Hemorrhagic gastroduodenal artery pseudoaneurysm coil embolization

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ABSTRACT

Image-guided percutaneous interventions for treatment of pseudoaneurysms have become more common in cases with failed or limited endovascular access but may be technically difficult due to anatomic location and surrounding structures. We present the case of a man with a history of intraductal papillary mucinous neoplasm after Whipple procedure with postoperative hemorrhage from a gastroduodenal artery pseudoaneurysm. The pseudoaneurysm was successfully treated by an anterior abdominal percutaneous approach utilizing a blunt-tip needle technique to avoid adjacent bowel injury.

KEYWORDS Coil; embolization; hemorrhagic; pseudoaneurysm

Visceral artery aneurysms and pseudoaneurysms are rare entities that occur most commonly in the hepatic and splenic arteries.¹ Surgical intervention may be too high risk if the pseudoaneurysm is poorly located and could result in further morbidity and mortality in unstable patients or poor surgical candidates. The endovascular approach is limited in cases with multiple feeding arteries and complex arterial anatomy, which may necessitate a percutaneous technique. Percutaneous approaches risk damaging surrounding structures within the abdomen while accessing the pseudoaneurysm, particularly the adjacent bowel and vasculature. Because inherent risks are associated with traversing bowel or abutting bowel with a sharp-tip needle, an alternative approach is to perform a visceral dissection technique with a blunt-tip needle, as demonstrated in our case.

CASE REPORT

A 55-year-old man presented with an intraductal papillary mucinous neoplasm and underwent a pylorus-sparing pancreaticoduodenectomy (Whipple procedure) complicated by recurrent bleeding and downtrending hematocrit. The patient was initially referred to interventional radiology and underwent mesenteric angiography with coiling of the inferior pancreatic artery branch. The patient's hematocrit continued to slowly trend downward and he underwent repeat

angiogram with coiling of an actively extravasating replaced right hepatic artery, which originated from the superior mesenteric artery. The hematocrit stabilized, although follow-up computed tomography (CT) demonstrated a persistent pseudoaneurysm from the previously surgically ligated and angiographically confirmed to be occluded gastroduodenal artery (*Figure 1a*). A percutaneous transhepatic CT-guided approach was attempted but aborted due to lack of contrast opacification and clear localization of the pseudoaneurysm.

A percutaneous paracolic approach was performed with an 18-gauge Hawkins needle. The peritoneum was accessed with a sharp needle tip through the anterior abdominal wall. Approximately 100 cc of sterile saline solution was then infused to displace to colon. To safely bypass the colon anterior to the pseudoaneurysm, the sharp tip was removed and the needle was advanced with a blunt-tip stylet. Once the blunt tip safely passed the bowel and was positioned in the inflammatory mass in the bed of the pancreatic head, the sharp-tip needle was reintroduced and inserted into the pseudoaneurysm. Cone-beam CT was performed for better localization of the instrument and pseudoaneurysm. Filling of the pseudoaneurysm was demonstrated and microcoil embolization was then successfully performed with nine 0.035-in, 14 cm × 12 mm Nester embolization soft platinum microcoils (*Figures 1b, 1c*). Follow-up CT confirmed successful treatment with no residual opacification of the pseudoaneurysm (*Figure 1d*). The patient's

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Figure 1. (a) Axial CT image demonstrates a large gastroduodenal artery pseudoaneurysm (circle). (b) A needle (arrow) terminates in the gastroduodenal artery pseudoaneurysm (star), which fills with contrast. The peripancreatic embolization coils are stable. (c) Percutaneous coil (arrow) embolization of the gastroduodenal artery pseudoaneurysm. (d) Follow-up coronal CT image 1 month later shows a stable embolization coil pack in the gastroduodenal artery pseudoaneurysm without persistent pseudoaneurysm or recurrence.

hematocrit remained stable throughout the remainder of the hospitalization.

DISCUSSION

Multiple case series have described a similar technique utilizing a blunt tip during percutaneous procedures to avoid damage to surrounding structures for a variety of procedures, such as abscess drainage and lymph node biopsies.^{2–5} A recent retrospective case series by Tyng et al described accessing intra-abdominal abscesses in anatomically challenging locations in seven patients by removing the sharp needle tip and performing a visceral dissection with a blunt-tip needle to safely bypass bowel.⁶ Similar to our case, the needle was reintroduced before entering the targeted collection once the tip had passed the bowel. A retrospective study of 30 patients by de Bazelaire et al described performing deep lymph node biopsies with a blunt-tip needle without complication.⁷ In these cases, an 18-gauge coaxial system was used, and the sharp-tip stylet was removed to displace vital structures in the thorax, abdomen, and pelvis to safely reach the lymph nodes. Our procedure provides an example of a similar technique but differs by applying this method in combination with hydrodissection to perform a vascular embolization in a challenging case.

Case reports describe the low risk of infection with transgressing through the stomach, small bowel, or colon by

utilizing a high-gauge needle with little associated complication.⁸ This negates the need to bypass the colon. However, avoiding the bowel altogether decreases the risk and concern for introducing infection, particularly with the increased risk associated with injecting embolic agents as required for treatment of a pseudoaneurysm.

In conclusion, a variety of approaches, including multiple percutaneous techniques, are available to treat visceral pseudoaneurysms. This case demonstrates that utilizing a blunt-tip needle provides additional options to access pseudoaneurysms in the context of anatomic and vascular limitations without the associated risks of passing through or damaging the bowel. Percutaneous embolization continues to be an effective treatment option with the development and utilization of novel techniques such as this in the approach and treatment of pseudoaneurysms in a safe manner.

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