

Imaging of Liver Transplant Complications

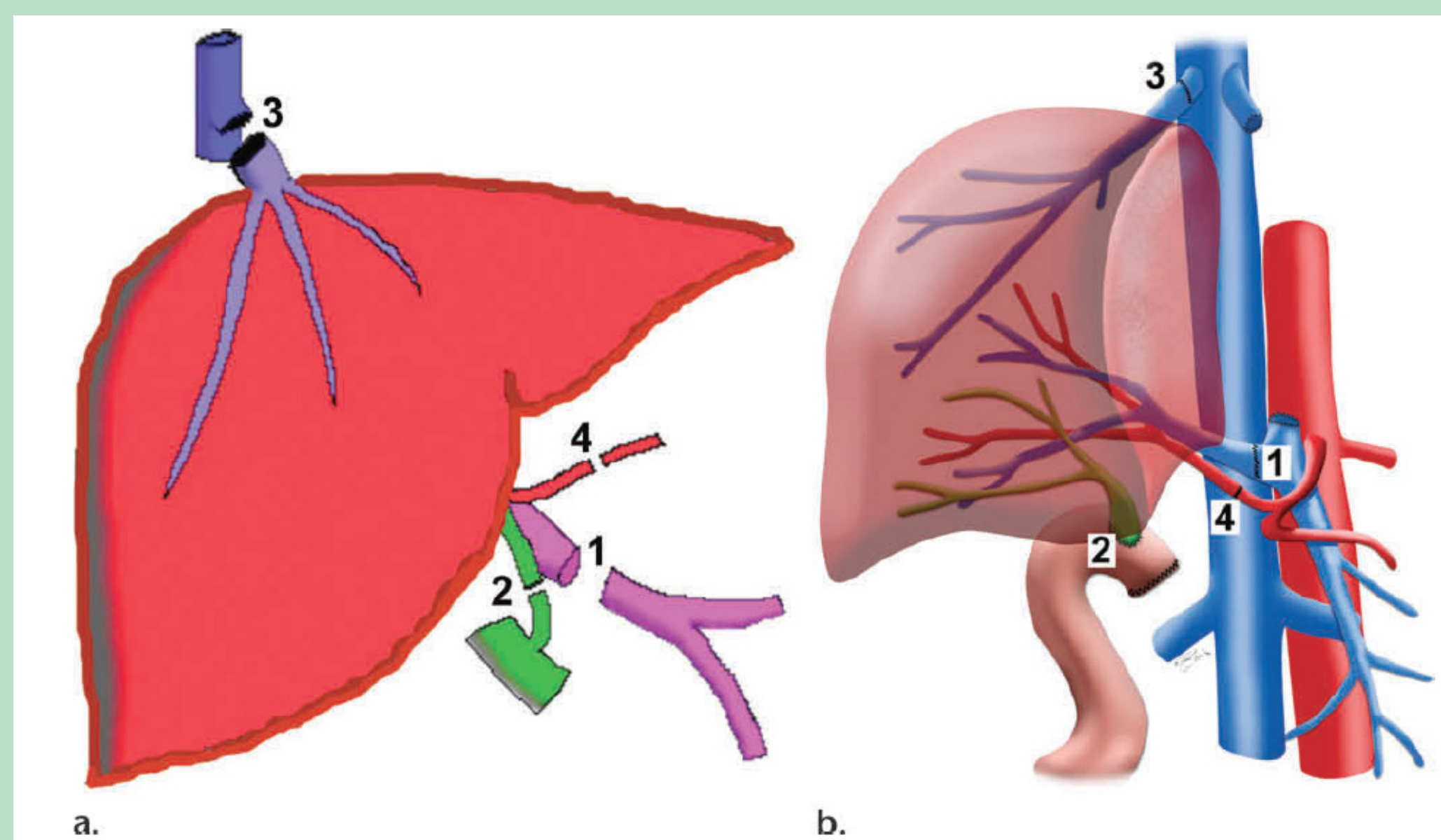


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INTRODUCTION:

Continued improvement in graft survival has led to a widespread acceptance of liver transplant as the preferred treatment for the majority of patients with end stage liver disease. Patients who have undergone solid organ transplantation are very difficult to assess and emphasis has been placed on non-invasive imaging techniques for their evaluation. The purpose of this exhibit is to describe the imaging findings of possible complications after liver transplantation and the appropriate interventional techniques. There are multiple imaging modalities available to evaluate complications. Doppler ultrasound is the preliminary modality of choice for gross evaluation and it will help determine the need for further imaging. Ancillary tests include computed tomography (CT), magnetic resonance (MR), cholangiography, angiography and scintigraphy. Each modality is different and its diagnostic usefulness will depend on individual presentation and clinical purpose.

