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Radiological management of multiple hepatic artery pseudoaneurysms associated with cholangitic abscesses

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Abstract

Hepatic artery pseudoaneurysms (HAP) are uncommon, occurring mostly as a complication of trauma (accidental or iatrogenic). Liver abscess rarely causes HAP and multiple HAP associated with cholangitic abscesses have not been reported in the literature. We present a patient of acute necrotizing pancreatitis with stent block cholangitis and multiple cholangitic abscesses who developed hemorrhagic output through drainage catheter in the liver abscess. A multiphasic CT angiography demonstrated three HAP, which were treated with a combination of endovascular coil embolization and percutaneous thrombin injection. The fact that cholangitic abscesses may be associated with pseudoaneurysms should not be neglected, considering the potentially catastrophic complication and relatively easy radiological management. CT angiography permits accurate diagnosis and lays down the roadmap for endovascular procedures.

Key words: Cholangitic abscess; CT angiography; embolization; interventional radiology; pseudoaneurysm

Introduction

Hepatic arterial pseudoaneurysms (HAP) are uncommon and usually occur secondary to accidental or iatrogenic trauma. The iatrogenic causes include percutaneous procedures (liver biopsy, biliary drainage), laparoscopic cholecystectomy, and open surgeries (liver transplantation).[1-3] Pseudoaneurysm may also result from adjacent inflammation and infection (as in cholecystitis, pancreatitis, and abscess) or from primary vascular causes such as vasculitis.[1] The clinical presentation is usually in the form of upper gastrointestinal tract (GIT) bleeding (as a result of pseudoaneurysm rupturing into the biliary tree or gall bladder). The bleeding may also be intraperitoneal (leading to hemoperitoneum) or into the adjacent liver abscess (leading to blood within drain content). HAP as a complication of liver abscess are rare,[1-7] and multiple pseudoaneurysms associated with cholangitic abscesses have not been reported in the literature. We present a case of severe acute pancreatitis with stent block cholangitis and multiple cholangitic abscesses that developed multiple HAP. The role of computed tomography angiography (CTA) and successful radiological interventional management is highlighted in the article.

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Case Report

A 33-year-old male patient presented to the emergency department with epigastric pain, fever, and vomiting. Examination revealed fever, icterus, tachycardia, and abdominal guarding. Thoracic examination was unremarkable. Investigations revealed neutrophilic leukocytosis (white blood cell count of 28,400/mm^3 and 90% neutrophils), raised serum alkaline phosphatase (2833 IU), and elevated total and conjugated bilirubin (11.5 and 9.2 mg/dl, respectively). There was no past history of smoking or chronic alcohol consumption. Endoscopic retrograde cholangiopancreatography (ERCP) and common bile duct (CBD) stenting were done for cholangitis 2 months before. Laparoscopic pancreatic necrosectomy, abscess drainage, and cholecystectomy were done 1 month prior to his present admission. The patient continued to have high-grade spiking fever and raised neutrophil counts in the post-operative period, and ultrasonography (USG) showed persistent peripancreatic fluid collections. The patient was managed with multiple pigtail drainages, but there was no symptomatic relief; therefore, the patient was referred to our institute.

USG revealed multiple hypoechoic lesions in both lobes of liver, few showing internal debris, with the largest in the left lobe (measuring 9 × 8.5 cm), suggestive of abscesses. USG-guided 10F pigtail catheter was inserted into the large left lobe abscess, which drained foul-smelling purulent material. On the third day of admission, altered blood was seen draining from the pigtail catheter, which persisted for next 48 h. Even though the hemoglobin level of patient did not show any significant fall (8.4 g/dl on the day of admission and 8.2 g/dl subsequently) and the patient was hemodynamically stable, CTA was planned in view of persistent blood in the catheter drain.

CTA revealed three contrast-filled outpouchings from hepatic arteries, which followed the attenuation of aorta in venous phase as well, suggestive of pseudoaneurysms [Figure 1]. One of these pseudoaneurysms was arising from the left hepatic artery (lateral branch) and was located just medial to the pigtail catheter. Two other pseudoaneurysms were seen to arise from the right hepatic artery (from the anterior and posterior branches). The right hepatic artery was replaced and was originating from superior mesenteric artery. The abscesses adjacent to these pseudoaneurysms showed hyperdensity on the non-contrast scan, indicating presence of acute hemorrhage. The venous phase demonstrated multiple liver abscesses, mild central intrahepatic biliary radical dilatation, along with post-necrosectomy changes in the pancreatic bed and peripancreatic collections.

