, 8.3%). Mean diameter of the cysts was 9 cm (range: 6-12 cm). Localizations of the cysts were head (n=3, 23.1%), corpus (n=4, 30.8%), and tail (n=5, 38.5%) of the pancreas, and duodenal wall

(n=1, 7.7%). Indications for drainage were pain (n=8, 61.5%), nausea-vomiting (n=3, 23.1%), infection of the cyst (n=1, 7.7%), and jaundice (n=1, 7.7%). Endoscopically, bulging was present in all cases except one (11/12, 92%). Mean length of the incision was 1.3 cm (range: 1-3 cm). While aspiration alone without stenting was performed in the patient with duodenal dystrophy, a 10F-10cm double pigtail stent was placed in all remaining patients (figure 3A-B). Mean duration of the follow-up period was 10.5 months (range: 7-36 months).

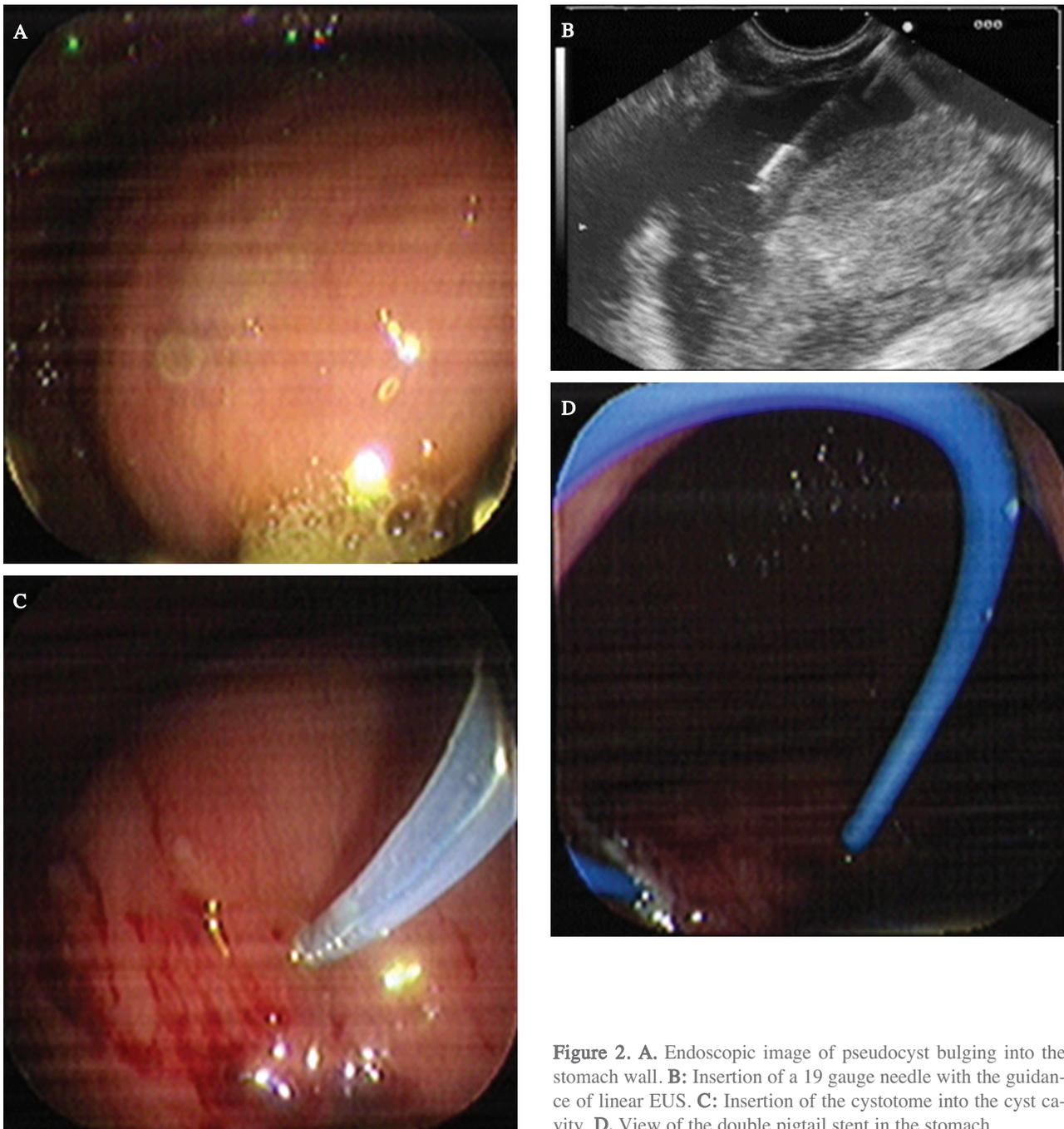


Figure 2. **A.** Endoscopic image of pseudocyst bulging into the stomach wall. **B:** Insertion of a 19 gauge needle with the guidance of linear EUS. **C:** Insertion of the cystotome into the cyst cavity. **D.** View of the double pigtail stent in the stomach.

