CAIR Case of the Month

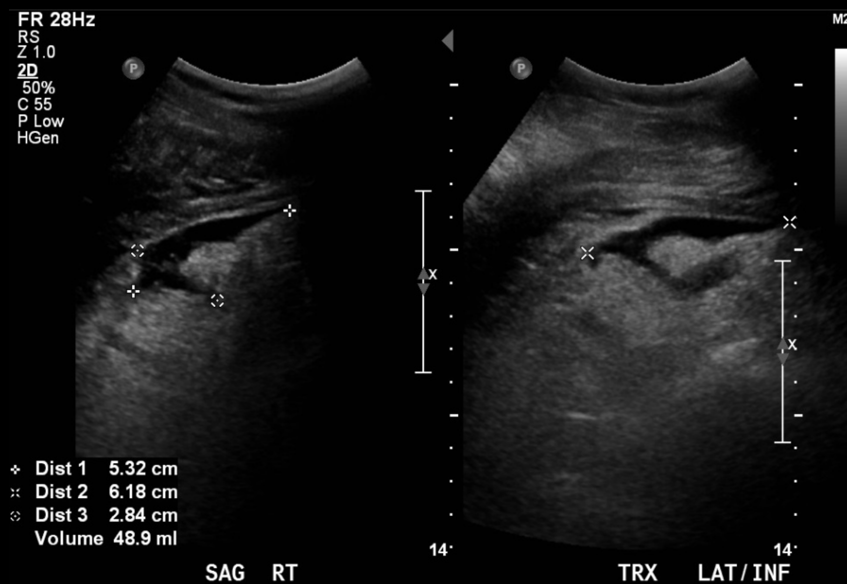
Case Courtesy of Drs. J. Reaney,
P. Sarlieve and R. Owen
University of Alberta

Clinical History

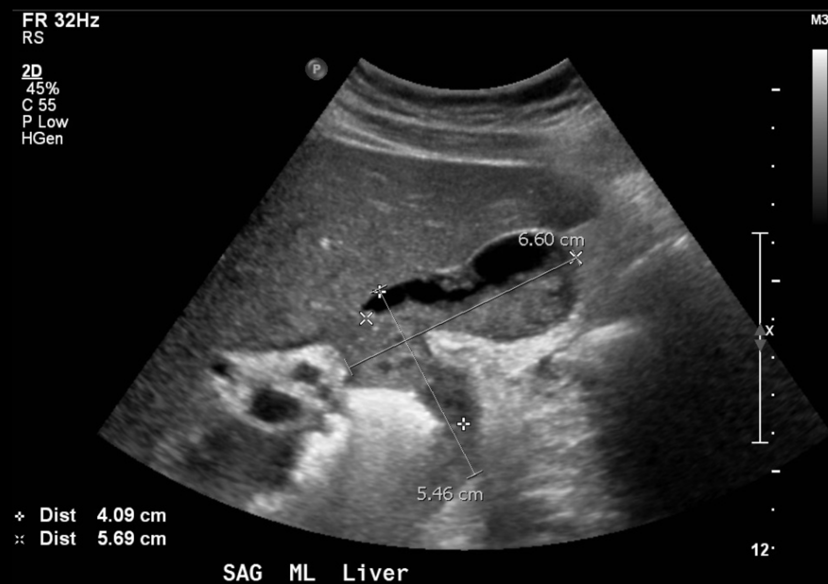
- 47 year old male with end stage cirrhosis secondary to alcoholism
- Orthotopic liver transplant requiring complex vascular reconstruction due to cadaveric anatomy
- Presented 11 days post-transplant with cholangitis

Gallbladder fossa collection

Day 1



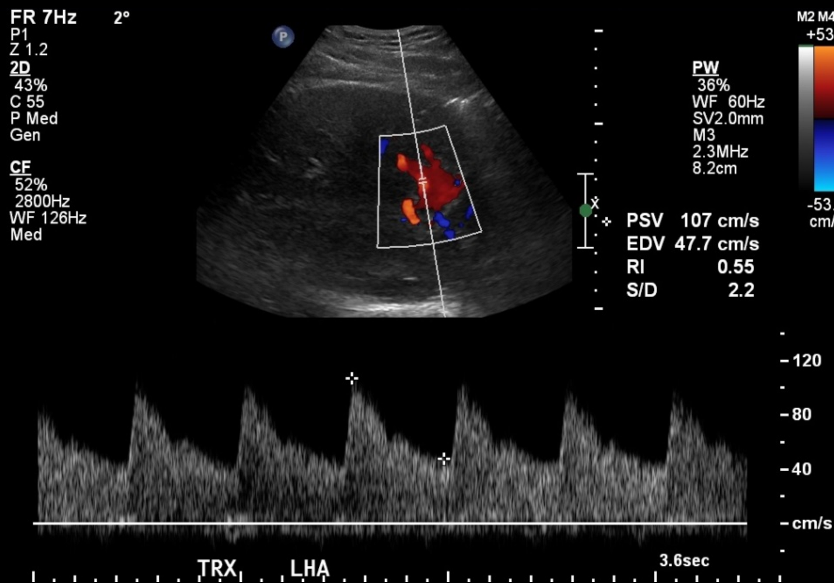
Day 11

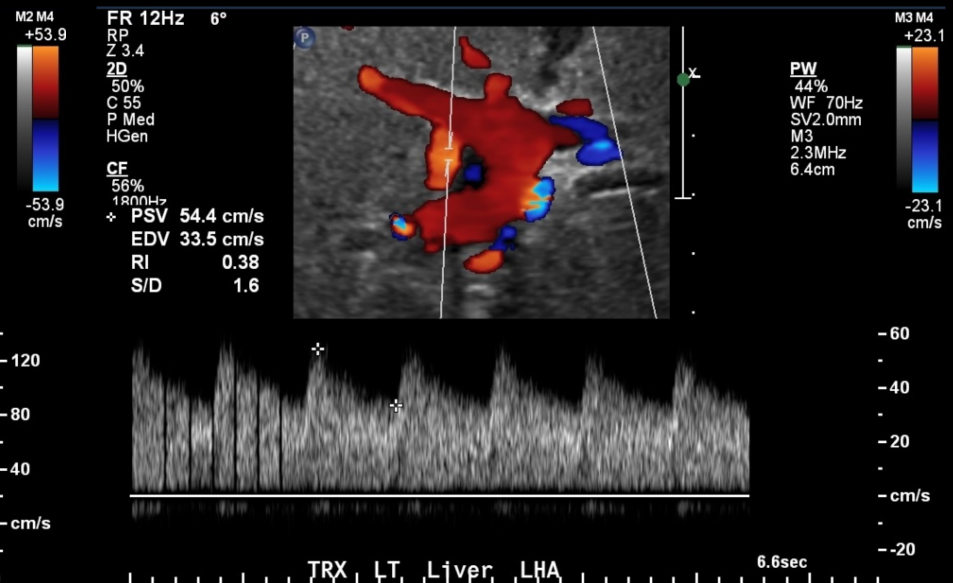


Left hepatic artery duplex US

Day 1 – RI 0.55

Day 11 – RI 0.38

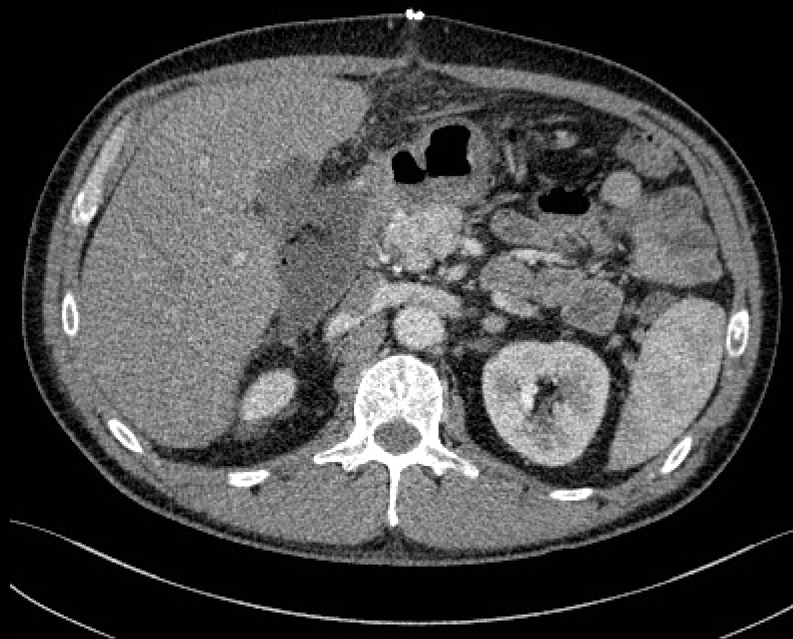




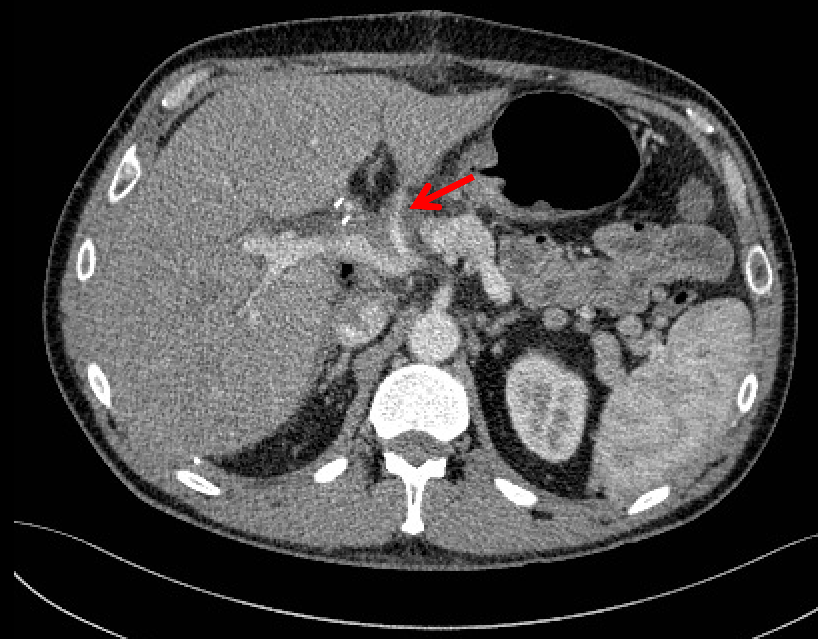
Appearances concerning for a hepatic artery anastomotic stenosis