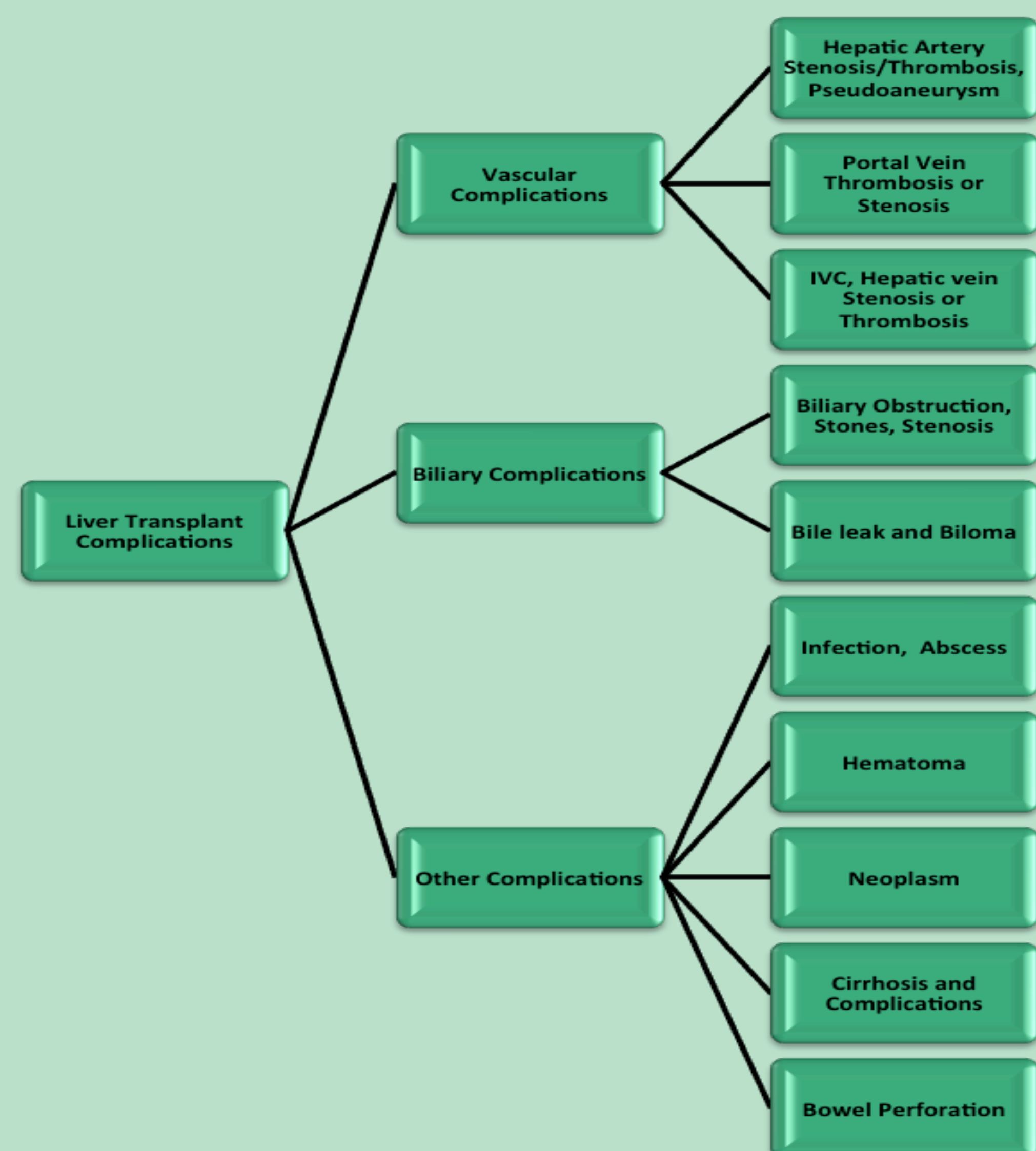
ANATOMY



1. Portal vein anastomosis
2. Bile Duct anastomosis
3. IVC anastomosis
4. Hepatic artery anastomosis

COMPLICATIONS:

