Arterial Coil Embolization and Arterialization of the Portal Vein for a Ruptured Hepatic Artery after Partial Hepatectomy

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Editor:

Although arterial embolization is often necessary for hemostasis, hepatic arterial ischemia results in liver necrosis in the absence of collaterals. In such cases, portal vein arterialization preserves arterial flow to the liver, avoiding the complications of ischemia, necrosis, and liver failure.

Institutional review board approval was obtained for this study, and the requirement for informed consent was waived. A 64-year-old man underwent left hepatectomy (left lobe and caudate lobe resection) for bile duct carcinoma. On day 28, he presented with upper gastrointestinal bleeding. Computed tomography showed bleeding from the proper hepatic artery. Emergency angiography confirmed bleeding from the proper hepatic artery (Fig 1). The distal hepatic artery could not be catheterized. Therefore, embolization of the proper hepatic artery was performed using 2 4-mm-diameter × 120-mm-long TRUFILL DCS ORBIT GALAXY coils (Codman Neuro, Raynham, Massachusetts) (Fig 2). Collateral hepatic arteries were not observed (Fig 3). Embolization was followed by creation of a surgical ileocolic arteriovenous shunt the same day. The iliocolonic artery and vein underwent end-to-end anastomosis (Fig 4). Before embolization, the patient's aspartate aminotransferase was 37 U/L and alanine aminotransferase was 17 U/L. Immediately after embolization, aspartate aminotransferase increased to 980 U/L, and alanine aminotransferase increased

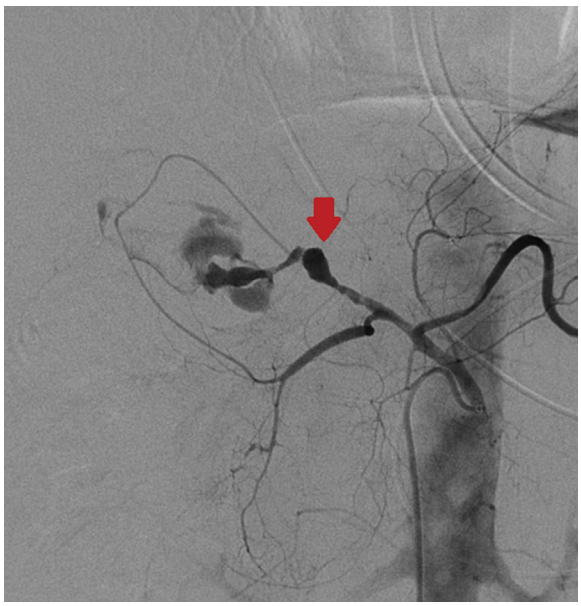

Figure 1. Angiography of celiac artery. Active bleeding is seen at the proper hepatic artery (arrow).

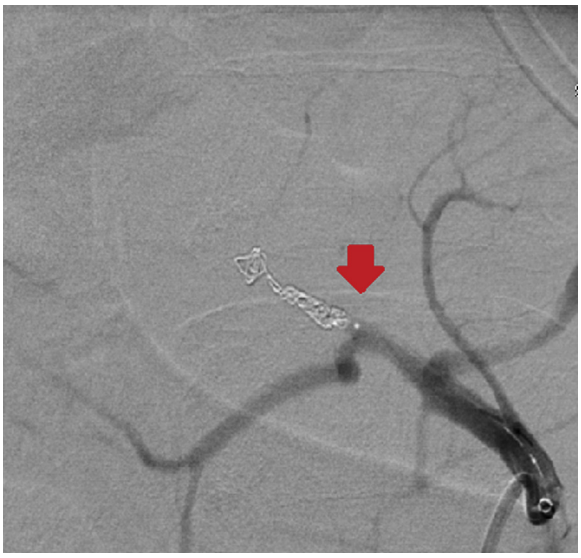

Figure 2. Angiography of celiac artery. Bleeding stopped after coil embolization (arrow).

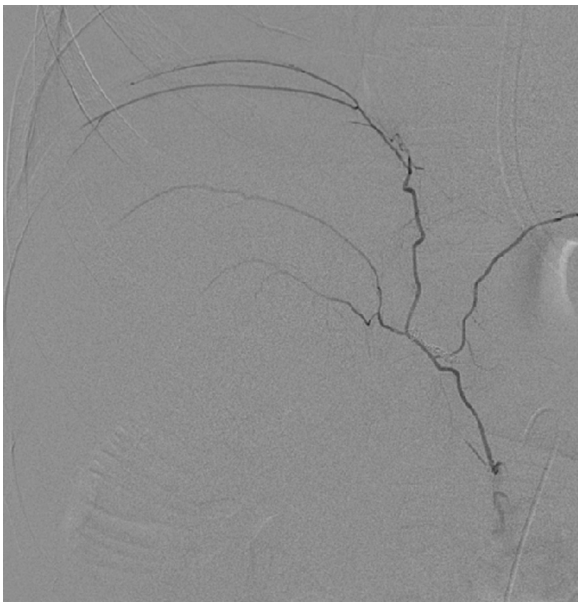

Figure 3. Angiography of right inferior phrenic artery. The collateral hepatic artery was not observed.