CT day 12

Gallbladder fossa collection

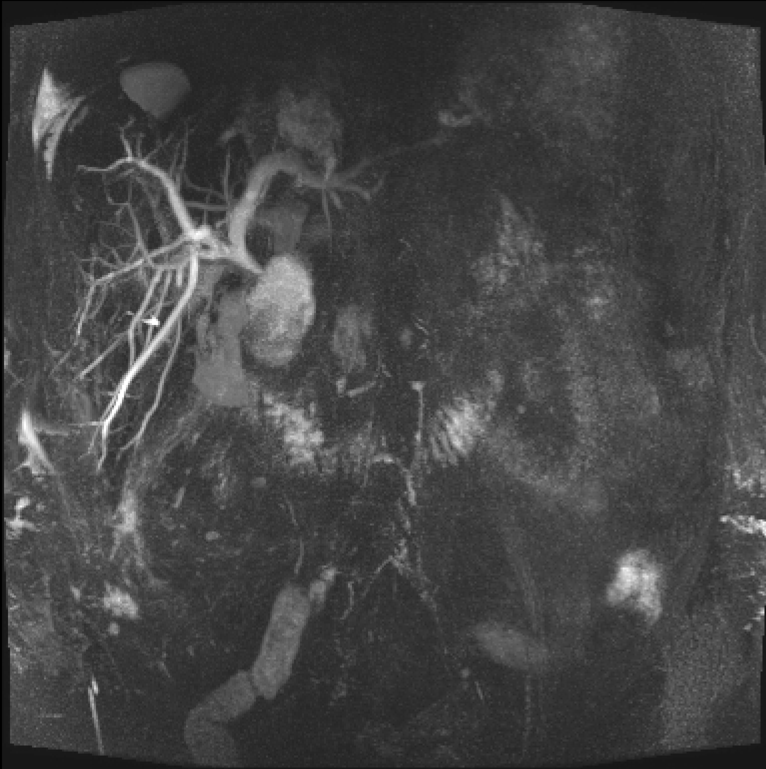


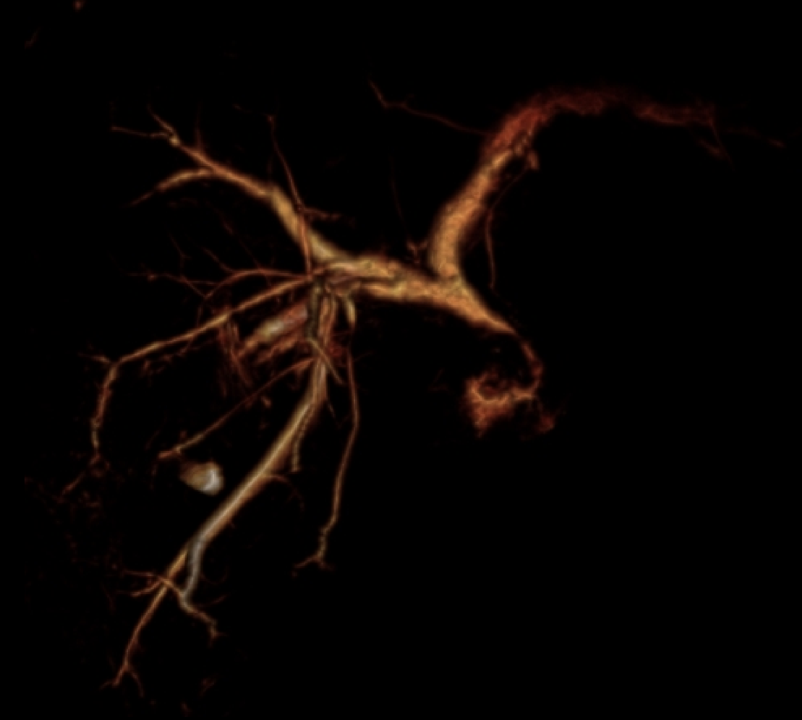
Hepatic artery stenosis



MRCP day 12

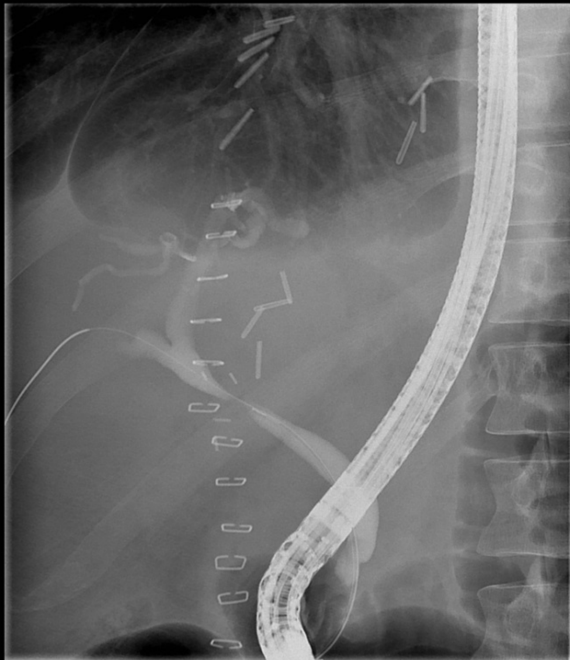
Biliary anastomotic stenosis



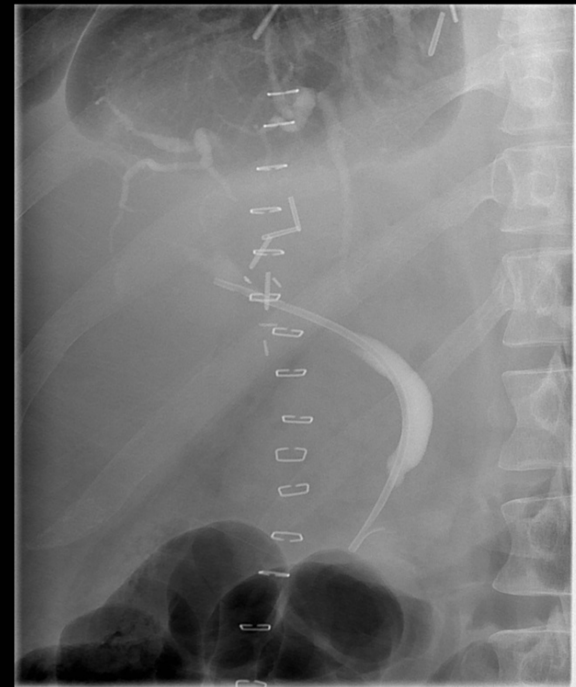


ERCP day 13

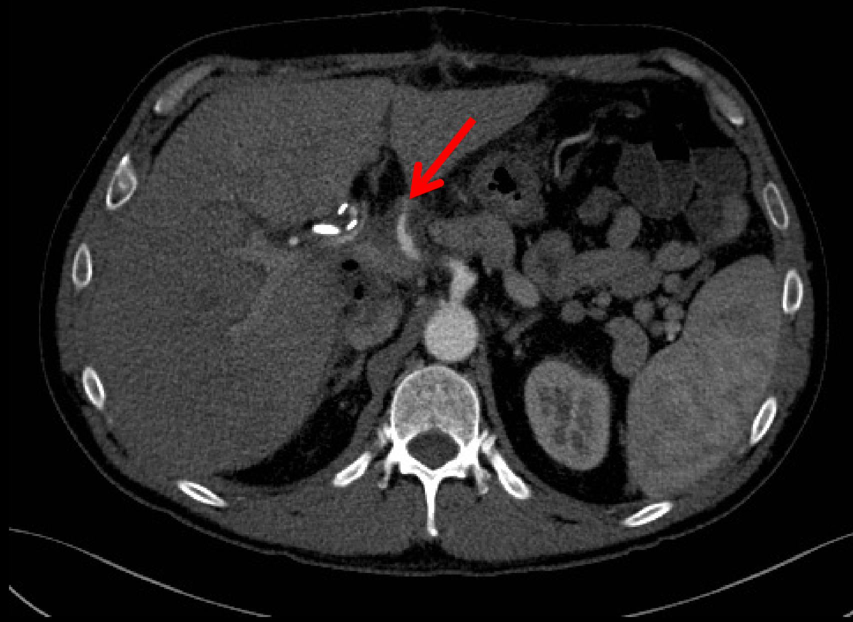
Biliary anastomotic stenosis

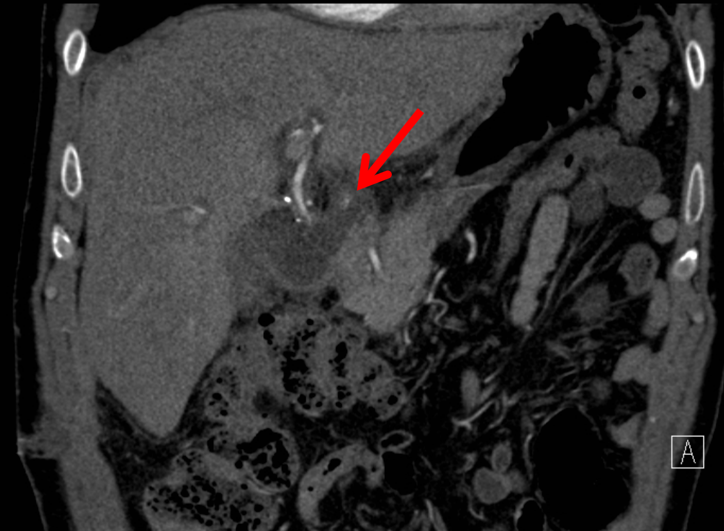


Treated with plastic stent



CT angiogram day 15





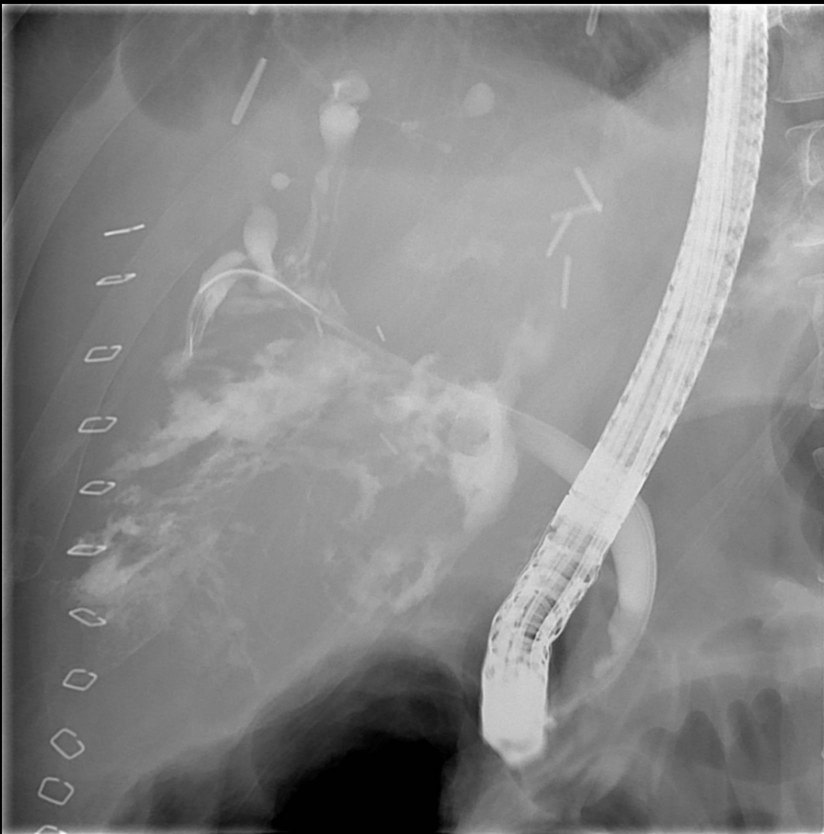
Hepatic artery anastomotic stenosis
Angioplasty not performed at this time due to the risk of rupture at the recent anastomosis

