RFS | Resident Fellow Student

CASE OF THE MONTH

SIR 2015 Case Submission

MAKING CONNECTIONS

KAISER PERMANENTE®

Los Angeles Medical Center

Resident: Chris Molloy, MD

Fellow: Christian Coroian, MD, MBA

Attending: Tina Hardley, MD

Program/Dept(s): Los Angeles Medical Center

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CHIEF COMPLAINT & HPI

- Chief Complaint
  - 36 year old male status post right hepatectomy with persistent biloma refractory to percutaneous biliary drain, now with high volume cloudy biliary drain output, shakes, rigors and RUQ pain
- History of Present Illness
  - En bloc right hepatectomy for large parenchymal echinococcal cyst causing biliary compression and pancreatitis. Post operatively complicated by complicated biloma with persistent biliary drainage through percutaneous biliary drain which continued four weeks postoperatively
  - Grew up on a farm in India with countless dogs and cattle

RELEVANT HISTORY

- Past Medical History
  - Recent pancreatitis and obstructive jaundice, ERCP with sphincterotomy, balloon dilatation of biliary ducts and biliary stent
- Past Surgical History
  - Recent right sided en block hepatectomy for large echinococcal cyst with persistent bile leak, resultant biloma formation and obstructive biliary stenosis
- Family History
  - Mother with diabetes and hypertension
- Review of Systems
  - Positive for nausea, vomiting, fevers, rigors, and RUQ abdominal pain

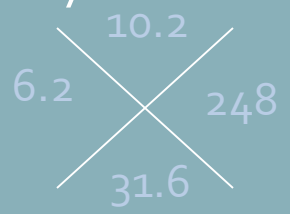
RELEVANT HISTORY

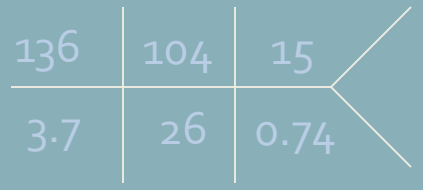
- Medications
  - Albendazole
  - Ciprofloxacin
  - Ondansetron
  - Enoxaparin

- Allergies
  - No known drug allergies

DIAGNOSTIC WORKUP

- Physical Exam
  - A&Ox3, NAD, abdomen soft, mildly tender to pressure, right sided drain intact with no sign of infection or erythema
- Vitals
  - BP 108/70 | Pulse 87 | Temp 97.2 °F | Wt 51.8 kg
- Laboratory Data