With these imaging findings, the patient was planned for angiographic embolization [Figure 2]. Digital subtraction angiography (DSA) done through transfemoral route using 5F RC-1 catheter (Cook, Bloomington, IN, USA) and 2.7F microcatheter (Progreat; Terumo, Tokyo, Japan) confirmed the HAP. No active contrast extravasation was noted. All three HAP were embolized using four microcoils (size 18-4-6; Cook). Post embolization, there was no contrast filling of the pseudoaneurysms. Follow-up USG done 24 h later showed recurrence of one of the HAP (arising from the anterior branch of right hepatic artery) [Figure 3]. It was subsequently embolized under USG guidance using 22G Chiba needle, by injecting 2 ml of 100 U/ml concentration human-derived lyophilized thrombin (Floseal; Baxter Healthcare Corporation, Hayward, CA, USA) [Figure 3]. After 3 weeks of intensive intravenous antibiotics, the patient improved and was discharged. A follow-up CT done after 3 months did not show any recanalization of the pseudoaneurysms.

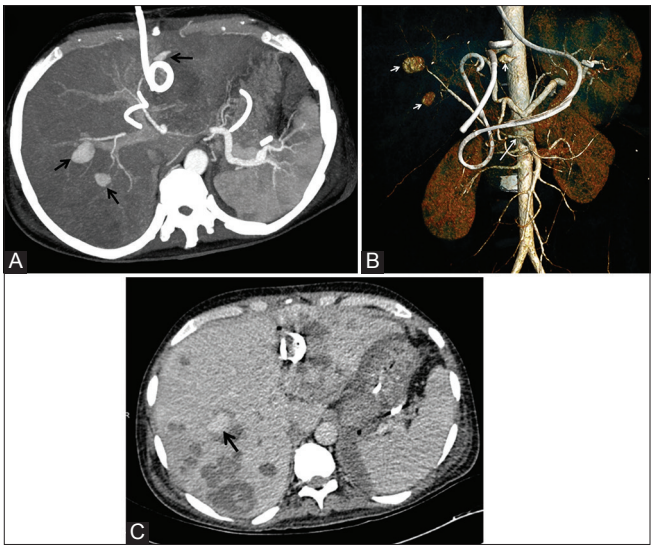

Figure 1 (A-C): (A) Axial maximal intensity projection (MIP) image of the arterial phase acquisition shows three pseudoaneurysms, arising from the anterior and posterior branches of right hepatic artery and the lateral branch of left hepatic artery (black arrows) (B) Volume-rendered image gives three-dimensional overview of the pseudoaneurysms (short white arrows) and arterial anatomy, depicting replaced right hepatic artery (long white arrow) (C) Axial post-contrast venous phase CT image demonstrates multiple cholangitic abscesses in both lobes of liver. The largest one in the left lobe shows pigtail catheter tip within. Black arrow depicts the contrast-filled pseudoaneurysm arising from the right anterior hepatic artery, paralleling the attenuation of aorta

Discussion

HAP are uncommon, though they are the second most common site of acquired visceral pseudoaneurysms. Majority of HAP involve extrahepatic vessels, with only 25% being intrahepatic. These may rupture into biliary tree, peritoneal cavity, duodenum, adjacent focal lesion, or may develop fistulous communication with portal vein branches. There are only few case reports of HAP associated with liver abscess,[1-7] etiologies being amebic and pyogenic. The occurrence of HAP with cholangitic