Re-presented with cholangitis day 23

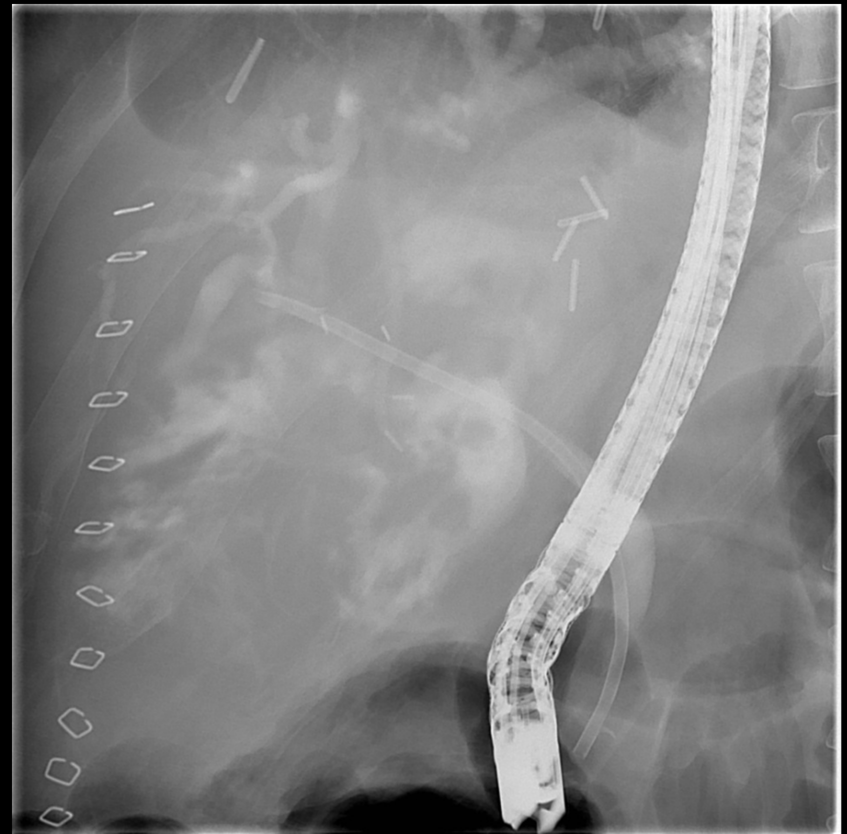
- Re-presented with symptoms of cholangitis and a 1-2 day history of dark urine on day 23
- Rapid LFT elevation over 2 days
  - Bilirubin 34 to 111 μmol/L
  - Alkaline phosphatase 480 to 918 U/L
  - AST 26 to 384 U/L
  - ALT 42 to 266 U/L

ERCP day 23

Biliary anastomotic leak



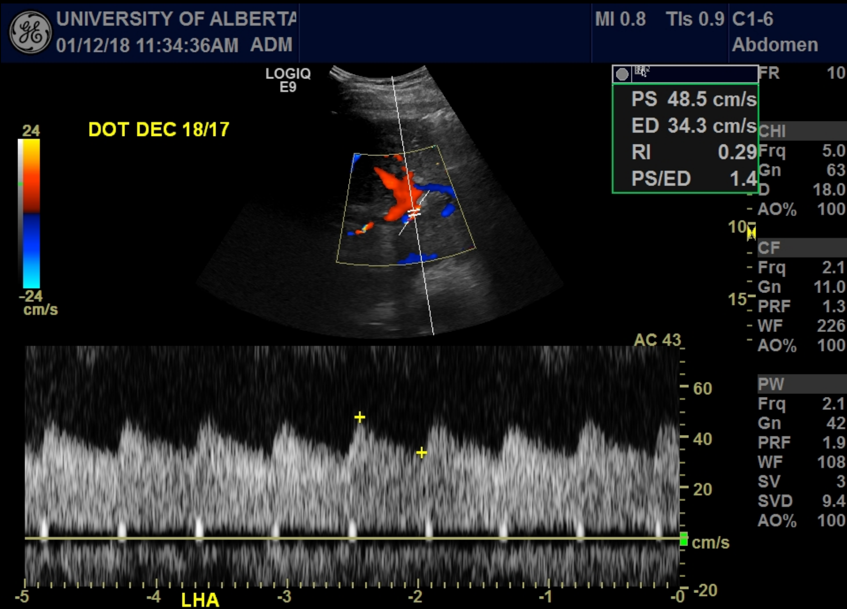
Plastic stent placed



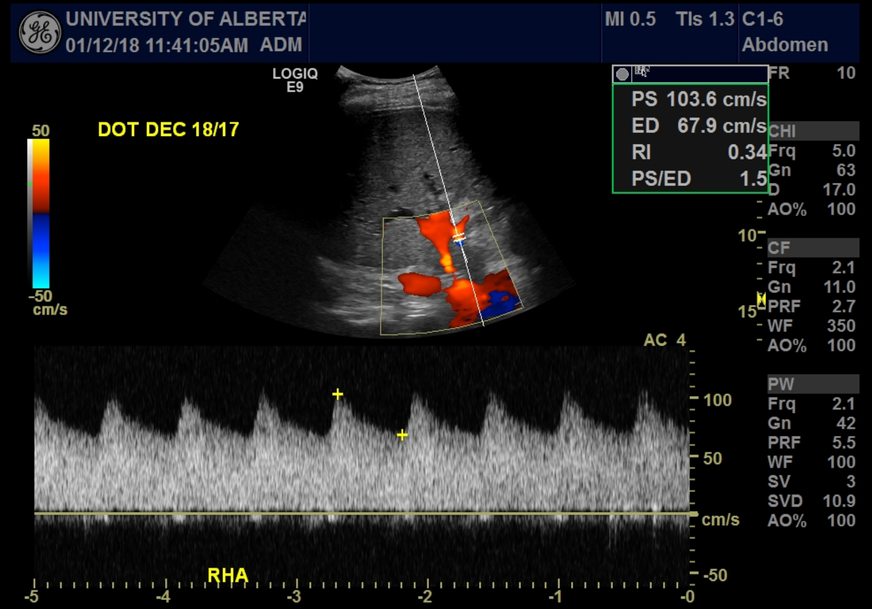
Proceeded the same day to laparotomy for abdominal washout, evacuation of hematoma and biliary reconstruction with Roux-en-Y hepaticojejunostomy