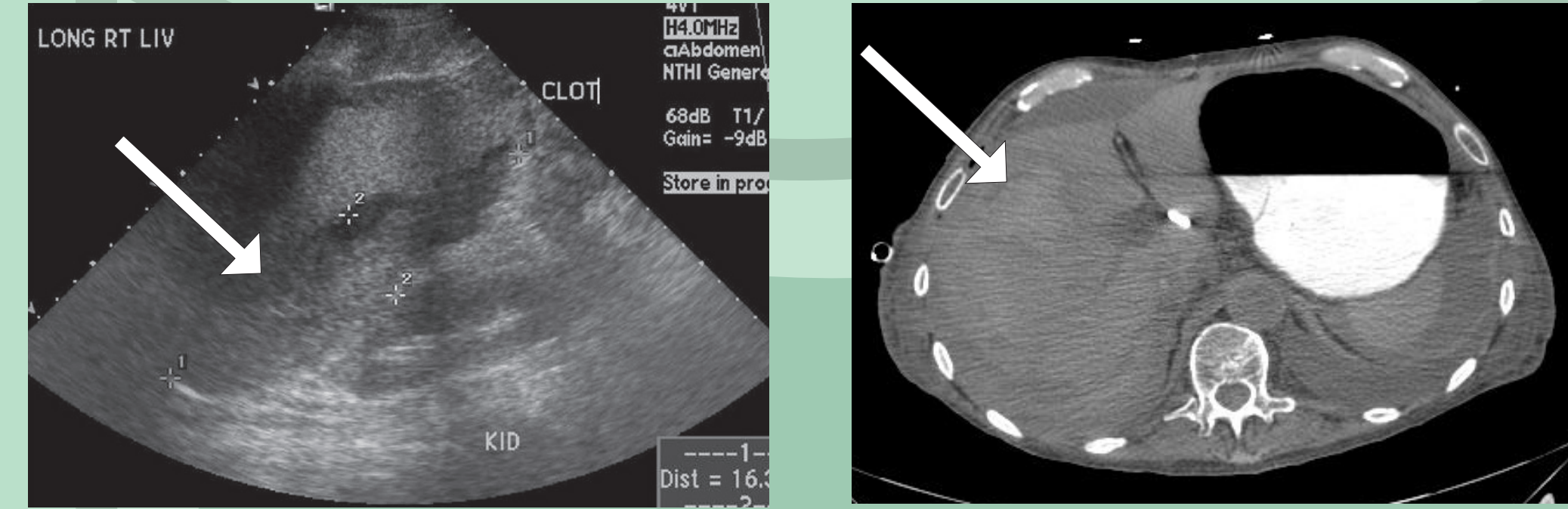
Vascular complications such as stenosis and thrombosis can affect the hepatic artery, portal vein, inferior vena cava (IVC) or hepatic vein. Biliary complications can be divided into stenosis and leaks with biloma formation. Other complications to be considered include recurrent hepatitis, posttransplantation lymphoproliferative (PTLD) disorder, bowel perforation, and recurrent malignancy.



CASE 1

HEMATOMA

Ultrasound image demonstrates a complex, heterogenous perihepatic fluid collection most consistent with hematoma. The hematoma was drained percutaneously. Non-contrast axial CT image demonstrates an intrahepatic hyperattenuating fluid collection consistent with hematoma status post liver transplant. Patient became hemodynamically unstable and returned to operating room.



CASE 2

EXTRAHEPATIC BILIARY STRICTURE

Percutaneous cholangiogram (PTC) demonstrates a stricture at the biliary anastomosis. An external/internal biliary drainage catheter was placed percutaneously.