T.Bili 1.0 / ALT 76 / Alk Phos 319
Albumin 3.4 / Prealbumin 26
INR 1.3

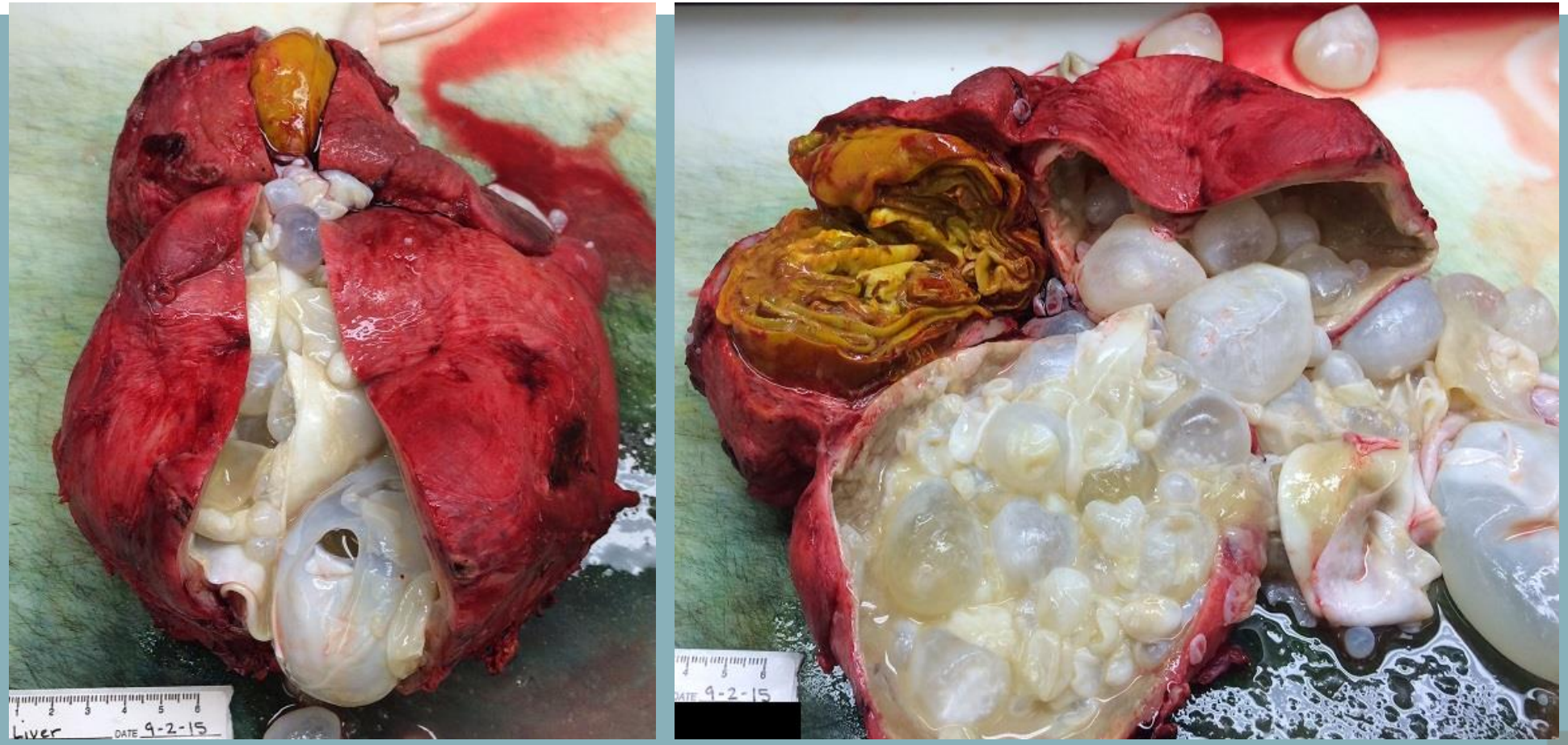
DIAGNOSTIC WORKUP

Original pre-surgical 3 phase liver CT (axial view) demonstrating 7.8cm complex cystic mass within the right lobe of the liver

