Endovascular management of a large hepatic artery aneurysm

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Abstract

Visceral arteries aneurysms (VAA) are an increasingly interesting clinical entity due to their challenging diagnosis and treatment options. The more prevalent use and accuracy of enhanced imaging techniques such as ultrasonography and computed tomography have increased the frequency of diagnosis of aneurysmal degeneration of the visceral arteries. Despite there is no statistically significant difference in terms of overall mortality and post-operative complications between endovascular therapy and open repair, interventional strategies present a significantly lower length of stay and less invasiveness and should be preferred in elderly patients, or in case of co-morbidity and poor candidates for surgery.

Case report

A 79-year-old male with a history of smoking, hypertension and dyslipidemia was admitted to our Department for the evaluation of a common hepatic artery aneurysm (CHA). The patient already underwent right nephrectomy 14 years earlier for kidney cancer from which originated mild chronic renal failure (serum creatinine level 1.9 mg/dl). During follow-up for renal cancer, the patient discovered a bladder carcinoma and underwent computed tomography urography (CTU) for staging, which showed a CHA measuring 72x47 mm (Fig. 1). The contrast-enhanced CT scan revealed also an anatomic variation with common hepatic artery replaced from superior mesenteric artery.

On admission, the patient showed good general conditions as well as normal laboratory parameters; body mass index was 24.2 kg/m², blood pressure 120/80 mm Hg, heart rate 72 beats/min.

Under local anesthesia the left brachial artery was isolated at the elbow. After a 21 G needle puncture an 8Fr 80 cm sheath was positioned in descending aorta. Intraoperative arteriogram confirmed aneurysm anatomy and the absence of CHA from celiac trunk, as seen on CT.

To stabilize the introducer sheat, a wire loop technique (2) was needed between the brachial artery and the right common femoral artery.

The splenic artery anatomy was extremely tortuous and a buddy wire technique was employed to stretch the vessel in order to cannulate it and deploy two Viabahn stent-graft (8 mm x 5 cm) (W. L. Gore and Associates, Inc., Flagstaff, AZ). Completion angiogram showed complete exclusion of the aneurysm with no endoleaks (Fig. 2). A 30-day contrast enhanced CT scan confirmed wide patency of the stent-grafts and total exclusion of the aneurysm (Fig. 3).
Discussion

Hepatic artery aneurysms (HAAs) are very rare with an incidence of 0.002–0.4%, more commonly seen in males in the fifth to sixth decade of life. They occur most frequently in the common or proper hepatic (40%) and the right hepatic artery branches (50%), and less commonly in the left artery branches (3, 4).

Our case is unusual because it involved aberrant anatomy. Variation in hepatic arterial anatomy is seen in 40-45% of people. Classic branching of the common hepatic artery from the celiac artery, and the proper hepatic artery into right and left hepatic arteries to supply the entire liver, is seen in 55-60% of the population. CHA replaced from superior mesenteric artery in 2% of the population (5). The etiology of hepatic artery aneurysms includes atherosclerosis, mediointimal degeneration, trauma, infection and iatrogenic causes (6). As aortic valve abnormalities (i.e. aortic quadricuspid valve) can be related to ascending aortic aneurysm because of the shear stress originated from irregular cusps (7), CHAA can be the result of artery wall degeneration in response to blood turbulence due to berrant origin of hepatic artery.

Most of the HAAs are asymptomatic. The rate of rupture of HAAs, reported to be up to 20–30% and the high mortality associated with the spontaneous rupture mean prompt evaluation and management. Abdominal CTA or magnetic resonance angiography yields the diagnosis of HAAs in most cases; however, selective catheter angiography is the gold standard for diagnosis and for therapeutic intervention (6, 8). Viabahn stent-graft (W. L. Gore and Associates, Inc., Flagstaff, AZ) with its flexibility enables it to traverse tortuous arteries and conform closely to the complex anatomy of the artery (9).

The endovascular strategy is establishing itself as a valid alternative to open repair in complex aneurismatic pathology, both visceral and aortic, as seen in EVAR complication like endoleaks (10).

The improvements in endovascular techniques and the chance of a less invasive approach allow the treatment of a higher number of visceral artery aneurysm, because of less in-hospital length of stay, post-operative pain and wound-related complications coupled with patient compliance.

A recent literature review (11) shows a technical success and visceral preservation rate > 90% for endovascular management of visceral artery aneurysms, with a major complication rate of 3.7%, including major access site complications, cardiac and cerebrovascular events, hemorrhage, visceral infarction, infective/inflammatory complications. Re-intervention rate was 4.4%, even if low, it suggests the need of an accurate follow-up to early identify endoleaks or sac reperfusion.
Marone et al. (12) comparison between endovascular treatment and open repair shows that there is no difference in terms of perioperative mortality and 1 and 5 years survival for these two approaches.

In conclusion, endovascular treatment of visceral artery aneurysms is a safe and feasible strategy with high technical success rate and low perioperative complications.

A systematic follow-up is needed to early individuate requirement of re-intervention.

References