CASE 3

HEPATIC ARTERY STENOSIS

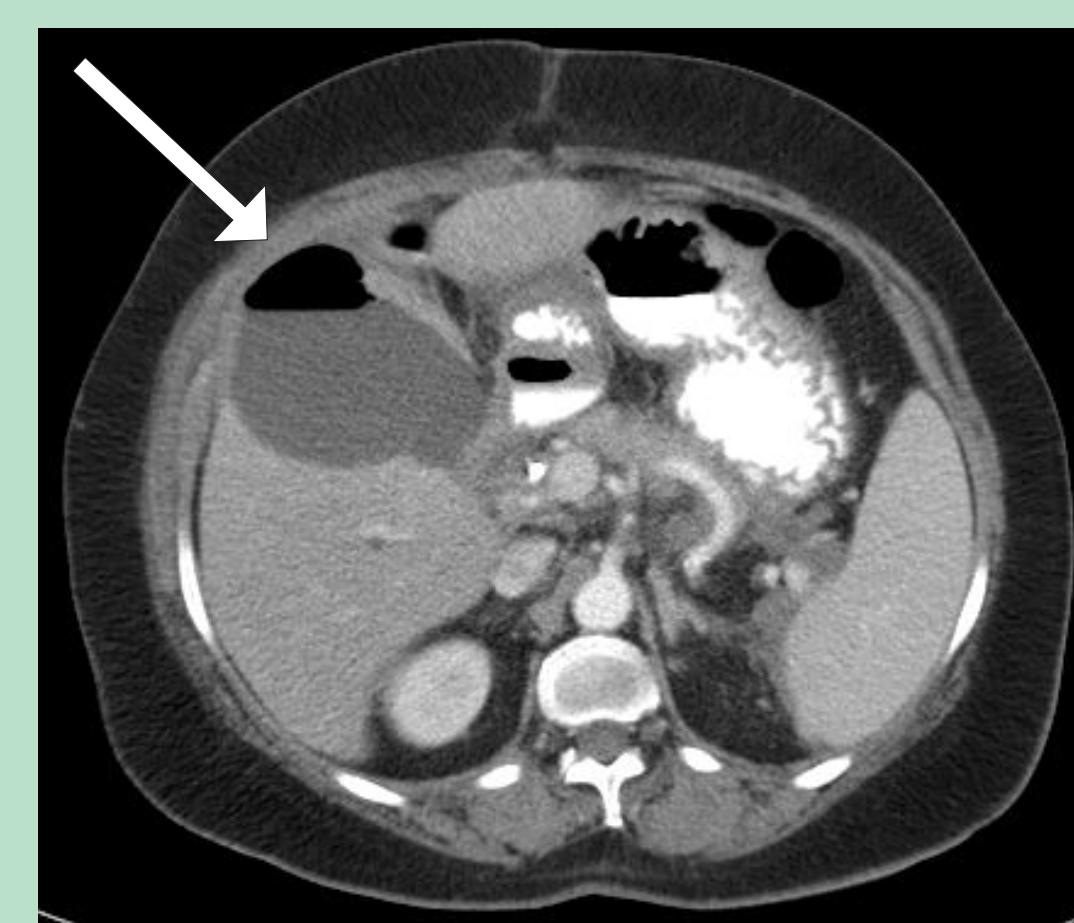
Hepatic arteriogram demonstrates focal narrowing near the anastomotic site consistent with hepatic artery stenosis. Patient underwent balloon angioplasty followed by stent placement of the proximal portion of the stricture.



CASE 4

BILOMA

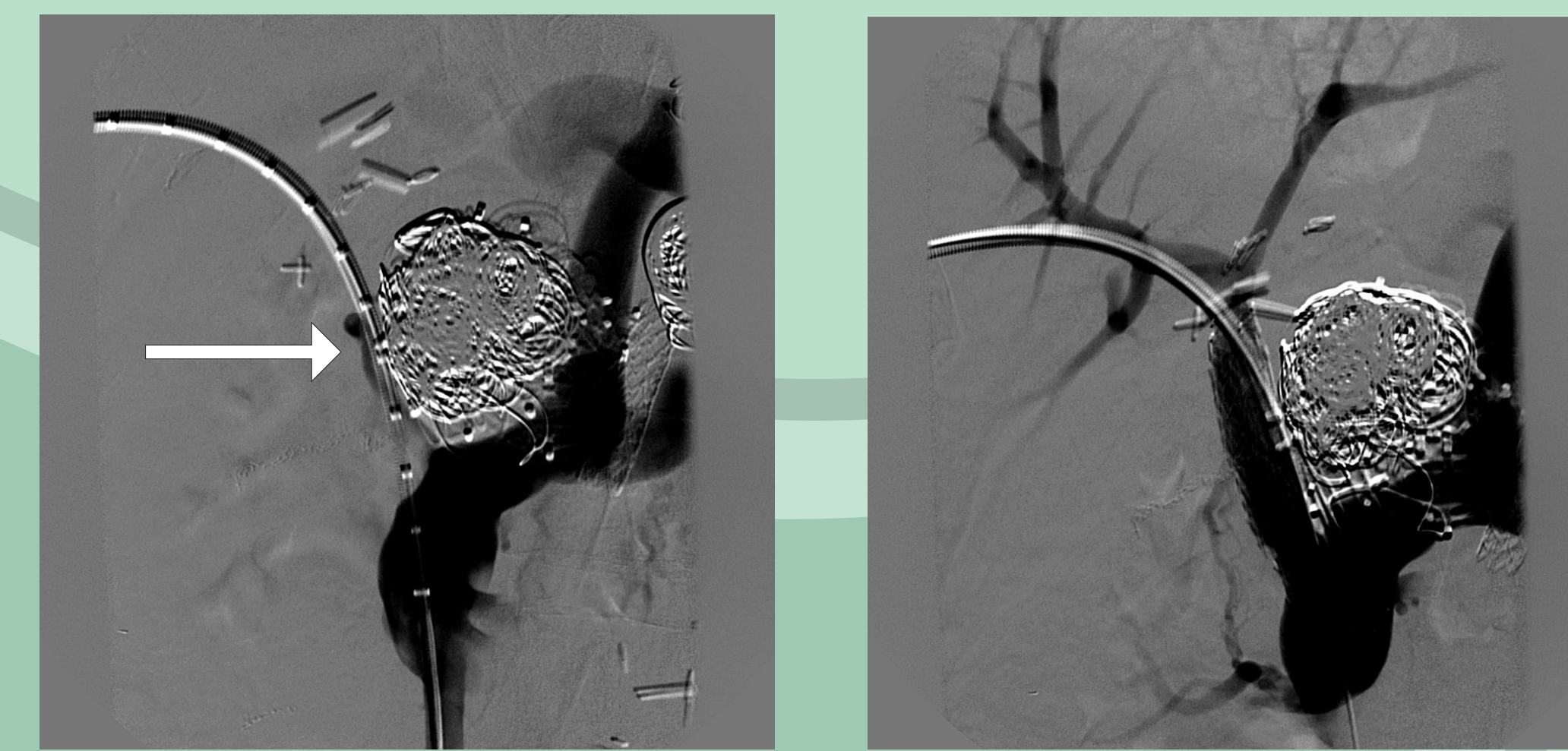
Contrast-enhanced CT of the transplanted liver demonstrates a hypoattenuating fluid collection with an air/fluid level. Aspiration of fluid yielded bile-tinged fluid with culture positive for infection. Findings were consistent with an infected biloma.