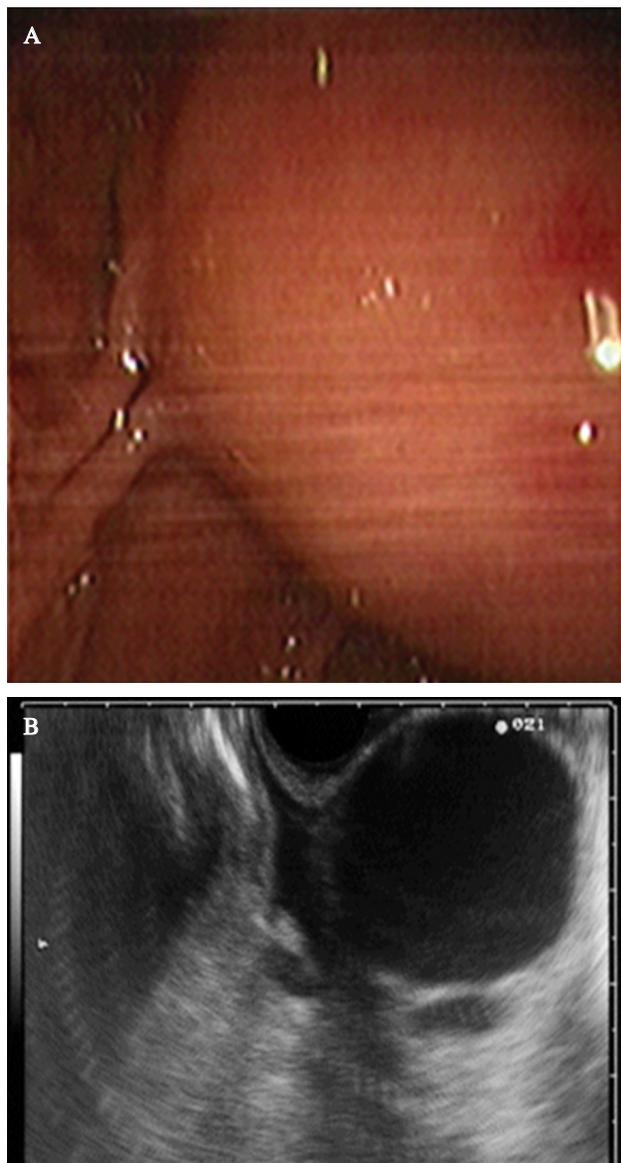


Figure 3. A. Endoscopic view of the pseudocyst which occurred in a case of duodenal dystrophy. B. Linear EUS image of the pseudocyst in duodenal wall.

There was just one complication (8%): an intraabdominal abscess developed in a patient with a pseudocyst (diameter of 12 cm) located in the head of the pancreas, which occurred 60 days after cystogastrostomy. The abscess fully regressed after surgical drainage followed by antibiotic therapy. Mean duration for complete resolution of the cysts was 5.5 months (range: 3-12 months). Full recovery was achieved in 10 patients (83.3%) with a single endoscopic intervention. In follow-up visits, symptomatic relapse was seen in one patient who had alcoholic pancreatitis because of the obstruction of the double pigtail stent. An asymptomatic relapse was observed in another patient

who had idiopathic acute pancreatitis. Thus, the overall relapse rate was 16.6% (2/12). Cyst diameters in relapsing patients were 10 and 11 cm, and both lesions were in the tail of the pancreas. The patient with symptomatic relapse showed clinical improvement after placement of a second 10F-10cm double pigtail stent. One patient with asymptomatic relapse was followed without any treatment. In all patients with biliary acute pancreatitis and in one patient with duodenal dystrophy, cholecystectomy was performed approximately one month after endoscopic drainage. There was no procedure-related mortality.