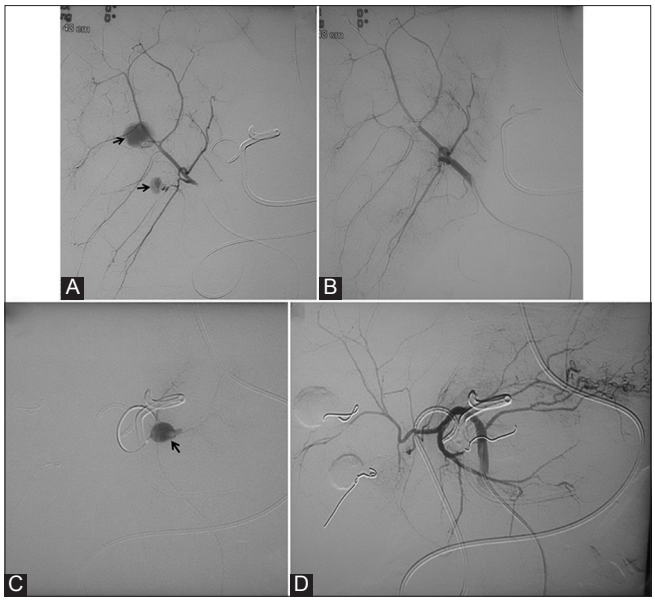

Figure 2 (A-D): Digital subtraction angiogram (DSA) images. (A) Selective replaced right hepatic artery DSA shows two pseudoaneurysms, one from a branch of anterior division and the other from a branch of posterior division (black arrows) (B) DSA after coil embolization shows non-filling of the pseudoaneurysms (C) DSA after selective catheterization of the lateral branch of left hepatic artery shows a pseudoaneurysm (black arrow) without any active contrast extravasation (D) DSA of hepatic artery after coil embolization shows non-filling of the pseudoaneurysm

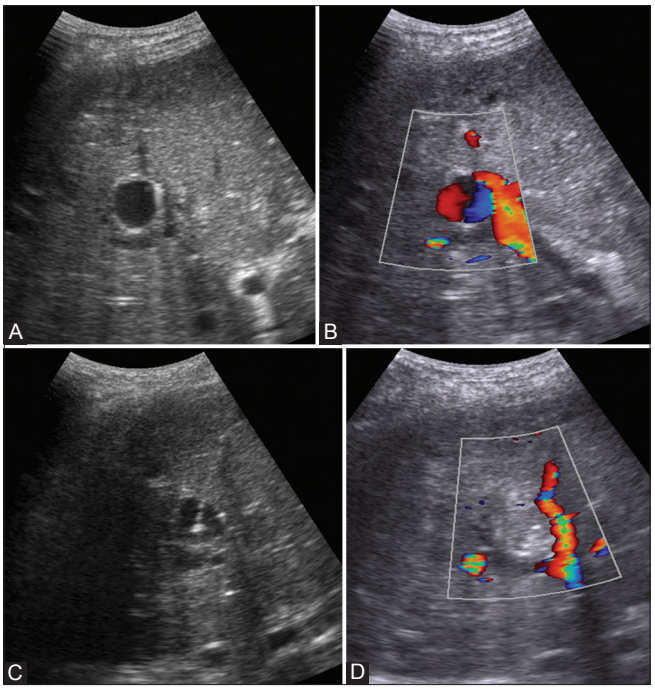

Figure 3 (A-D): USG-guided thrombin injection. (A) Gray-scale image shows anechoic pseudoaneurysm arising from the anterior branch of right hepatic artery, which shows yin-yang pattern of color flow within (B) indicating recanalization (C) Shows USG-guided placement of 22G needle tip within the pseudoaneurysm (D) Increased echogenicity within the pseudoaneurysm is observed following thrombin injection and there is absence of color flow, suggestive of complete thrombosis

abscesses and cholangitis has not been reported in the literature. Moreover, in our case, there were multiple pseudoaneurysms, associated with multiple abscesses. Because of the risk of rupture due to surrounding inflammation, such pseudoaneurysms need to be tackled urgently.

The conventional management of such cases has been surgery with hepatic artery ligation or segmental resection. But currently, radiological interventions are the treatment of choice because of lower morbidity and mortality, and better patient comfort. Endovascular embolization and/or percutaneous thrombin injection provide a viable treatment strategy. Also, these procedures can be repeated in case of rebleed which may occur because of background inflammation. The endovascular techniques include embolization with coils (most commonly used), glue, and use of covered stents to exclude the pseudoaneurysm from the circulation.[8] Coils need to be placed across the neck of the pseudoaneurysm, as proximal embolization may lead to recurrence due to the presence of arterio-arterial collaterals. Percutaneous thrombin injection is a simple technique for pseudoaneurysms within solid organs, can be done under CT or USG guidance, and is especially useful to manage recurrence after failure of coil embolization.[9]

The importance of early detection of HAP in case of cholangitic abscess cannot be overemphasized, given its catastrophic complications and relatively easy management. CTA is instrumental in detecting these lesions and also demonstrates the precise location and identifies the affected artery. This was especially useful in our case where there was a variant anatomy. The wealth of information obtained on CT enables optimal planning of radiological interventions and also serves to reduce radiation and contrast dose. Initially, endovascular embolization was technically successful in all the three HAP. But recanalization of one pseudoaneurysm occurred, which was promptly treated by percutaneous technique, without any complications. The case is unique in that it addresses diagnosis of an unusual entity, its proper evaluation using CT, and two methods of minimally invasive radiological management for treating this potentially life-threatening entity.

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Conflicts of interest
There are no conflicts of interest.

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