Hepatic artery pseudoaneurysm: a postoperative arterial complication after orthotopic liver transplantation

A 59-year-old female patient who underwent orthotopic liver transplantation (OLT) for cryptogenic cirrhosis-associated hepatocellular carcinoma presented with fever and anaemia (Hb: 10 mg/dl, RBC: 3,450,000 U/mm3, Htc: 29%) on 40th postoperative day.

Imaging Findings:

Colour-Duplex-Ultrasound examination of abdomen revealed an oval lesion (23x16mm) within which there was arterial flow at the level of the hepatic hilum, suspected for pseudoaneurysm of hepatic artery (HA).

Computed Tomography (CT) examination (Fig. 1a-c) demonstrated the presence of the voluminous (21x17mm) pseudoaneurysm of HA located at the level of arterial anastomosis, widely communicating with the arterial lumen.

Digital subtraction angiography (DSA) performed through femoral approach and 7FrHS and 2C5FCobra catheters confirmed the presence of the pseudoaneurysm (Fig. 2). A stentgraft 5x19mm (Jostent Graftmaster, Abbott) was placed at the level of the lesion.

The day after, CT was repeated due to the worsening of patient clinical conditions (Hb: 6.7 mg/dl, RBC: 2,360,000 U/mm3, Htc: 19.6%): minimal persistence of arterial supplying caused by insufficient intimal stent adhesion was detected (Fig. 3); pseudoaneurysm’s neck was only partially covered by graft due to wide communication between lesion and arterial lumen.

DSA confirmed CT findings (Fig. 4a) and during the procedure a further stentgraft 5x16mm (Jostent Graftmaster, Abbott) was distally engaged to the first one: post-procedural angiographic evaluation depicted pseudoaneurysm
exclusion from circulation (Fig. 4b).

At 6-months follow-up CT (Fig. 5a-c) stentgrafts were patent and well-positioned.

**Discussion:**

HA pseudoaneurysm represents a rare but important postoperative arterial complication after OLT.

Pseudoaneurysms generally occur in 0.3-2% of OLT (mean-time from transplantation to diagnosis: 30 days) [1]. Pseudoaneurysm may be intrahepatic or extrahepatic: both types may occur from anastomosis breakdown (due to technical factors, infection, biliary leakage) or as iatrogenic complications after angioplasty, percutaneous biopsy or biliary procedures. In particular, extrahepatic pseudoaneurysms commonly arise at the level of surgical arterial anastomosis [2].

Clinical presentation may vary from incidental imaging-finding in asymptomatic patients, to aspecific abdominal pain, fever, anaemia, intra-abdominal bleeding, hypotension and acute haemodynamic collapse in case of rupture. Moreover, a ruptured intrahepatic pseudoaneurysm may lead to gastro-enteric, biliary or portal fistulation, with resultant haemobilia or gastrointestinal bleeding [3].

The risk of rupture for pseudoaneurysm in transplanted patients is 50% [3]; if untreated the reported mortality-rate is 69% or higher in case of extrahepatic pseudoaneurysm [4]. Although pseudoaneurysms are uncommon, they represent potential life-threatening post-OLT arterial complications which must be promptly diagnosed and treated. In fact, without an early treatment, they may threaten patient and graft survival, limiting the long-term success of transplantation.

Diagnosis of pseudoaneurysm is usually made by noninvasive imaging (US/CT).

US depict pseudoaneurysm as an oval anechoic mass along the hepatic artery with turbulent arterial flow pattern or typical bidirectional flow.

CT shows the arterial-phase enhancement of the perivascular lesion, confirming the vascular nature of the mass. Angiography is performed whenever a percutaneous endovascular treatment is possible [5].

Treatment is indicated in case of progressive increase in size, but it should be considered in every case of pseudoaneurysm due to the high mortality-rate associated with untreated lesions. Traditional treatment consists of surgical resection of the lesion with artery reconstruction (potentially using graft interposition or arterial conduit) or HA ligation.

Percutaneous endovascular techniques are valid nonsurgical alternative therapeutic options which allow a safe, successful and minimally invasive treatment of HA pseudoaneurysm. Both catheter-guide transvascular coil embolisation and low profile covered stentgrafts placement are able to exclude pseudoaneurysms from circulation, significantly improving graft and patient survival and avoiding surgical revision or liver retransplantation [6].

After the procedure, a strict imaging-based (US, CT) follow-up is required in order to detect promptly any procedural complication.

**Differential Diagnosis List:** Hepatic artery pseudoaneurysm as arterial complication after OLT, Graft rejection, OLT vascular complications, OLT biliary complications

**Final Diagnosis:** Hepatic artery pseudoaneurysm as arterial complication after OLT.

**References:**


**Figure 1**

**a**

Description: CT evaluation (MIP reconstruction) in sagittal view shows the voluminous (21x17mm) pseudoaneurysmatic lesion of hepatic artery. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy

**b**

Description: CT evaluation (VR reconstruction) shows the voluminous (21x17mm) pseudoaneurysmatic lesion of hepatic artery. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: CT evaluation (VR reconstruction) highlights the wide communication of HA pseudoaneurysmatic lesion with the arterial lumen (3mm). Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Selective HA angiography performed 24h after first stentgraft placement confirms minimal persistence of arterial supplying caused by insufficient intimal stent adhesion. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
**Description:** Due to persistence of arterial flow into the pseudoaneurysm, a further stentgraft 5x16mm situated distally and engaged to the first one that was placed. Post procedural angiogram confirms the exclusion of pseudoaneurysm from circulation. **Origin:** Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Figure 3

a

Description: 6-months follow-up CT evaluation shows patent and well-positioned stentgrafts. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy

b

Description: 6-months follow-up CT evaluation shows patent and well-positioned stentgrafts. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: CT evaluation (VR reconstruction) shows well-positioned stentgrafts. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: Selective HA angiography before stentgraft insertion confirms CT-findings of HA pseudoaneurysm. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy
Description: CT-scan performed 24h after first stent placement (MIP reconstruction) shows graft partially covering pseudoaneurysm neck due to wide communication between lesion and arterial lumen, with minimal persistence of arterial supplying. Origin: Department of Diagnostic and Interventional Radiology, University Hospital of Pisa, Italy