Duplex US day 25

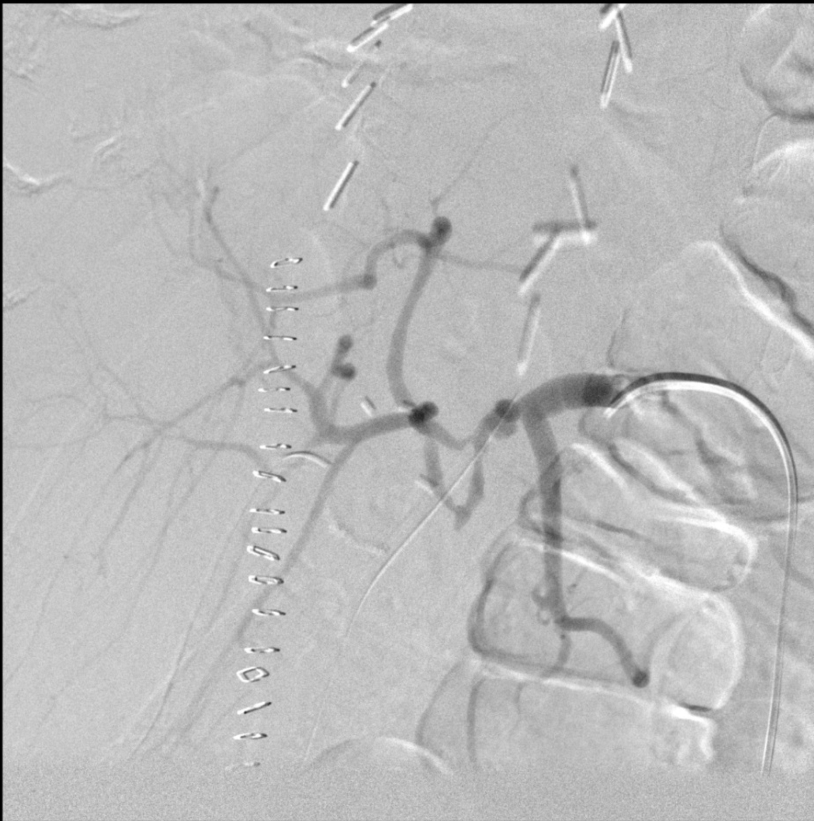
Left hepatic artery - RI 0.29

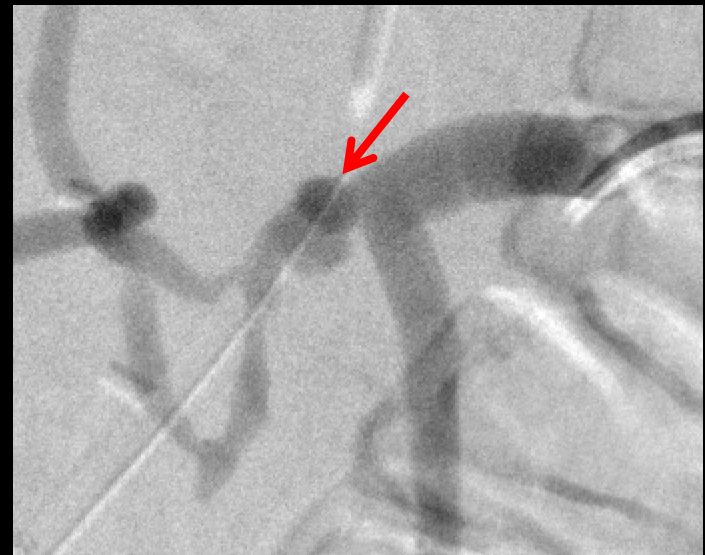


Right hepatic artery - RI 0.34



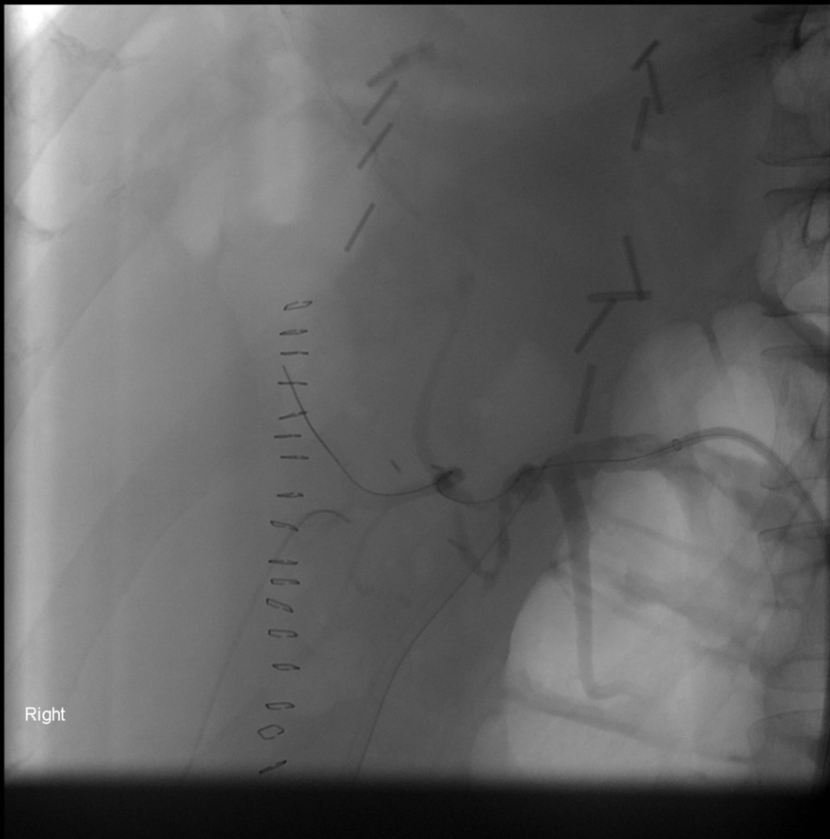
Angioplasty day 28

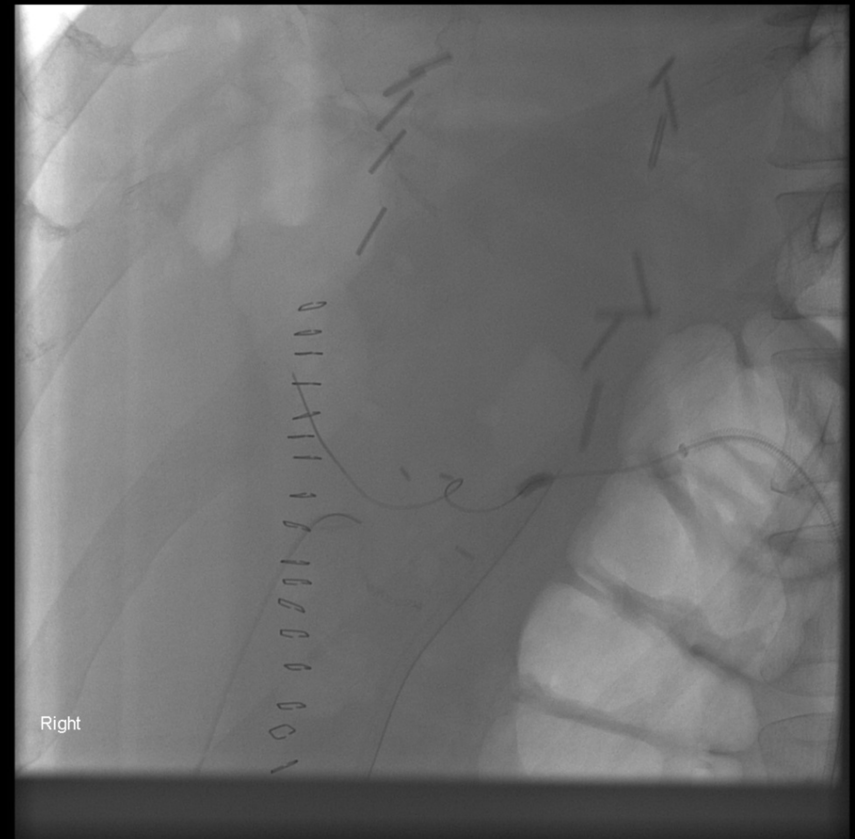




Short web like stenosis at hepatic artery anastomosis with a new small saccular pseudoaneurysm not identified on CT