DIAGNOSTIC WORKUP

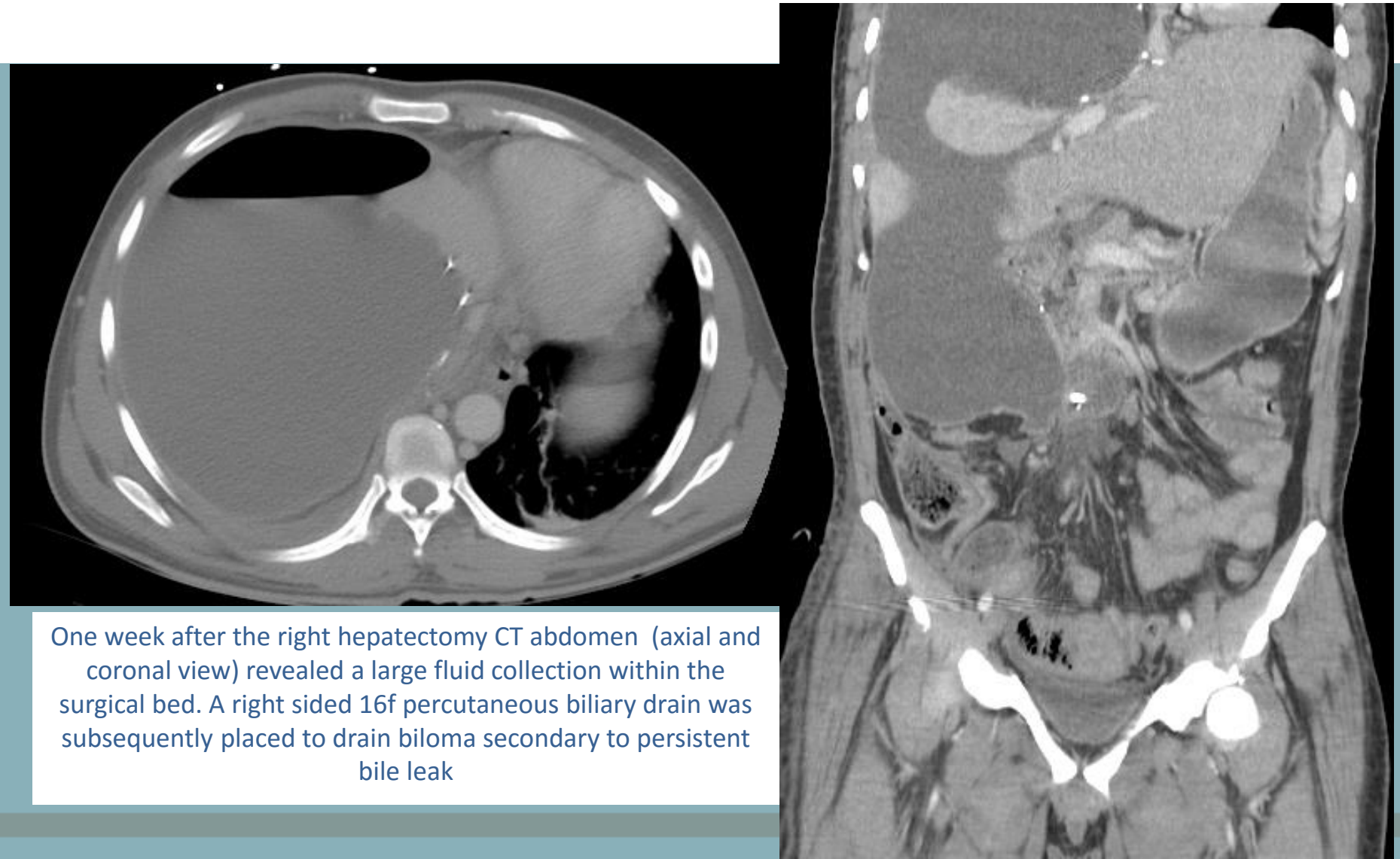
Original pre-surgical 3 phase liver CT (coronal view) demonstrating a multilobulated 7.8cm complex cystic mass within the right lobe of the liver. At this time there was also biliary dilatation, and splenomegaly.

