

Endovascular Stent Graft Repair of an Acute Traumatic Common Hepatic Artery Pseudoaneurysm

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Abstract

A 62-year-old woman presented to our trauma center and was found to have hemorrhage contained within the lesser sac with extravasation of contrast. We present a report of an acute traumatic common hepatic artery pseudoaneurysm with active hemorrhage successfully treated with an endovascular stent graft. To our knowledge, this is the first case reported in the literature of an acute traumatic common hepatic artery pseudoaneurysm treated with an endovascular stent. Trans-catheter arterial embolization and stenting continues to evolve as an alternative, often with less morbidity and mortality, to traditional surgical approaches for pseudoaneurysm repair.

Brief Report

A 62-year-old woman presented to our trauma center following a motor vehicle collision in which she was the restrained driver. The patient briefly lost consciousness but was found to be alert and appropriate at the scene. She described complaints of upper abdominal pain radiating to her back. On presentation, the patient was tachycardic with a heart rate of 112 Beats Per Minute (bpm) and a blood pressure 120/65. Physical examination elucidated right upper quadrant and epigastric abdominal tenderness with pain radiating to the back. Other injuries included an open fracture of the right medial malleolus. Focused Abdominal Sonogram for Trauma (FAST) identified no free peritoneal or pericardial fluid. Computed Tomography (CT) scan of the abdomen and pelvis identified right rib fractures, pulmonary contusions, a grade II liver laceration, contained hemorrhage within the lesser sac and a pseudoaneurysm of the common hepatic artery with active extravasation of contrast (Figure 1). The patient remained hemodynamically unchanged with resolution of her prior tachycardia to a heart rate of 94 bpm.

In consultation with vascular surgery and interventional radiology, angiography was performed which confirmed a common hepatic artery pseudoaneurysm with active hemorrhage into the lesser sac (Figures 2 and 3). Given the location of the injury, we believed this was not amenable to embolization. Subsequently, given that the patient's hemodynamic status remained unchanged, we opted to attempt endovascular repair of the injury. An endovascular stent graft was placed across the common hepatic artery successfully excluding the region of injury. A post-placement angiogram demonstrated patency of the common hepatic artery and successful cessation of hemorrhage with exclusion of the pseudoaneurysm (Figure 4).



Figure 1: Pseudoaneurysm of the common hepatic artery with active hemorrhage into the lesser sac.



Figure 2: Pseudoaneurysm with active extravasation and proximal aspect of common hepatic artery.



Figure 3: Pseudoaneurysm with active extravasation and distal aspect of common hepatic artery.



Figure 4: Stent graft repair of common hepatic artery with exclusion of the pseudoaneurysm.

The patient was admitted to the intensive care unit for hemodynamic monitoring, abdominal exams, and serial hemoglobin levels. Operative fixation of her orthopedic injuries was performed on the first post-injury day. She was downgraded from the intensive care unit on the second-post-injury day and subsequently discharged home two days later following an uneventful recovery.

Discussion

Visceral artery aneurysms are rare but potentially lethal, especially in the setting of acute trauma, with an overall incidence of 0.1% to 0.2%. Hepatic artery aneurysms account for approximately 20% to 30% of visceral artery aneurysms second only to splenic artery aneurysms [1-3]. Furthermore, these aneurysms often progress to rupture causing significant morbidity and mortality [2]. During the modern era of trauma care, endovascular modalities are performed most commonly to control acute hemorrhage from liver and spleen injuries. Trans-catheter arterial embolization and stenting has evolved as an alternative, often with less morbidity and mortality, to traditional surgical approaches for pseudoaneurysm repair [4]. Previously, several authors have reported the use of trans-arterial embolization to control hemorrhage caused by injury and pseudoaneurysms of the hepatic artery [1,3,4-6]. We report the case of an acute traumatic proximal common hepatic artery pseudoaneurysm with active hemorrhage that was successfully treated with an endovascular stent graft.

Rupture into the peritoneum of gastrointestinal tract is the major complication of visceral artery aneurysms and is associated with a high mortality [1,2,4]. As such, aggressive intervention is required. Acute hepatic artery pseudoaneurysms are often symptomatic with abdominal pain, anemia, and hypovolemia. However, the symptoms of jaundice and hematemesis are not likely to be observed in the immediate post-injury setting. As such most of these injuries are identified by contrast-enhanced CT with a sensitivity of approximately 67% [6].

Percutaneous trans-arterial catheter-based treatment options have emerged in the treatment of pseudoaneurysm repair and are now included as potential options to traditional surgical approaches. The method of intervention is most often determined by patient hemodynamic status, anatomy of the lesion, and location of the vascular injury [4]. Patients who are hypotensive with ongoing hemorrhage are clearly candidates for operative intervention. In this case, as our patient was normotensive and quickly resolved her initial tachycardia, we elected to pursue endovascular management of the lesion. On discovering that the lesion involved the extrahepatic common hepatic artery, we determined that embolization of this vessel would not be a viable option. Surgical repair with a vein graft was also considered. After discussion, we elected to attempt the placement of a common hepatic artery stent that was ultimately successful in excluding the injury while maintaining distal blood flow.

We acknowledge that the endovascular placement of trans-arterial stents does not come without potential risks. Risks of stent placement include, but are not limited to, infection, erosion, acute arterial occlusion, and possible redevelopment of the pseudoaneurysm [4]. However, many of these potential complications may also occur following traditional surgical repair. Furthermore, controversy remains regarding the implementation of anticoagulation for stent protection in patients at increased risk for hemorrhage. We chose

to maintain our patient on low-dose aspirin given the potential risk of hemorrhage from her liver laceration, rib fractures, and/or pseudoaneurysm.

The use of endovascular trans-arterial techniques for the management of pseudoaneurysm has been established as a viable alternative to traditional operative management. Most lesions that are not amenable to embolization, such as this injury to the common hepatic artery, ultimately require surgical exploration and repair.

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