CASE 5

PORTAL VEIN THROMBOSIS/STENOSIS

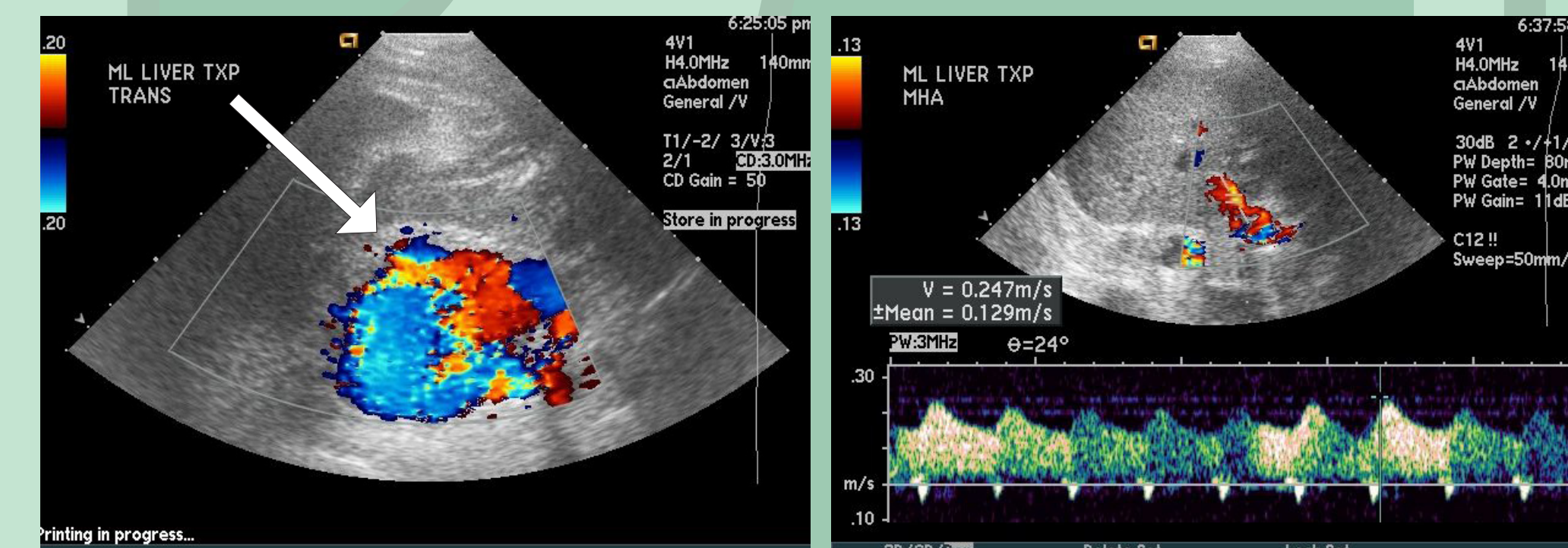
Color Doppler sonographic image demonstrates minimal flow within the portal vein. Resulting portal venogram demonstrated no flow within the main portal vein. After balloon angioplasty and stent placement, there was satisfactory flow of contrast.