None of the authors have identified a conflict of interest.

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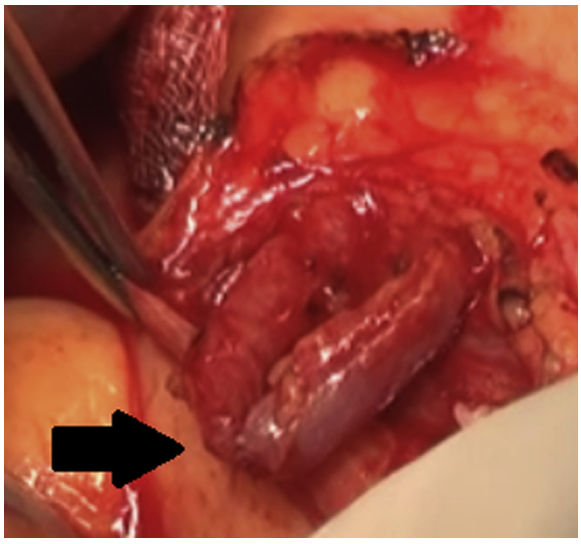

Figure 4. Surgical findings. An ileocolic arteriovenous shunt (arrow) was performed after embolization.

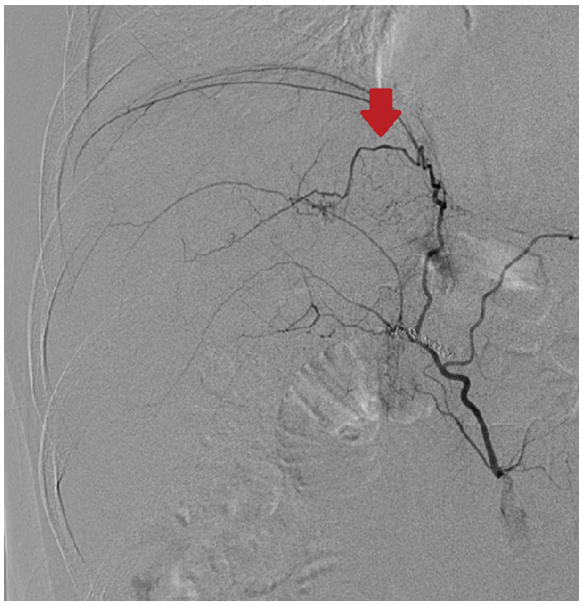

Figure 5. Angiography of right inferior phrenic artery. Angiography performed 4 weeks after embolization showed development of collateral hepatic arteries from the right inferior phrenic artery (arrow).

to 569 U/L. The next day, aspartate aminotransferase was 365 U/L, and alanine aminotransferase was 445 U/L. After 13 days, the patient's transaminases normalized. Ultrasound showed increased hepatic arterial blood flow. Repeat angiography performed 4 weeks later demonstrated collateral hepatic arteries (**Fig 5**), at which point the shunt was occluded using a 3.5-mm-diameter × 90-mm-long TRUFILL DCS ORBIT GALAXY coil and 2 4-mm-diameter × 120-mm-long Tornado coils (Cook Inc, Tokyo, Japan) (**Fig 6a**, **b**). The patient was discharged on hospital day 47 after significant improvement. The patient remained asymptomatic with normal transaminases and hepatic arterial flow on Doppler ultrasound.

Hemorrhage from the hepatic artery is a life-threatening complication after hepatectomy (1). Although arterial embolization is useful, hepatic arterial interruption inevitably causes fatal liver hypoxia when all collateral arteries to the liver have been eradicated. Sato et al (2) reported that morbidity and mortality rates of hepatic arterial embolization were 45% and 30%, respectively, without hepatic collaterals. In general, the extensive collateral pathways, including the inferior phrenic arteries, intercostal arteries, and gastric arteries, serve to protect the liver from ischemic insult. Teramoto et al (3) reported a case of arterial embolization and portal vein arterialization for hemorrhage after pancreaticoduodenectomy. Portal vein arterialization may result in portal hypertension causing gastrointestinal bleeding, which can be treated by embolization of the shunt (4). Portal vein arterialization is a salvage technique, increasing the oxygen saturation of portal vein blood and preventing hepatic ischemia in this patient with an occluded