DIAGNOSTIC WORKUP



Gross Pathology of Echinococcal Cyst after en-bloc right hepatectomy

DIAGNOSTIC WORKUP



One week after the right hepatectomy CT abdomen (axial and coronal view) revealed a large fluid collection within the surgical bed. A right sided 16f percutaneous biliary drain was subsequently placed to drain biloma secondary to persistent bile leak

INTERVENTION: BILIARY DRAINAGE

Follow up CT abdomen (coronal and axial views) after right sided percutaneous drain (blue arrow) was placed within the biloma demonstrating decreased fluid collection (green arrow), however his symptoms continued.

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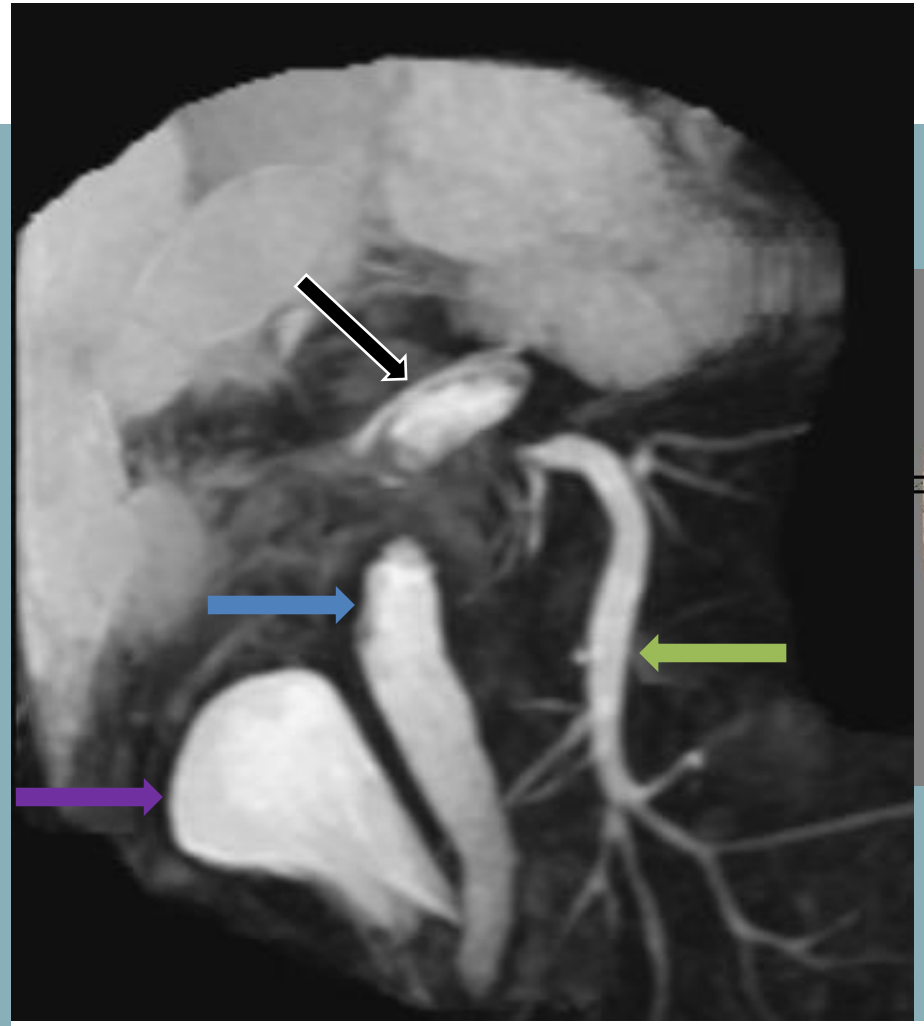
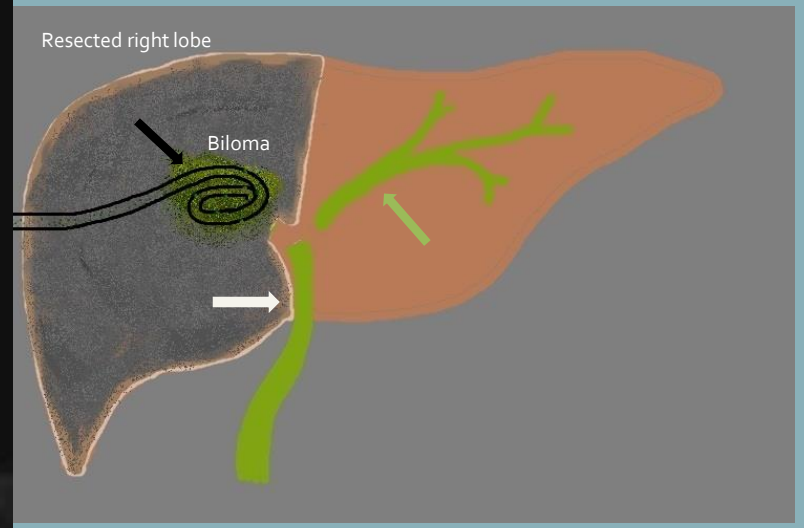
DIAGNOSTIC WORKUP