CASE 6

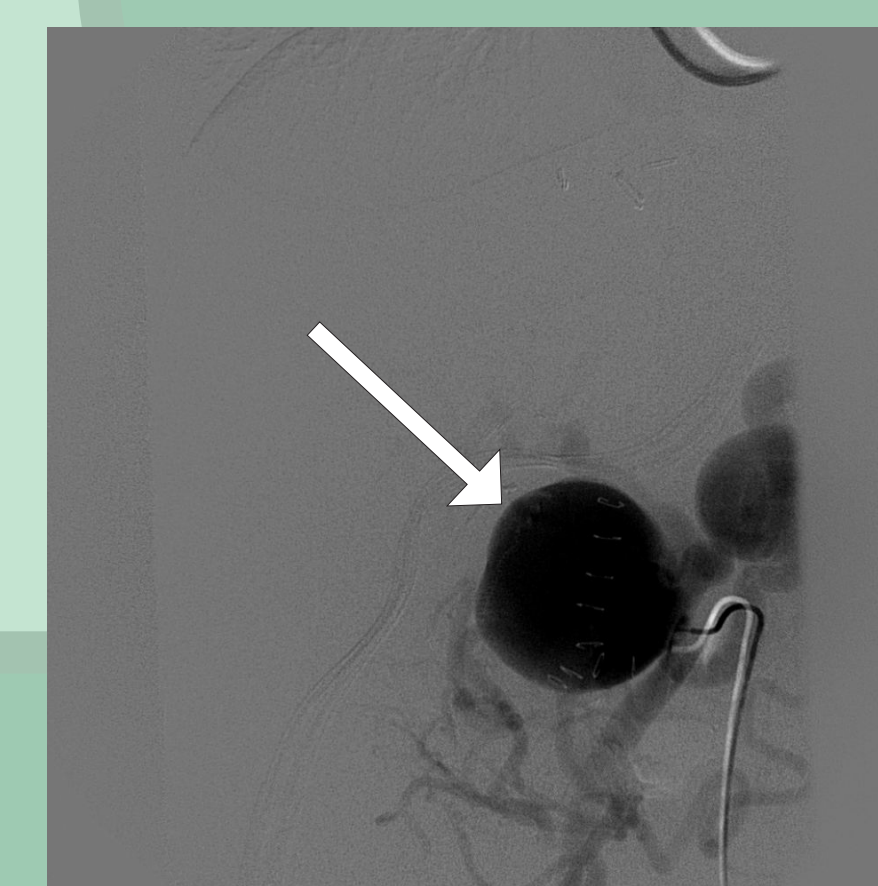
HEPATIC ARTERY PSEUDOANEURYSM

Sonographic images show a dilated vascular structure near the liver hilum. The main hepatic artery distal to this exhibited a tardus parvus waveform. Subsequent angiography demonstrated a large pseudoaneurysm (white arrow) arising near the junction of patient's anatomical variant of proper hepatic artery arising from the SMA. Patient received coil embolization as treatment for the pseudoaneurysm. An incidental splenic pseudoaneurysm is also visualized



