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CASE REPORT

Percutaneous Transgastric Snaring for Repositioning of a Dislocated Internal Drain from a Pancreatic Pseudocyst

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Abstract Pancreatic pseudocysts may occur in up to 10% of patients with acute or chronic pancreatitis. Symptomatic, persistent, and infected pancreatic pseudocysts require interventional therapy. We present the case of a patient with complete dislocation of a double pigtail catheter into an infected pseudocyst and the repositioning of the drainage catheter using a transgastric snaring technique. The combination of CT-guided percutaneous puncture and fluoroscopic snaring permitted minimally invasive management of this rare complication.

Keywords Computed tomography · Drainage · Pancreas · Pseudocyst

Introduction

Pancreatic pseudocysts are a common complication of acute or chronic pancreatitis and a less common sequela after pancreatic trauma [1]. They may occur in up to 10% of patients with pancreatitis and represent about 20% of all cystic lesions of the pancreas [2]. Pancreatic pseudocysts are defined as a collection of pancreatic juice enclosed by a well-defined wall of fibrous or granulation tissue. The fluid collection needs to be present for at least 4 weeks to be deemed a pseudocyst [1].

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Symptomatic, persistent, and complicated pseudocysts are considered an indication for surgical or interventional therapy. While surgery was the reference method for the treatment of pancreatic pseudocysts, there are now less invasive techniques including endoscopic and percutaneous drainage. Both are particularly suited for the treatment of infected pseudocysts [3–5]. Most common complications in percutaneous drainage include the risk of bleeding and inadvertent passage of the pleural space. Both are reported to occur in approximately 1–2% of patients [6].

We describe the uncommon complication of a complete dislocation of a drainage catheter into an infected pseudocyst and the transgastric repositioning of the drainage catheter with a fluoroscopically guided snaring technique.

Case Report

An 86-year-old woman was admitted to hospital in reduced condition with ague, night sweat, and upper abdominal pain. Physical examination revealed a heart rate of 113 beats/min and a body temperature of up to 39.8 °C. She had a history of diabetes mellitus type 2a and arterial hypertension. Four months prior to the current hospital admission she suffered acute necrotic pancreatitis of unknown cause. Blood testing showed elevated parameters of infection with leukocytosis (25.6 g/l [normal range 4.3–10.0]), elevated CRP (>230 mg/l [<5]), and raised procalcitonin (0.8 µg/l [0.1–0.5]).

Abdominal B-mode ultrasound showed little fluid in the infrahepatic or the left suprarenal recess. The common bile duct measured 10 mm. Due to a diffusely inflated and dilated bowel the pancreatic region was not assessable. Contrast-enhanced multislice spiral CT (MSCT; Somatom

Definition, Siemens, Forchheim, Germany; 64 × 0.6 mm, 120 kV, 165 $mAs_{eff.}$) was performed 60 sec after injection of 100 ml of Iopromide 370 (Ultravist 370, Bayer-Schering Pharma, Berlin, Germany). The MSCT examination revealed a 9.4 × 4.8 cm prepancreatic fluid collection surrounded by a contrast-enhancing wall (Fig. 1). MSCT also depicted moderate mesenterial edema and several moderately enlarged mesenterial lymph nodes.

Based on these finding the diagnosis of an infected pancreatic pseudocyst was made. After antibiotic therapy had been started (1 g Ertapenem, Invanz, MSD Sharp & Dohme, Haar, Germany) interventional therapy by percutaneous drainage was scheduled. For sedation, boluses of 30 µg/kg midazolam (Dormicum, Hoffman-La Roche, Basel, Switzerland) and 50 µg/kg piritramide (Dipidolor, Janssen-Cilag, Neuss, Germany) were administered intravenously as needed. In addition local anesthesia with 15 ml mepivacaine 1% (Meaverin 1%, DeltaSelect, Dreieich, Germany) was performed. Under CT guidance the pseudocyst was transgastrically punctured with an 18G needle (One-Step centesis catheter, Merit Medical, South Jordan, UT, USA). Ten milliliters of pus was aspirated for further diagnostic investigation. Subsequent microbiological examination of the pus proved the presence of *E. coli*. Via the Teflon catheter of the puncture needle a 0.035-inch stiff wire with an 8 cm flexible tip (Amplatz Stiff Wire Guide, Cook, Bloomington, IL, USA) was placed in the lesion. Thereafter the stomach was distended with 1 l of air via a nasogastric tube. After removal of the Teflon catheter an 8.5 Fr (length 7 cm) double pigtail catheter (ENDO-Flex, Voerde, Germany) was introduced over the wire.