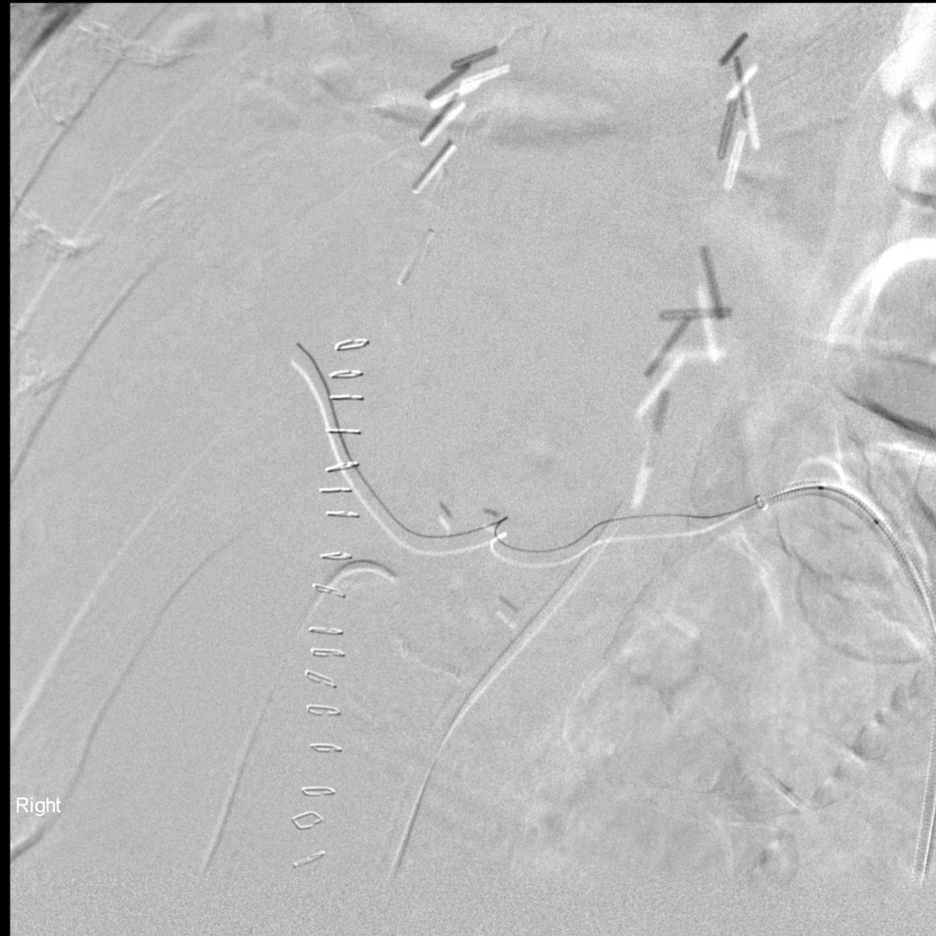
Angioplasty day 28



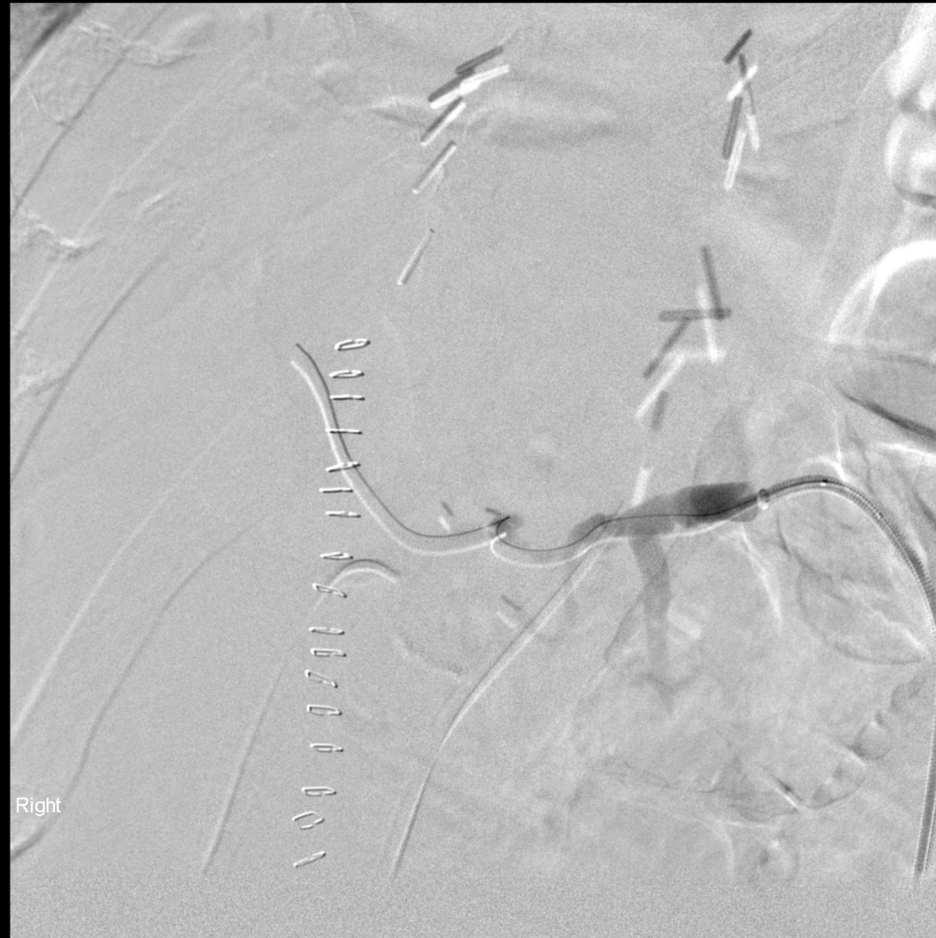


POBA performed using a 3.5 x 15 mm balloon

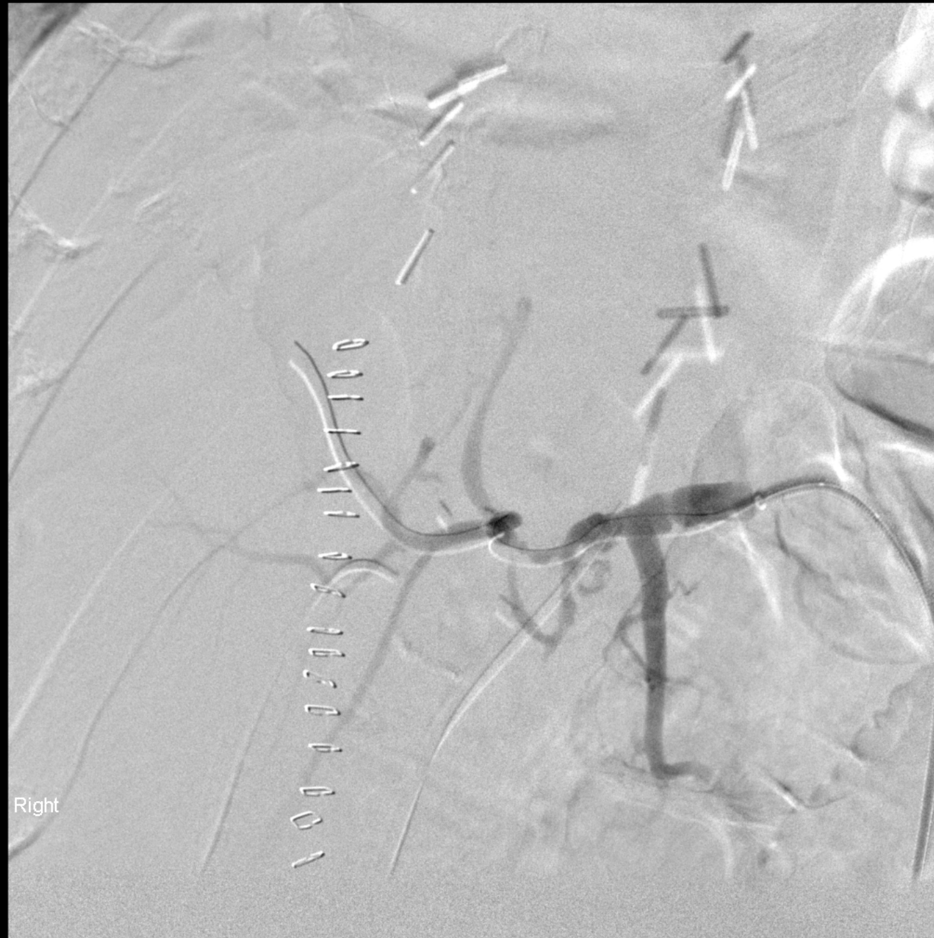
Post-angioplasty angiogram



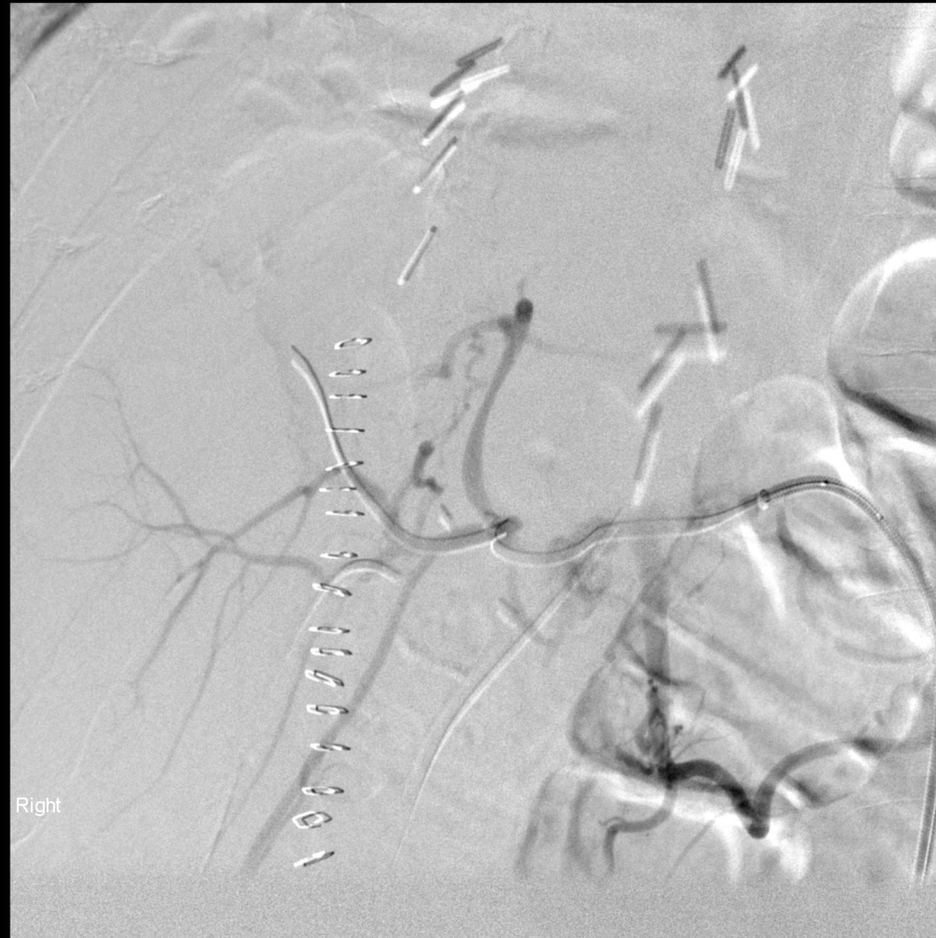
Post-angioplasty angiogram



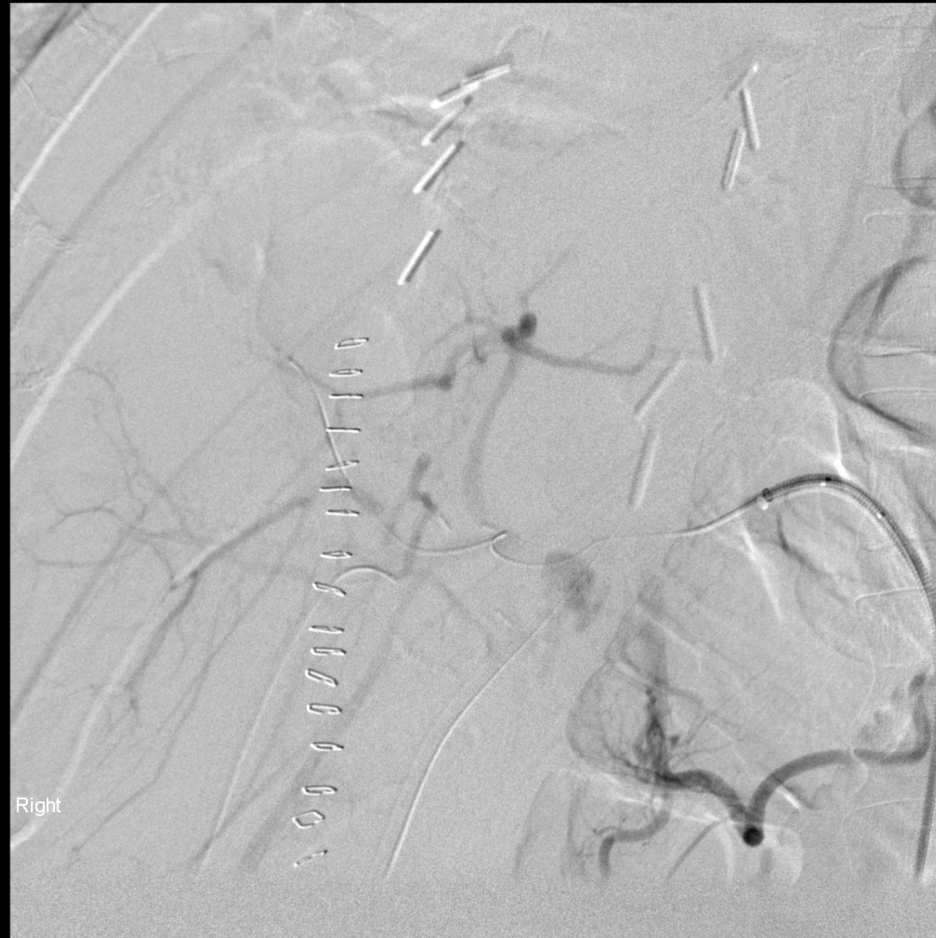
Post-angioplasty angiogram



Post-angioplasty angiogram

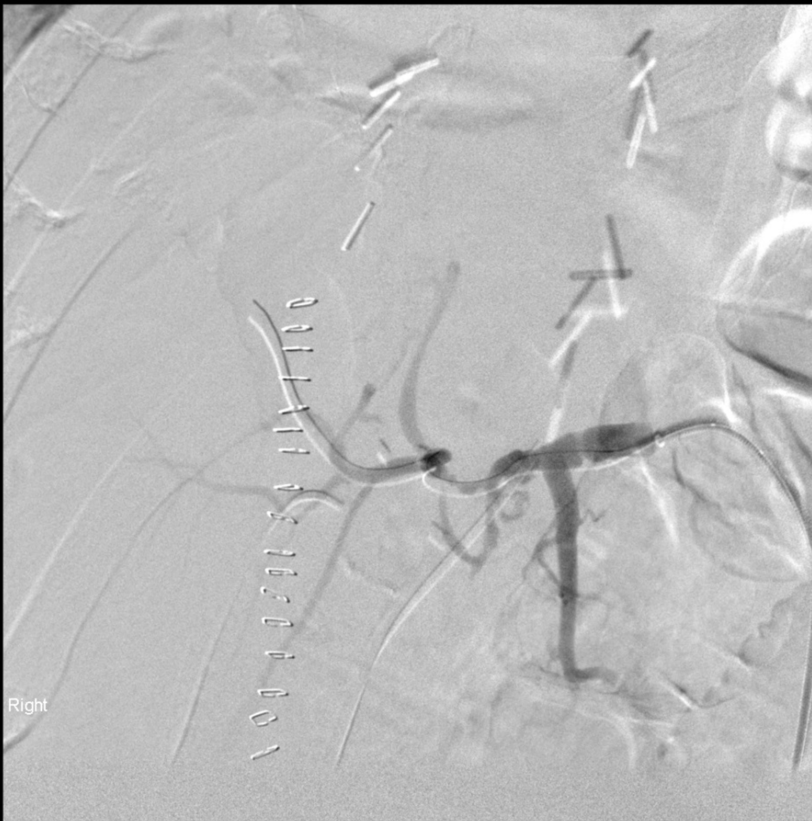


Post-angioplasty angiogram

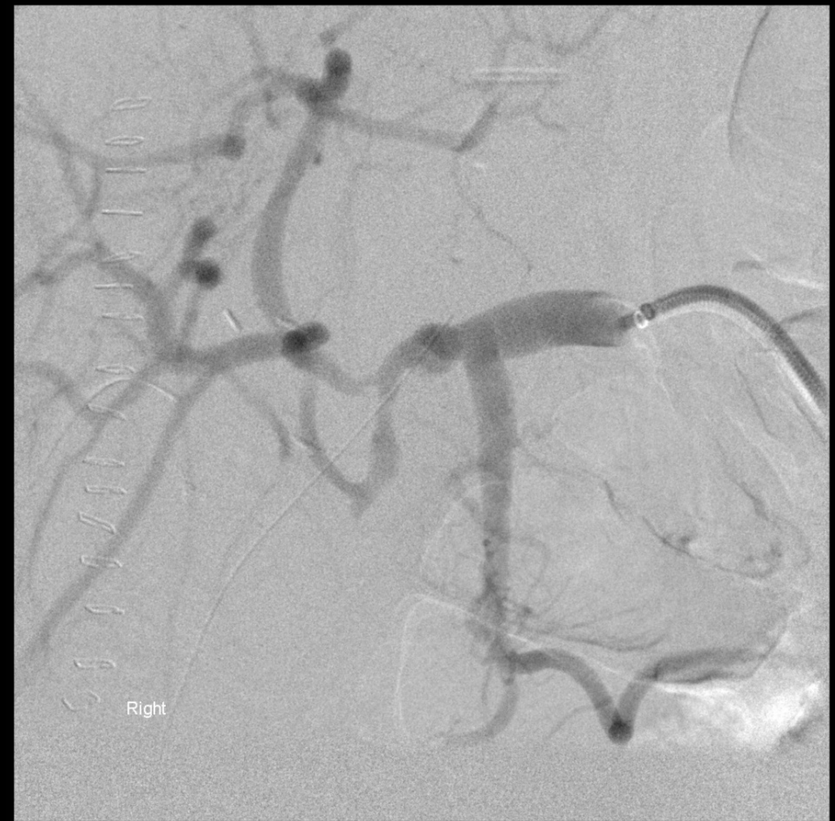