Pseudoaneurysm

Hepatic Artery Waveform



Pseudoaneurysm

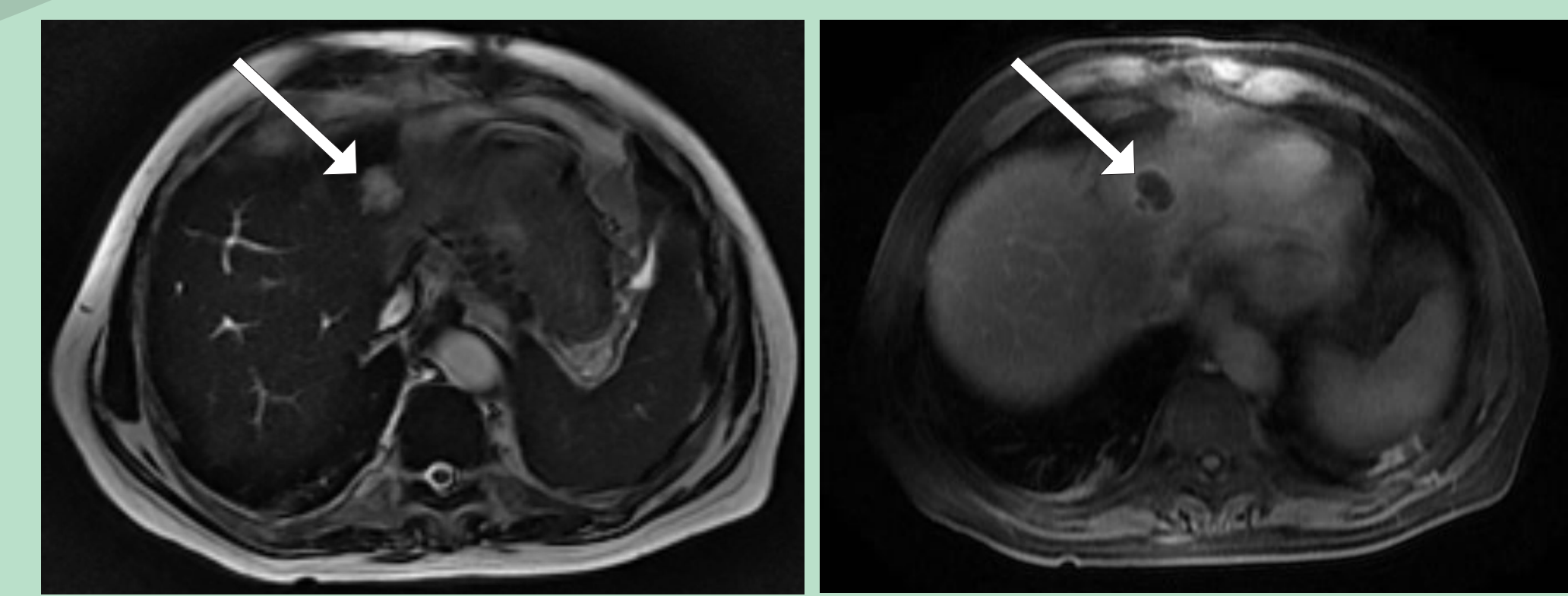


s/p coil embolization

CASE 7

LIVER ABSCESS

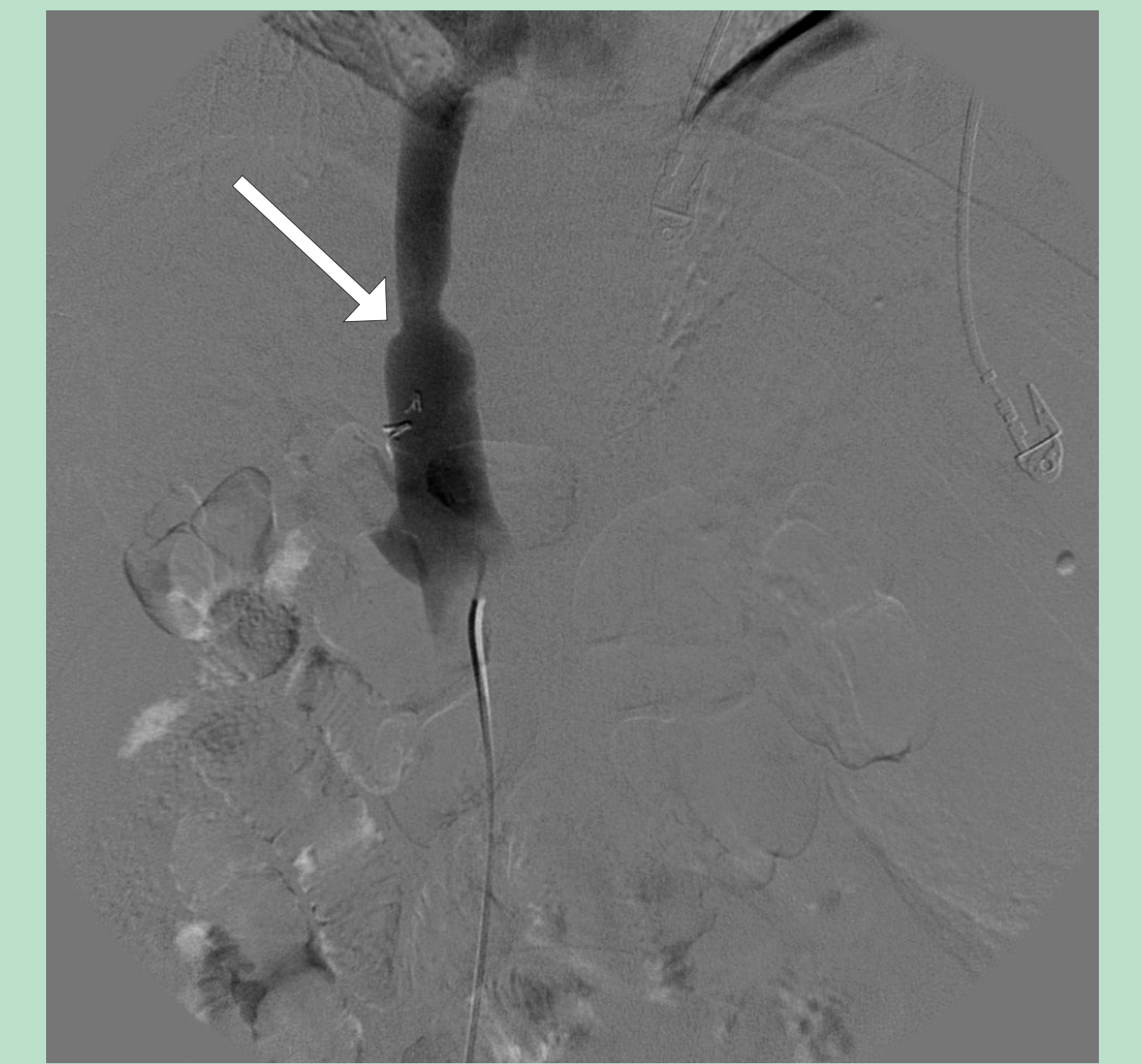
Magnetic resonance (MR) T2 and T1W contrast enhanced images of the transplanted liver demonstrate a rim-enhancing fluid collection in the inferior left hepatic lobe. Patient underwent percutaneous drainage and the fluid returned positive for *E. coli*.