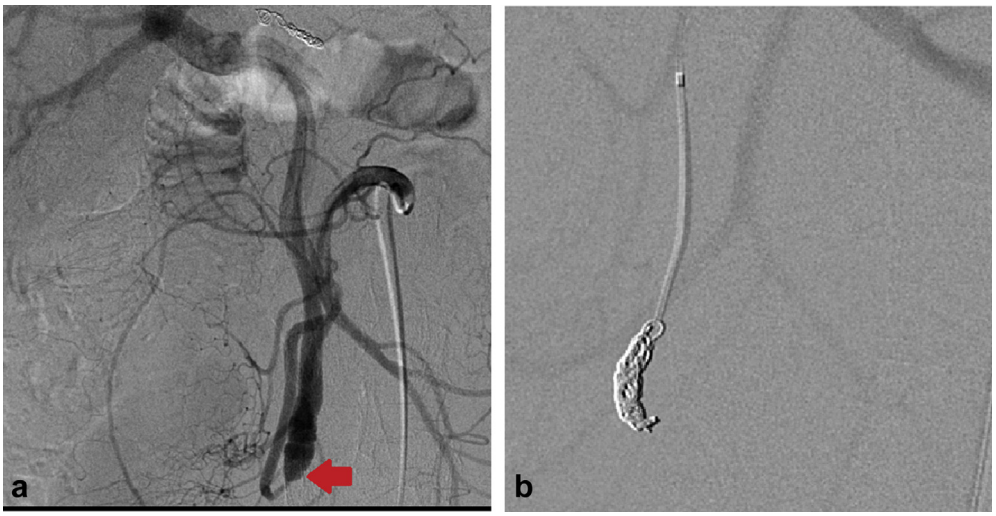

Figure 6. Angiography of the superior mesenteric artery. **(a)** Arterial portal shunt is shown (arrow). (**b**) After coil embolization was performed.

proper hepatic artery. In summary, portal vein arterialization may potentially reduce the risk of ischemia in patients undergoing arterial embolization for treatment of postoperative bleeding after liver resection.

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Salvage Periaortic Bovine Pericardial Baffle: Normal Postsurgical Anatomy and Complicating Aortic Fistula Diagnosed with CT Angiography

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Editor:

Periaortic bovine pericardial baffle is a salvage technique to control intractable intraoperative bleeding after ascending aortic surgery. We describe and illustrate the normal postsurgical computerized tomography (CT) appearance and present the case of a 41-year-old man with aortic endocarditis and complicating aortic fistula after creation of a periaortic bovine pericardial baffle during aortic root replacement. This study was approved by the local Institutional Review Board with a waiver of consent.

Placement of a periaortic baffle, constructed of bovine or autologous pericardium, is a salvage technique first

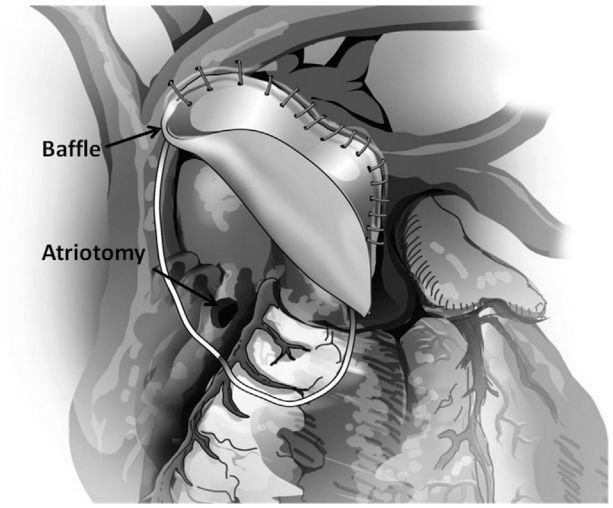

Figure 1. Periaortic bovine pericardial baffle. The illustration shows the sheet of bovine pericardium sutured over the ascending aorta and surrounding structures. Before completing the suture line, an atriotomy is created on the medial aspect of the right atrial appendage. The perigraft space is then closed.

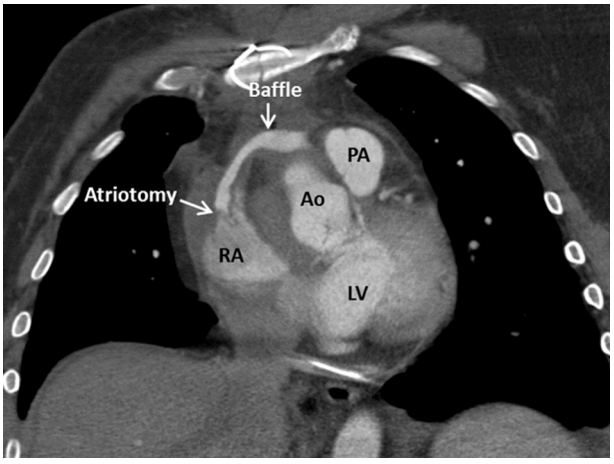

Figure 2. Normal postsurgical appearance. Computerized tomographic (CT) angiography of the chest coronal image shows the normal postoperative appearance of the pericardial baffle in a patient who had a baffle placed for ongoing bleeding from a surgically inaccessible site during aortic root replacement for complications of endocarditis. The right atriotomy for decompression of the bleeding is depicted. This clinically stable patient was imaged to determine patency of the pericardial baffle and status of aortic root pseudoaneuryms encountered during the aortic root reconstruction. The patient had remained alive years after the operation. The baffle eventually expectedly thrombosed on routine follow-up CT-angiography (not shown). Ao = ascending aorta; LV = left ventricle; PA = pulmonary artery; RA = right atrium.

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