Angioplasty day 28

Extravasation post angioplasty



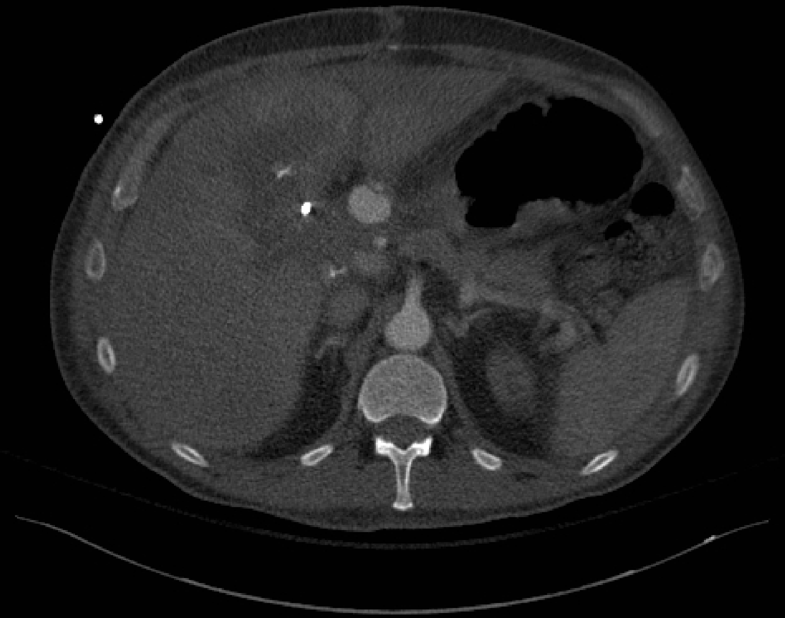
Tamponaded spontaneously



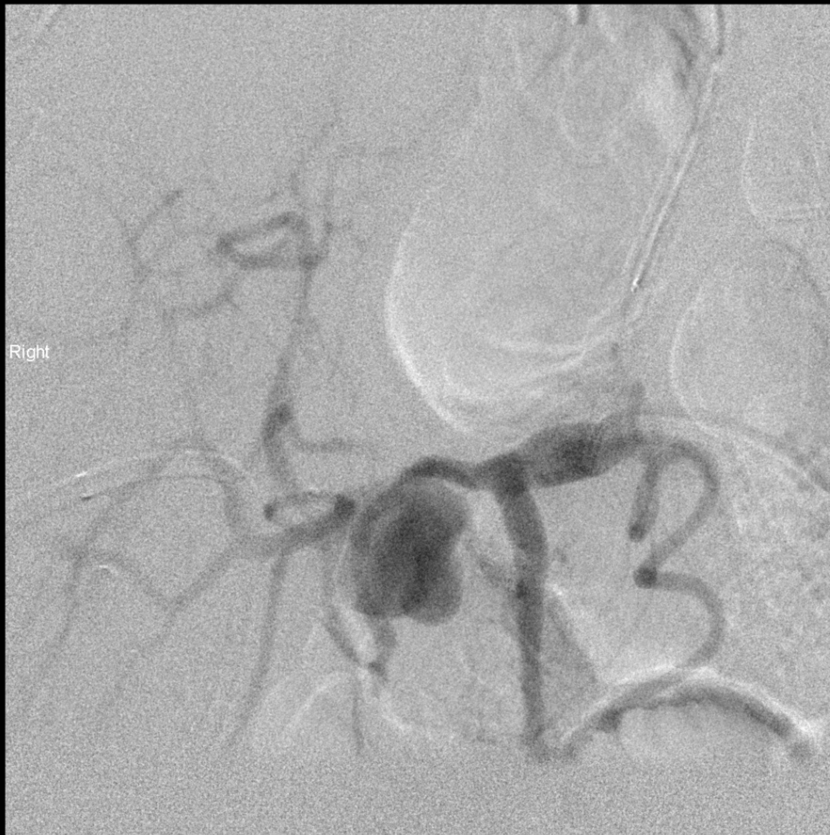
Patient's vitals stable during this procedure

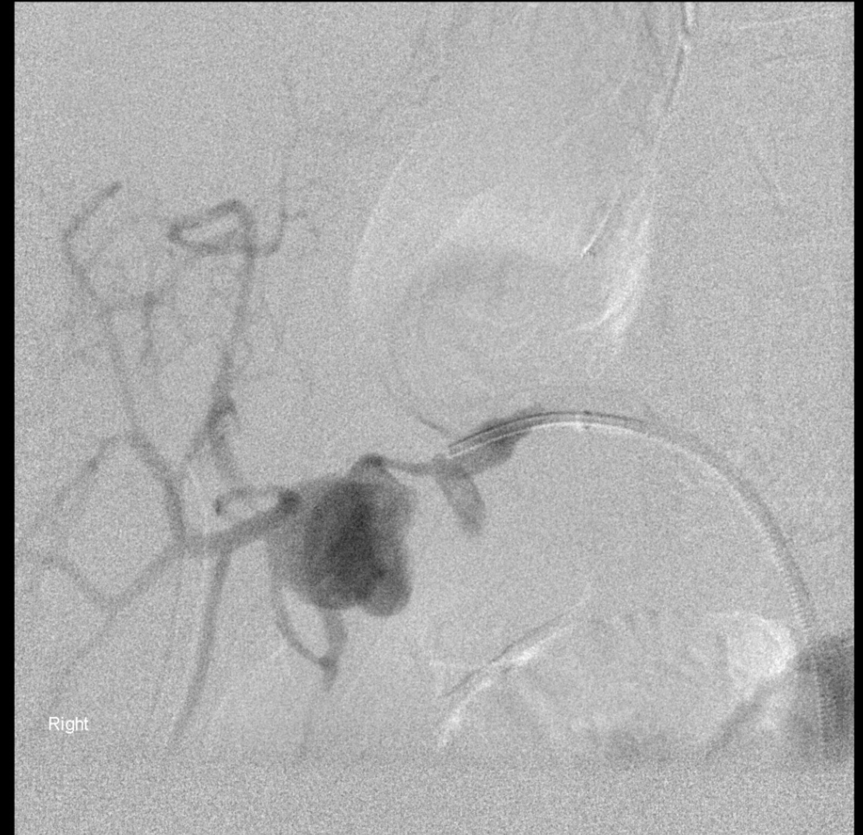
Deterioration day 30

- Became hypotensive on the ward
- Blood suddenly draining from abdominal drains
- Triphasic liver CT performed
- Large pseudoaneurysm adjacent to hepatic artery anastomosis identified
- Patient transferred to ICU