CASE 8

IVC ANASTOMOTIC STRICTURE

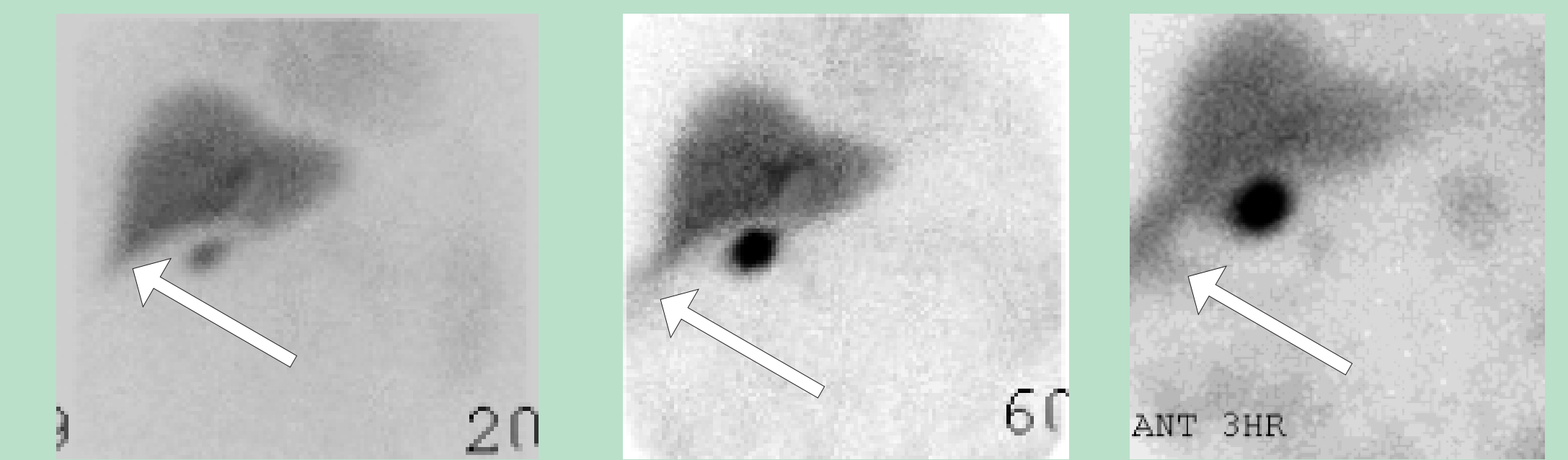
Inferior vena cavogram from patient with transplanted liver shows focal narrowing at the anastomotic site consistent with stricture. Patient underwent balloon angioplasty with resulting improvement of the stricture.



CASE 9

BILE LEAK

Hepatobiliary scintigraphic images at 20 minutes, 60 minutes, and 3 hours demonstrate a subhepatic bile leak.



INTERVENTIONS:

The possible percutaneous interventions include transhepatic biliary drain stent/catheter placement and percutaneous drainage of biloma and/or abscess. Vascular interventional procedures include angioplasty for hepatic stenosis, coil embolization/stent placement for pseudoaneurysms, and angioplasty and/or stent placement for venous stenoses.

CONCLUSION:

The clinical manifestations of transplanted liver complications are usually nonspecific and imaging techniques play a key role in the diagnostic workup. Radiologists have multiple modalities at their disposal for optimal evaluation. Early recognition of these complications will help lower morbidity and mortality rates and will likely allow for graft preservation.

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