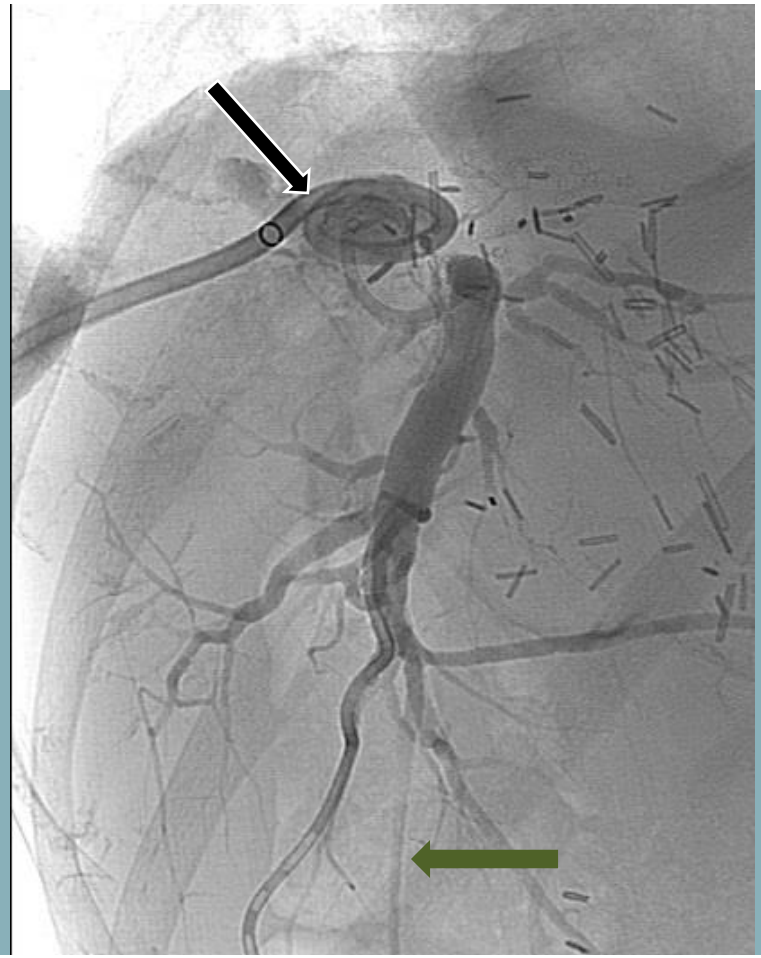


MRCP 3D reformat demonstrates complete obstruction of the left hepatic biliary duct (green arrow) . There was no communication between the left biliary duct (green arrow), the right biliary tube/biloma (black arrow) or the common bile duct (blue arrow). The duodenum is also seen (purple arrow).