DISCUSSION

Endoscopic transmural drainage is an alternative to surgery in the management of pancreatic pseudocysts (7,8). It was first reported by Sahel *et al.* (7) as an effective method. Efficacy of linear EUS-guided transmural drainage was shown in previous trials (2,3,9). Since this method reveals the relation of the cyst with the gastrointestinal tract, it enables drainage of the cysts, which also do not bulge into the duodenal or gastric wall (10).

In our series, patients were generally in their 5th decade. Except for one patient, a 10F-10cm double pigtail stent was successfully placed in all cases. In the patient with duodenal dystrophy, an incision of 3 cm was performed at the bulging region and aspiration was performed, without any other intervention. Following linear EUS-guided transmural drainage, a late-stage intraabdominal abscess developed in one patient, but no other complications developed in any patient during intervention and/or the follow-up period. Symptomatic relapse occurred in one patient. Resolution rate of cysts during the follow-up was 92.3% (12/13).

In two previous studies, the resolution rate was found as 89- 92% (5,11). In long-term results of a trial in which patients were followed for up to 44 months, Sharma *et al.* (6) reported a symptomatic relapse rate of 8%. For relapsing patients, a second endoscopic drainage was performed successfully. A previous study reported cyst resolution in 94%, symptomatic relapse in 9% and complications in 1.4% of cases (12). These results are in concordance with our findings.

In several trials, higher resolution rates were seen in pseudocysts secondary to chronic pancreatitis as compared to the cysts secondary to acute pancreatitis (13,14). A previous study reported a resoluti-

Table 1. Characteristics of patients who underwent linear EUS-guided pseudocyst drainage

Number of patients (n)	12
Number of procedures	13
Gender (M/F)	8/4
Age	51±15.6 (18-73)
Chronic pancreatitis	3/12 (25%)
Acute pancreatitis	8/12 (66%)
Duodenal dystrophy	1/12 (8.3%)
Localization of pseudocyst	
-Head	3/13 (23.1%)
-Corpus	4/13 (30.7%)
-Tail	5/13 (38.4%)
-Duodenal wall	1/13 (7.7%)
Cyst diameter (cm)	9±1.7 (6-12)
Bulging	12/13 (92.3%)
Plastic stent (10F-10cm double pigtail)	12 (92.3%)
Aspiration only	1 (7.7%)

on rate of 92% after endoscopic drainage in chronic pseudocysts, while this rate was 74% in acute pseudocysts. In the same trial, the complication rate was 17% in chronic and 19% in acute pseudocysts (14). In our series, resolution was not obtained in one acute and one chronic pseudocyst case.

In previous studies, no correlation between cyst diameter and duration of hospitalization, mortality, morbidity, relapse, or complication rate was reported (4,15). In our series, the one patient developing intraabdominal abscess had a cyst diameter of 12 cm and the two patients with recurrence had cyst diameters of 10-11 cm, both located in the tail of the pancreas. Further trials are needed to evaluate the correlation between size and localization of cyst and the development of complications and relapse.

With respect to symptomatic relapse, no significant correlation was found regarding the type of plastic stent (straight or double pigtail) (4), but in the same study, a higher complication rate was reported among patients with straight stents. In another study, the complication rate of patients in whom double pigtail stent was inserted was reported to be higher than of patients with straight stents, but this finding was not evaluated in randomized controlled trials (16). In our series, a 10F-10cm single double pigtail stent was inserted in all cases except one, and the resolution rate was determined as 91.6%.

Jouannaud et al. (17) performed cystoduodenostomy in two patients in a series of 23 patients with chronic alcohol-induced pancreatitis and duodenal dystrophy, and further performed surgical treatment in these two patients at 12 and 20 months due to symptomatic relapse. In that series, continued alcohol consumption was determined as one of the factors leading to relapse. In our patient series, pseudocyst in ectopic pancreas tissue in the duodenal wall secondary to biliary pancreatitis was observed in one case with duodenal dystrophy. This patient had symptoms of nausea and jaundice. Fenestration was performed on cyst bulging into the duodenum, and the cyst was evacuated by aspiration. One month later, cholecystectomy operation was performed. No relapse was observed during a follow-up period of seven months.

In conclusion, linear EUS-guided drainage of pseudocysts is an effective and safe therapeutic modality. Further prospective, randomized trials conducted on larger patient groups are required to determine the risk factors for relapse and complications.

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