Fig. 1 Contrast-enhanced MSCT scan shows a 9.4 × 4.8 cm prepancreatic fluid collection surrounded by a contrast-enhancing wall (arrows). As the patient had a history of necrotizing pancreatitis and typical parameters of infection the lesion was diagnosed as an infected pseudocyst

During catheter insertion the patient coughed repeatedly and tried to sit up. Subsequently the catheter was completely displaced into the pseudocyst (Fig. 2A). In order to reposition the catheter another CT-guided puncture of the pseudocyst was performed and the guidewire was placed in the pseudocyst again. To avoid displacement of the wire it was fixed on the skin using a transparent patch (Tegaderm HP, 3M, Neuss, Germany). Thereafter the patient was transferred to the angiography suite. A 6 Fr introducer sheath (Terumo, Tokyo, Japan) was introduced into the pseudocyst. The double pigtail catheter was caught with a 2 cm snare (AndraSnare AS 20, Andramed, Reutlingen, Germany) (Fig. 2B). After dilatation of the stomach with 500 ml of air one end of the double pigtail catheter was pulled back into the stomach. Finally the snare and the introducer sheath were removed from the stomach and correct positioning of the catheter was proven using non-enhanced MSCT (Somatom Definition, Siemens, Forchheim, Germany; 64 × 0.6 mm, 120 kV, 150 $mAs_{eff.}$; Fig. 2C).

After the intervention the clinical condition of the patient improved significantly. Within 3 days leukocytes (13.7 G/l) and CRP (160 mg/l) decreased. To facilitate resolution of the pseudocyst two additional 8.5 Fr (length 5 cm) internal double pigtail drainages (Endo-Flex, Voerde, Germany) were introduced endoscopically 3 days after the initial procedure. Since interventional endoscopic ultrasound was not available at that time the initial drainage catheter was used as a guide for positioning the additional drainage catheters.

Two weeks after the initial intervention the patient was discharged in good condition with three pancreatico-gastric drains. Two weeks after discharge from hospital the first drain was removed endoscopically. Contrast-enhanced CT 6 months after the intervention showed the pseudocyst to be completely resolved (Fig. 3) and the remaining drains were removed endoscopically. Seven months after discharge from hospital the patient is well without signs of recurrent pseudocyst or infection.

Discussion

About 36–41% of patients with pancreatic pseudocysts may experience complications such as pseudocyst rupture, abscess, jaundice, and hemorrhage if no treatment is performed [7, 8]. Nevertheless a "wait and see" strategy is justified by the knowledge that up to 56% of pseudocysts resolve spontaneously. This is true in particular for small pseudocysts (<5 cm) [8]. Thus expectant treatment is often performed unless the pseudocyst exceeds 5–7 cm. However, in symptomatic patients or in lesions exceeding 7 cm interventional therapy is commonly performed. There are a