INTERVENTION: PERCUTANEOUS CHOLANGIOGRAM

- Percutaneous attempt to connect from the right external drain/biloma to the CBD was unsuccessful, as no direct connection was visualized

- Note: left biliary tube access was advanced into the biloma, but further extending the left sided connection into the CBD proved unsuccessful



Cholangiogram demonstrated no direct connections between the biloma /right percutaneous pigtail (black arrow) and the CBD and/or the left biliary system. Percutaneous left biliary tube (green arrow) is also present.

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INTERVENTION: ERCP

- GI unsuccessfully attempted to connect the CBD to the right external drain/biloma, and then attempted to connect the CBD to the left biliary system
- The ERCP approach was unsuccessful due to suboptimal indirect angles between the access sites and the CBD

GI Endoscope (purple arrow) demonstrating no direct connection between the CBD (blue arrow) and right external drain/biloma (black arrow). The left percutaneous biliary drain (green arrow) is also seen.

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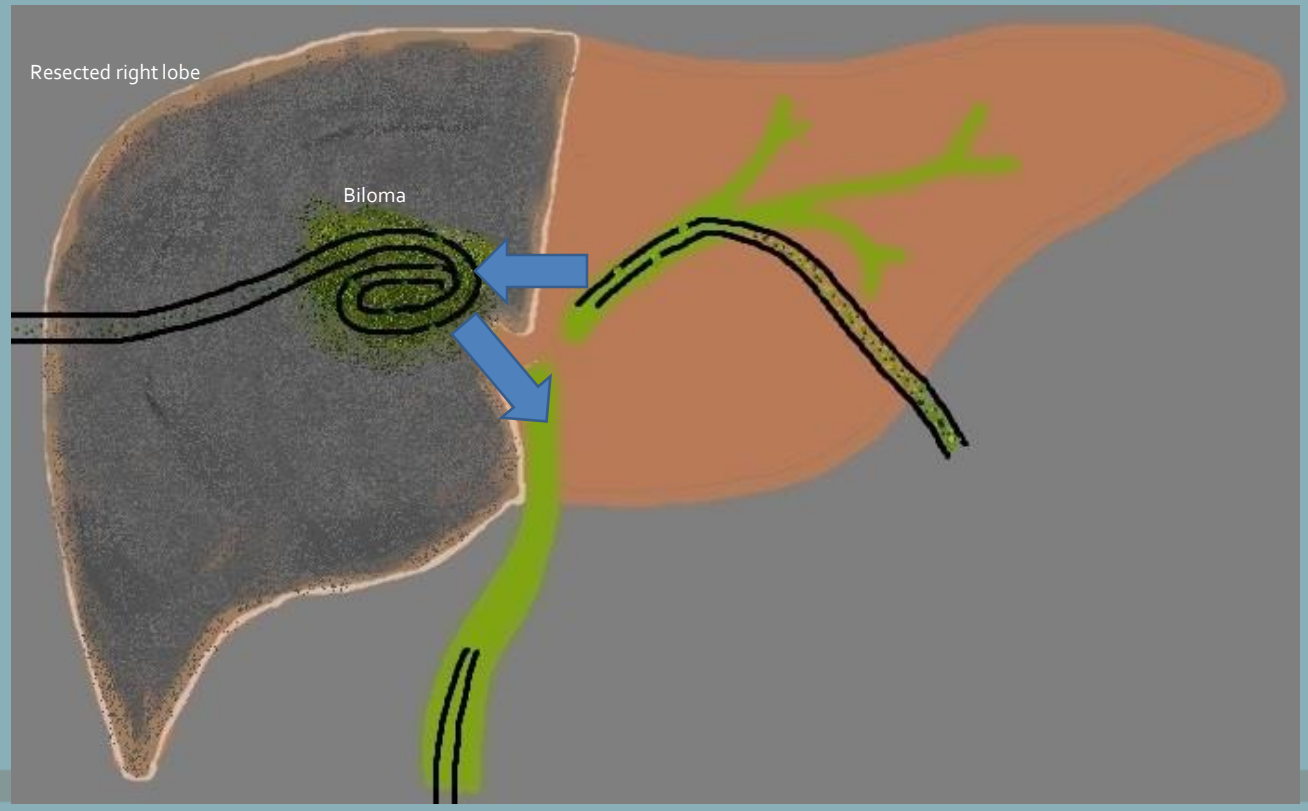
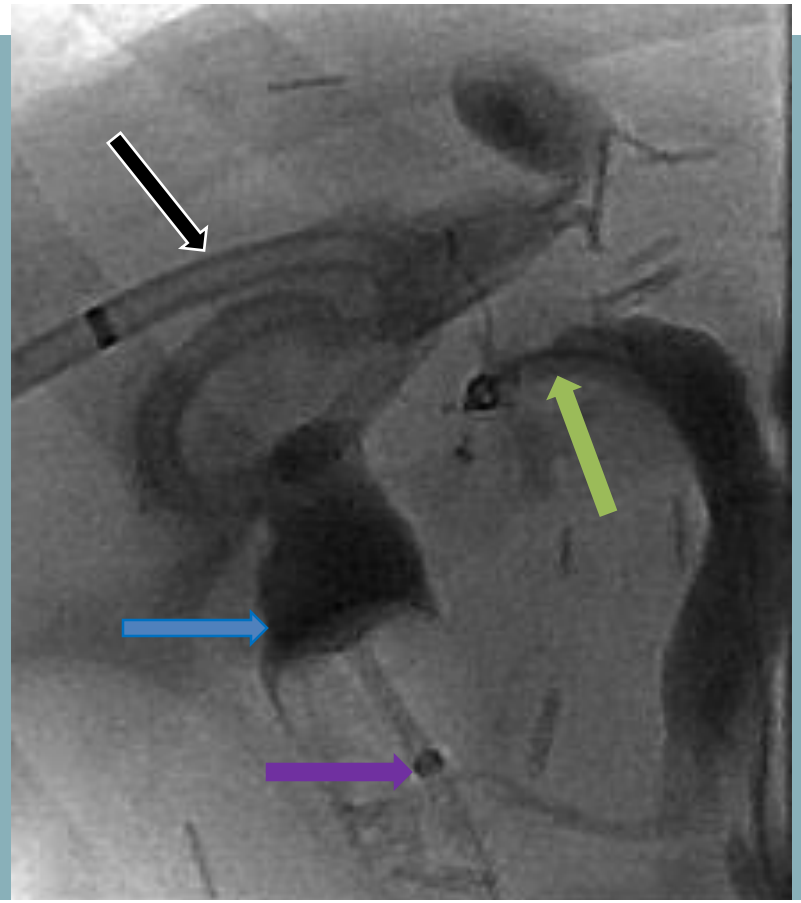
INTERVENTION: RENDEZVOUS