- Resuscitated, intubated and ventilated prior to transfer to the angio suite



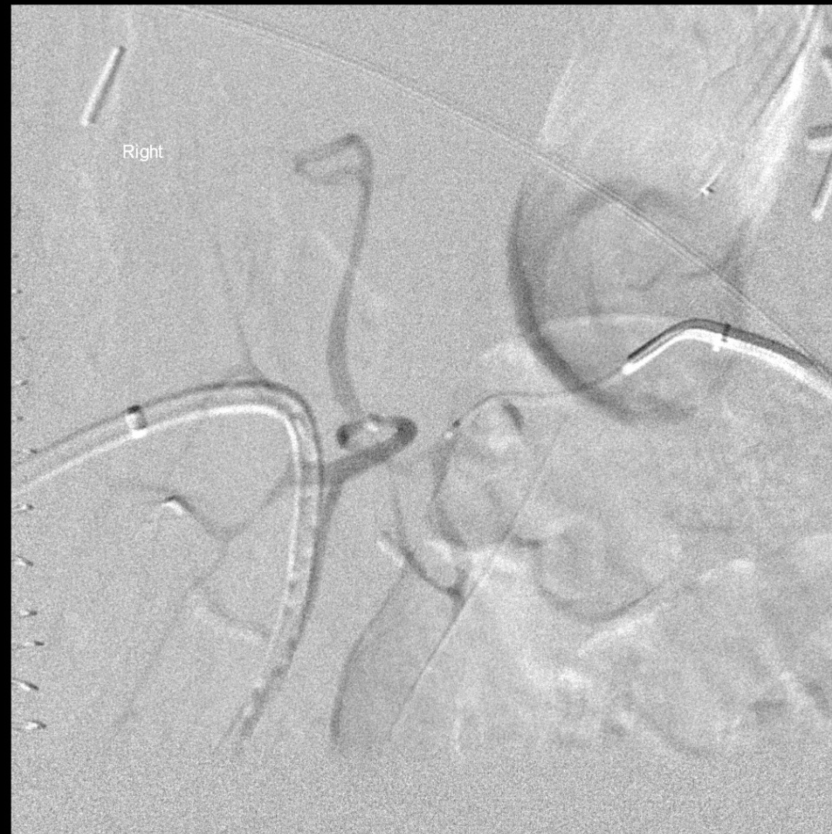
Angiogram day 30





Initial angiograms performed via a 5 Fr C2 catheter
A 6 Fr RDC was then inserted into the celiac axis

Angiogram day 30

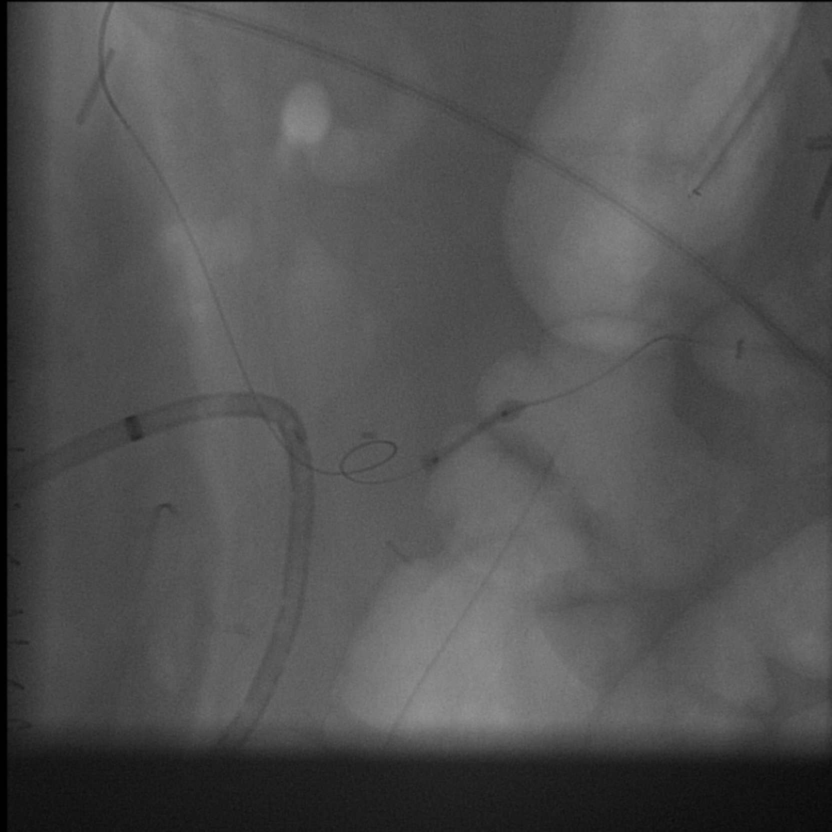


2.5 Fr microcatheter advanced beyond the pseuodaneurysm origin confirming a short proper hepatic artery segment distally and patent right and left hepatic arteries

Treatment options?