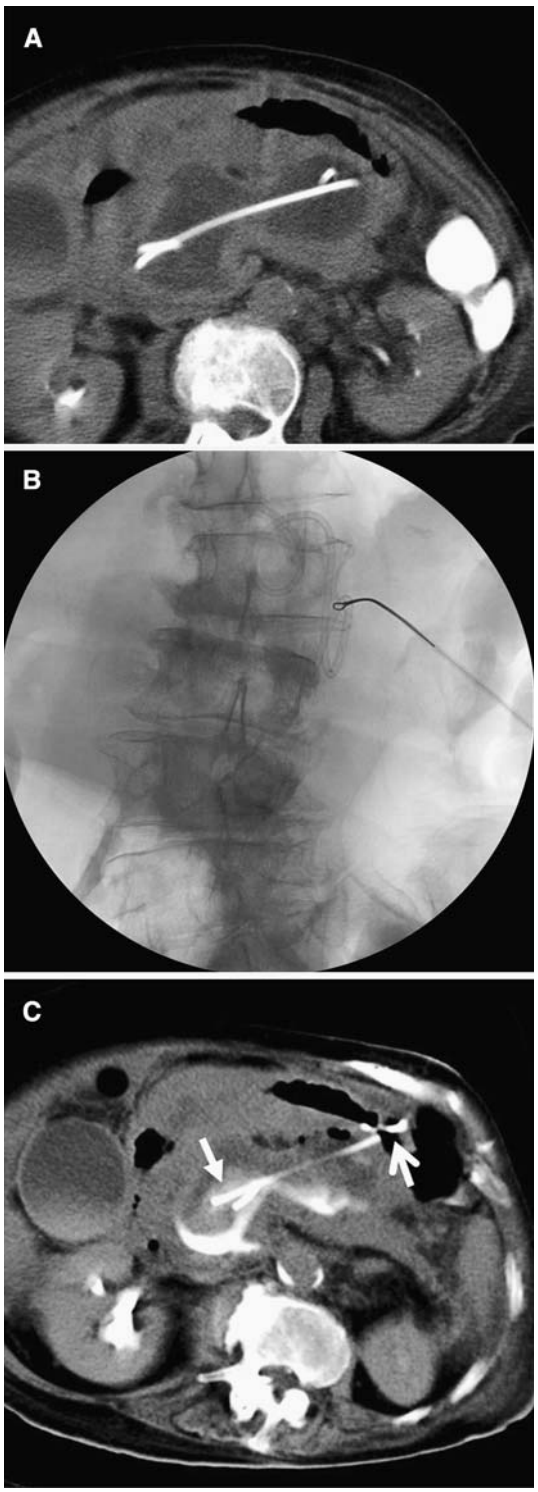

Fig. 2 **A** During percutaneous transgastric drainage the double pigtail catheter was completely displaced into the pseudocyst. **B** After a second transgastric puncture of the pseudocyst the catheter was caught with a 2 cm snare and one end of the double pigtail catheter was pulled back into the stomach. **C** Correct catheter positioning with one pigtail in the pseudocyst (filled arrow) and the other in the stomach (open arrow) was proven by MSCT

Fig. 3 Contrast-enhanced MSCT scan 6 months after the intervention shows the pseudocyst to be completely resolved. The remaining pigtail catheter was removed endoscopically after the CT scan was performed

variety of treatment options including surgical, endoscopic and percutaneous approaches, but there are no randomized studies for the management of pancreatic pseudocysts. While open surgery has the lowest recurrence rate of 3–9%, it is associated with a procedure-dependent mortality rate of approximately 10–30% [9, 10]. Percutaneous as well as endoscopic approaches are reported to result in higher recurrence rates of up to 22–24%. However, both these minimally invasive techniques are associated with lower complication rates in the range of 5–10% [11, 12]. Nevertheless, a relevant number of patients need to undergo surgery after percutaneous or endoscopic management of pancreatic pseudocysts [13].

In general, external drainage is less desirable than any of the internal drainage procedures because of the risk of pancreatico-cutaneous fistulas and secondary infection via the drainage catheter [6]. Percutaneous transgastric placement of catheters is a routine method derived from commonly accepted surgical methods. Several studies have reported this approach to be safe and effective [14, 15]. Since many pancreatic pseudocysts are directly adjacent to the gastric wall a transgastric access to the pseudocyst is usually readily obtainable. Moreover, some pseudocysts may be inaccessible by any other route. Modifying this percutaneous routine technique for internal drainage is an elegant solution if an endoscopic intervention can not be achieved.

Transgastric access for repositioning of a foreign body is unusual. However, using a transgastric approach for placing an introducer sheath in the pseudocyst is consistent with surgical experience and principles. It does not represent a significant additional risk to the patient, especially as

the access route was visualized using CT guidance. The subsequent use of a loop snare for repositioning a foreign body is an inexpensive and simple angiographic routine procedure. The extent of the particular lesion facilitated the use of a snare by providing enough space for snare deployment. Inflation of the stomach is helpful because it provides more space for placing the pigtail catheter. It also facilitates fluoroscopic delineation of the gastric wall and therefore correct catheter positioning. The puncture hole in the stomach did not cause any problems. As the stomach consists of a muscular wall the puncture site will close without further interventions. The same principle has been utilized when removing the catheter after transgastric drainage.

In conclusion, the combination of routine procedures—CT-guided puncture and fluoroscopically guided snaring—permitted the minimally invasive management of a rare complication. In order to avoid the burden and risk of additional surgery after minimally invasive interventions, it is important to develop techniques to deal with potential complications of interventional procedures.

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