- Combined rendezvous procedure was planned with IR & GI collaboration to establish a connection from the remaining left biliary system through the biloma to the CBD



INTERVENTION: RENDEZVOUS

- The occluded ends of the left hepatic duct and the CBD were oriented obliquely and several attempts to recanalize this connection were made from the endoscopic approach were unsuccessful
- IR attempted to recanalize from the left duct, however due to the oblique orientations and lack of proximity this was also unsuccessful



Rendezvous procedure with GI Endoscopic access (purple arrow) in the CBD (blue arrow), the right percutaneous biliary drain/biloma (black arrow), left percutaneous biliary drain (green arrow)

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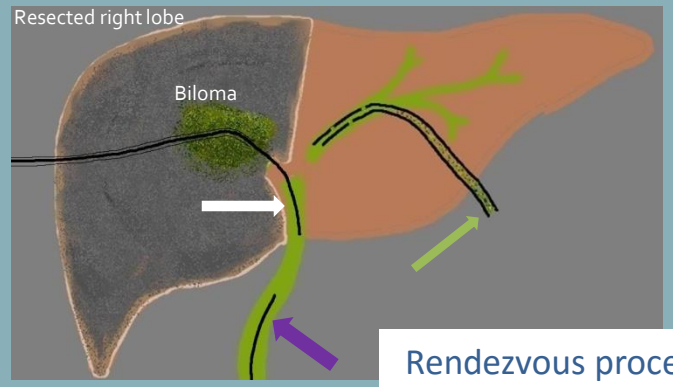
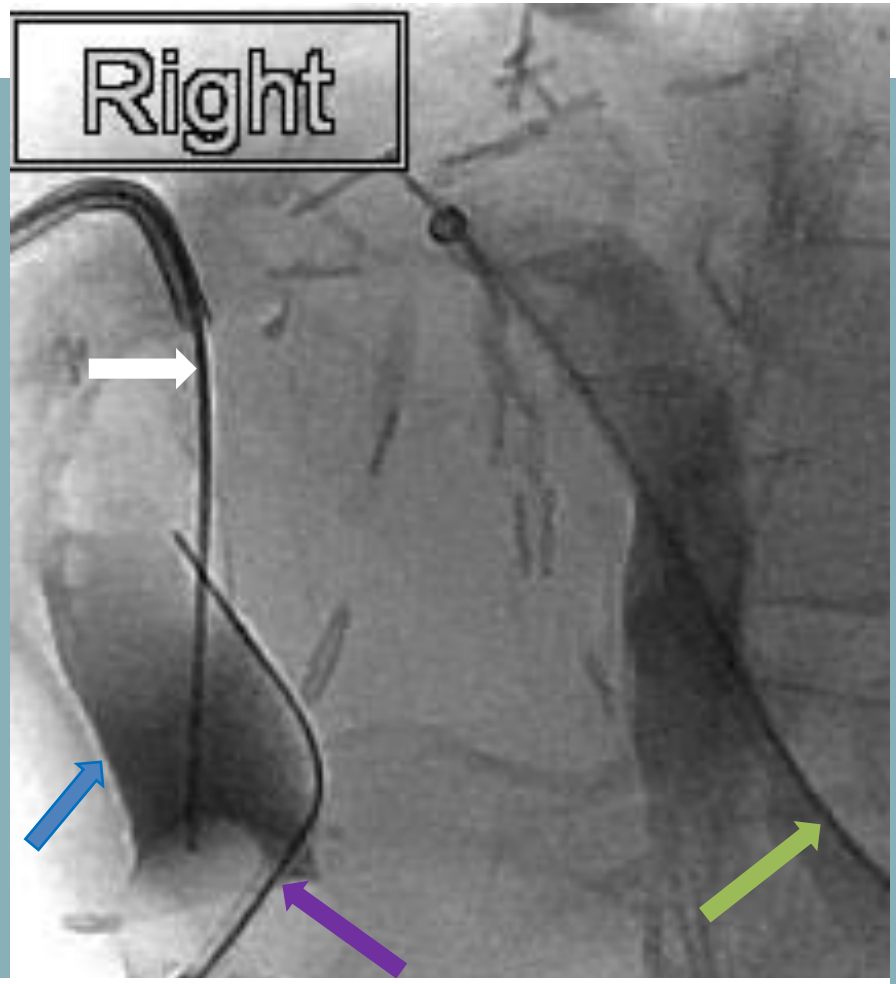
INTERVENTION: RENDEZVOUS

- Through the right percutaneous drain, a metal transjugular biopsy cannula was used with the back end of an Amplatz wire to direct sharp recanalization from the right biliary access/biloma to the CBD.
- Subsequently a wire from the left duct access was also advanced into the CBD





Rendezvous procedure with Amplatz wire (black arrow) recanalizing access to the CBD (blue arrow), with simultaneous GI Endoscopic access (purple arrow). The left percutaneous biliary access is also seen (green arrow).

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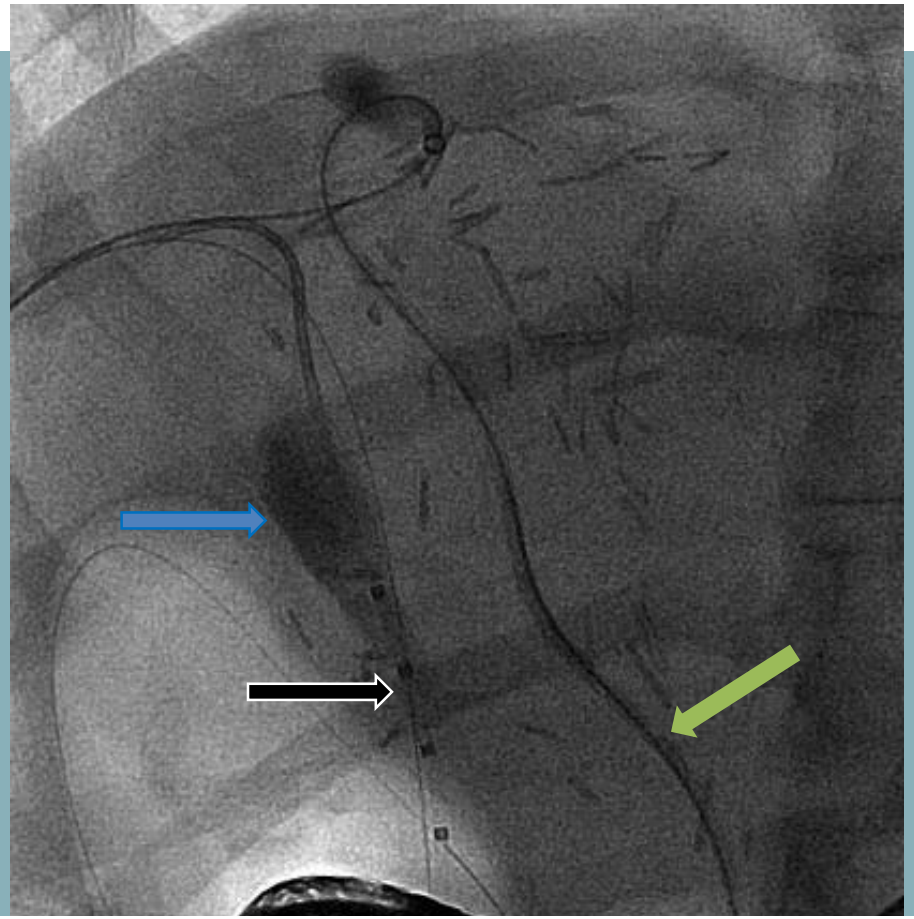
INTERVENTION: RENDEZVOUS

