Angiographic embolization of arterial hemorrhage following endoscopic US-guided cystogastrostomy for pancreatic pseudocyst drainage

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ABSTRACT

Pseudocyst development is a common complication of chronic pancreatitis. Endoscopic cystogastrostomy is an alternative to percutaneous drainage of pancreatic pseudocysts. Endoscopic ultrasound (EUS) guidance is thought to decrease the procedural risk by identifying and avoiding intervening vasculature. With EUS guidance, extreme care should be exercised to identify large gastric vessels in the path of the puncture. Preoperative imaging should be closely scrutinized for the presence of these vessels. In cases of hemorrhage, balloon tamponading is a rapid way to provide temporary control, allowing transfer of the patient for angiographic embolization. We present a case of arterial hemorrhage due to inadvertent puncture of a hypertrophied right gastric artery following EUS-guided cystogastrostomy, which was successfully treated with temporary balloon occlusion and coil embolization.

Key words: • pancreatic pseudocyst • endoscopy • hemorrhage • ultrasonography

CASE REPORT

Institutional review board approval is not required at our institution for case reports of this type; however, informed consent was obtained for all procedures.

A 54-year-old male presented with abdominal pain and an enlarging pseudocyst 3 months after an episode of severe pancreatitis. Computed tomography (CT) examination during the acute phase of his pancreatitis showed changes consistent with severe pancreatitis, without fluid collections. Magnetic resonance cholangiopancreatography performed 2 weeks later demonstrated multiple extrapancreatic and intrapancreatic fluid collections, with normal ducts. On a follow-up CT 3 weeks later, an 8.3 × 3.4-cm retrogastric fluid collection consistent with a pancreatic pseudocyst was found.

The patient was admitted for endoscopic retrograde cholangiopancreatography and pseudocyst drainage. Preoperative CT performed the night before the procedure showed a pseudocyst in the body of the pancreas and hypervascularity in the gastric wall anterior to the pancreas (Fig. 1). Biliary and pancreatic sphincterotomies were performed, followed by a cholangio-pancreatogram. This demonstrated multiple areas of extra-

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ed and the angiogram showed massive contrast extravasation from the right and left gastric arteries into the lumen of the stomach (Fig. 3). After balloon reinflation, the catheter was advanced into the distal left gastric artery using a 2.3F microcatheter (Cordis, Miami, FL, USA) and coil embolization was performed using 0.038” platinum Nester embolization coils (Cook, Inc., Bloomington, IN, USA). The catheter was then withdrawn into the distal right gastric artery with the placement of additional Nester embolization coils. Post-embolization arteriography following dilation balloon deflation showed no further extravasation (Fig. 4).

After successful embolization, the patient returned for completion of his endoscopic procedure. The dilation balloon was removed and a 10F × 4-cm double pigtail stent was used to create the gastrocystostomy. A percutaneous endoscopic gastrostomy/jejunostomy tube was placed for nutritional support.

The patient was admitted to the intensive care unit and was given a proton pump inhibitor and antibiotic prophylaxis (Cefazolin 1 g, intravenous) in accordance with the institutional protocol. Blood and urine cultures were negative and the patient remained afebrile after 3 days of hospitalization. The patient remained hemodynamically stable and did not require transfusion throughout his hospital stay. The patient was discharged in stable condition after 10 days of hospitalization. He was continuing to do well at the 3-month follow-up visit.

Discussion

Many pancreatic pseudocysts resolve on their own or with medical management. Indications for intervention include intractable pain, increase in size, fever with suspected infection, and gastric outlet or biliary obstruction. The standard therapy has been surgery. Surgical options include cystogastrostomy, cystoduodenostomy, and a Roux-en-Y cystojejunostomy. These surgical procedures carry morbidity rates of 10%–30%, mortality rates of 1%–5%, and recurrence rates of 5%–20% (5, 6). Three less invasive techniques have been developed to decrease morbidity and expense: radiologic, laparoscopic, and endoscopic.