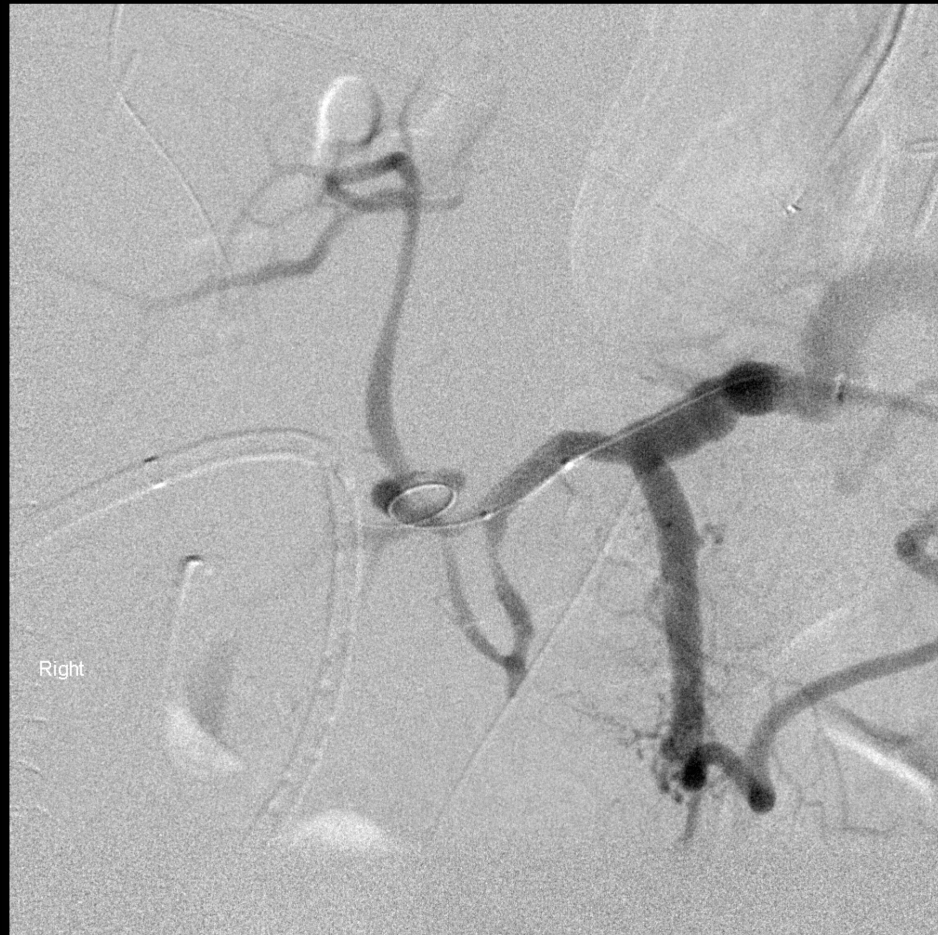
- Coil embolization
- Covered stent

Covered stent insertion

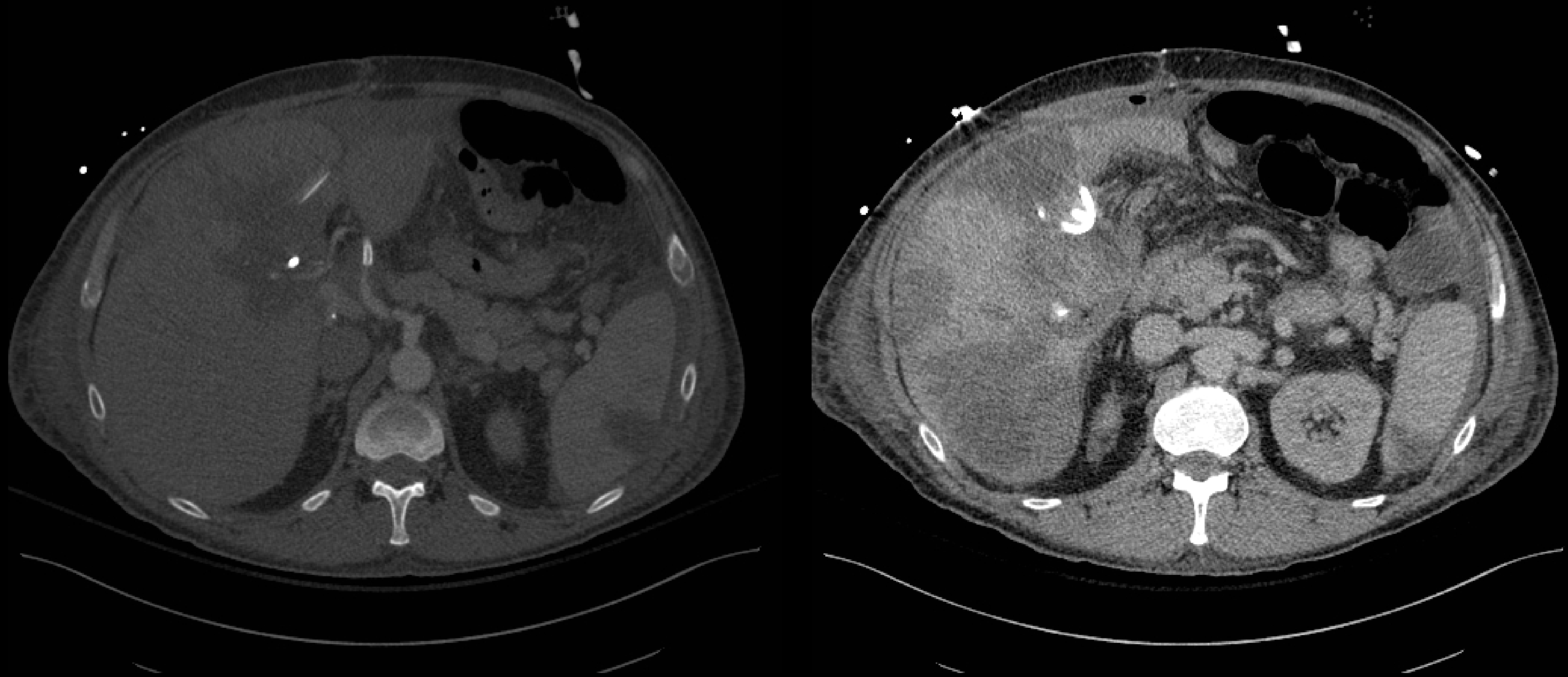


4.0 x 16 mm covered coronary artery stent placed and dilated to 4.38 mm

Post-covered stent angiogram



Post-procedure course



Despite patency of the covered stent the liver developed significant areas of necrosis
The patient proceeded to re-transplant 18 days post stent placement

Discussion

- Hepatic artery stenosis
  - Occurs in 2-13% of transplants
  - Angioplasty +/- stenting is first line treatment
- Hepatic artery pseudoaneurysm
  - Reported incidence 0.27% to 3% following orthotopic liver transplant
  - Risk factors include peritoneal infection, biliary leak, bili-digestive anastomosis and digestive leak
  - Surgical treatment options
    - Hepatic artery ligation (mortality rate 60% in one case series)
    - Pseudoaneurysm excision and immediate revascularization with a cryopreserved arterial allograft (mortality rate 28% in one case series)
  - Interventional radiology treatment options
    - Coil embolization of the hepatic artery
    - Exclusion of the pseudoaneurysm with a covered stent[1]

Piardi et al. World Journal of Hepatology 2016

Discussion

- How soon can angioplasty be performed post liver transplant arterial anastomosis?
- Optimal time discussed
  - Kodama et al >1 week[2]
  - Ueno et al >3 weeks[3]
  - Boyat et al no time restriction with available covered stents[4]

Discussion

- A suitably sized covered stent was not stocked in the interventional radiology department
- Covered stent obtained from cardiology cath lab in the middle of the night
- A knowledge of equipment available from other specialties can save the day in emergency situations

References

1. Piardi T, Lhuaire M, Bruno O, Memeo R, Pessaux P, Kianmanesh R, Sommacale D. Vascular complications following liver transplantation: A literature review of advances in 2015. World J Hepatol. 2016 Jan 8; 8(1):36-57.
2. Kodama Y, Sakuhara Y, Abo D, Shimamura T, Furukawa H, Todo S, Miyasaka K. Percutaneous Transluminal Angioplasty for Hepatic Artery Stenosis After Living Donor Liver Transplantation. Liver Transplantation. 2006; 12:465-469.
3. Uneo T, Jones G, Martin A, Ikegami T, Sanchez E, Chinnakotla S, et al. Clinical Outcomes From Hepatic Artery Stenting in Liver Transplantation. Liver Transplantation. 2006; 12:422-427.
4. Boyvat F, Aytekin C, Harman A, Sevmis S, Karakayali H, Haberal M. Endovascular Stent Placement in Patients With Hepatic Artery Stenoses or Thromboses After Liver Transplant. Transplantation Proceedings. 2008; 40:22-26.