Indications for percutaneous drainage of infected pseudocysts include an uncertain diagnosis and pseudocysts that are not easily accessible by other routes (7, 8). The percutaneous approach is contraindicated in cases of chronic pancreatitis with abnormal pancreatic duct anatomy, including severe stricture or obstruction, as it invariably results in an external pancreatic fistula (9). Complications include bleeding (1%–2%), inadvertent traversal of the pleural space or other viscera (1%–2%), introduction of secondary
infection (9%), and the development of pancreatic-cutaneous fistula or pseudocyst recurrence (8).

Laparoscopic drainage is an emerging technique. A review of 30 cases revealed a success rate of 89% with no recurrences during follow-ups of 6–32 months (10). Infection occurred in 7% and no other complications were reported. The theoretical advantages of this technique over percutaneous or endoscopic techniques are several. First, the risk of obstructing the communication between the cyst and the stomach is greater and thus less likely to get blocked. In addition, there is generally less risk of hemorrhage than with the other techniques because bleeding vessels can be seen and ligated (10).

Endoscopic therapy is less invasive compared to surgery, and it avoids the potential problem of external fistula formation. A benefit for patients is the fact that there is no communication with the body surface and thus no catheter protruding from the abdominal wall. The most commonly reported complications of endoscopic drainage of pancreatic pseudocysts include hemorrhage, infection of the pseudocyst, pancreatitis, and visceral perforation. Morbidity rates of 5%–24%, mortality rates of 0%–2%, and recurrence of pseudocyst rates of 6%–23% have been reported (11).

While no controlled trial has yet evaluated whether EUS decreases the risk of vascular complications, a review of 99 cases of pancreatic pseudocyst drainage using EUS guidance revealed only 3 cases of hemorrhage that necessitated surgery, indicating a relatively favorable safety profile (4).

Several recommendations have been made to decrease the complications of this procedure (11–13). Allowing 4–6 weeks for the wall of the pseudocyst to mature provides a more secure opportunity for anastomosis formation. The risk of hemorrhage is theoretically decreased by evaluating for pseudoaneurysms and gastric varices, especially in the context of portal hypertension. High-resolution dynamic bolus contrast CT scanning, therefore, is routinely ordered prior to transmural puncture at our institution. If the scan is suspicious for pseudoaneurysms or arterial communications, Doppler US or angiography is performed to further evaluate the vasculature. EUS also allows visualization of the vasculature and may prompt surgical intervention or a change of location for drainage.

Despite these precautions, the risk of complications is always present, as our case demonstrated. The enlarged gastric artery was not diagnosed on the original CT report and EUS failed to detect it as well, thus leading to its puncture. If hemorrhage does occur, the endoscopist must take decisive action. Electrocautery should be attempted first. Balloon tamponading within the fistula tract may stop the bleeding. For definitive treatment, patients can undergo surgery or angiographic embolization (14). As shown in the presented case, it is extremely important in vascular territories like the stomach to embolize both afferent and efferent vessels, as there is always the possibility of the reversal of flow via collaterals. In all vessels other than terminal arteries, such as the renal arteries, embolization proximal and distal to the site of extravasation is absolutely mandatory. EUS may also detect debris or loculation within the pseudocyst, which are associated with increased risk of pseudocyst infection. If endoscopic drainage is attempted in the presence of these findings, a large diameter communication should be created, and a nasocystic catheter for lavage may be placed (4).

The presented case demonstrates the following key points for the management of pancreatic pseudocysts. First of all, a pre-endoscopic contrast-enhanced CT was performed to evaluate the pseudocyst and the surrounding vasculature. A detailed examination of this CT revealed a tortuous artery between the stomach and pseudocyst. In order to detect this abnormality,
radiologists need to be familiar with the pathophysiological changes of the vasculature induced by pancreatitis and pseudocyst formation. Secondly, although EUS is a valuable tool for the evaluation of mural vessels and the selection of a location for puncture, it may not detect some vessels. Finally, when hemorrhage does complicate drainage, control must be gained quickly. In our case, balloon tamponading provided temporary control allowing the patient to be transferred for definitive treatment with transcatheter embolization.

References