- Once access to the CBD was confirmed, a marker pigtail catheter (with hub cut off) was loaded onto the Amplatz wire in reverse and advanced into the CBD
- Then the pigtail catheter was snared endoscopically and retracted until the pigtail formed in the biloma



Rendezvous procedure with pigtail (black arrow) from the right access into the CBD (blue arrow), snared via GI endoscope. The left percutaneous biliary access (green arrow) is also seen with wire extending into the biloma

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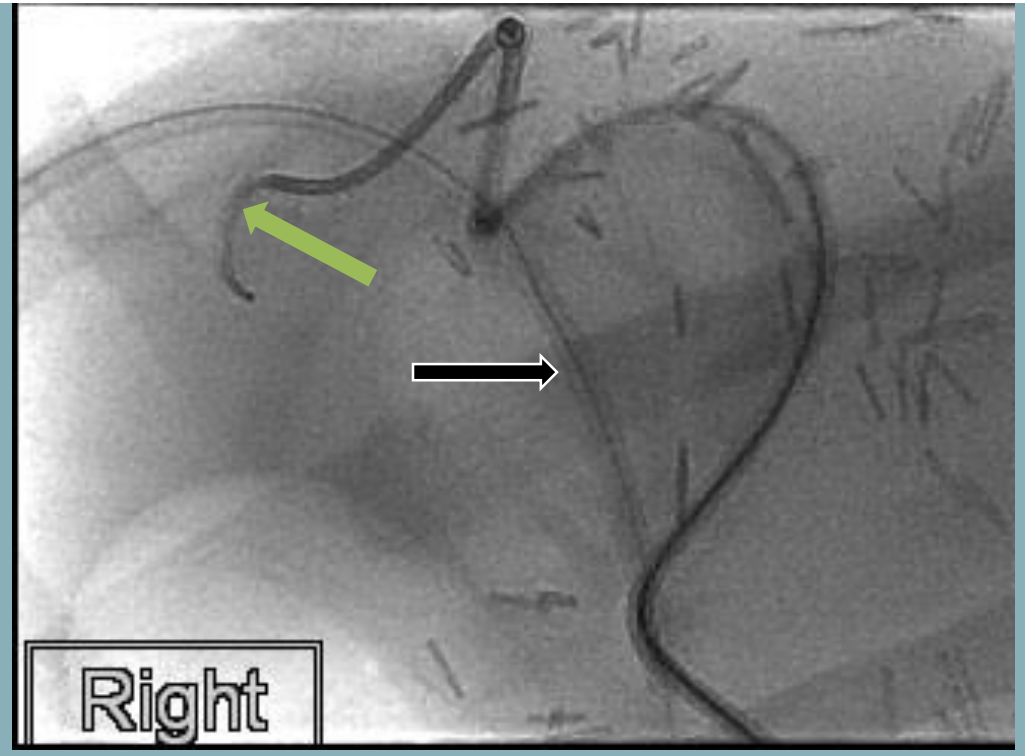
INTERVENTION: RENDEZVOUS

- A 7F reinforced Ansel sheath advanced through the left duct access into the biloma.
- A 15mm gooseneck snare was introduced and the pigtail was snared and withdrawn out the skin through the left biliary duct access.



Rendezvous procedure with pigtail (black arrow) from the right percutaneous access with the tip in the CBD . Snare introduced from the left percutaneous biliary access (green arrow).

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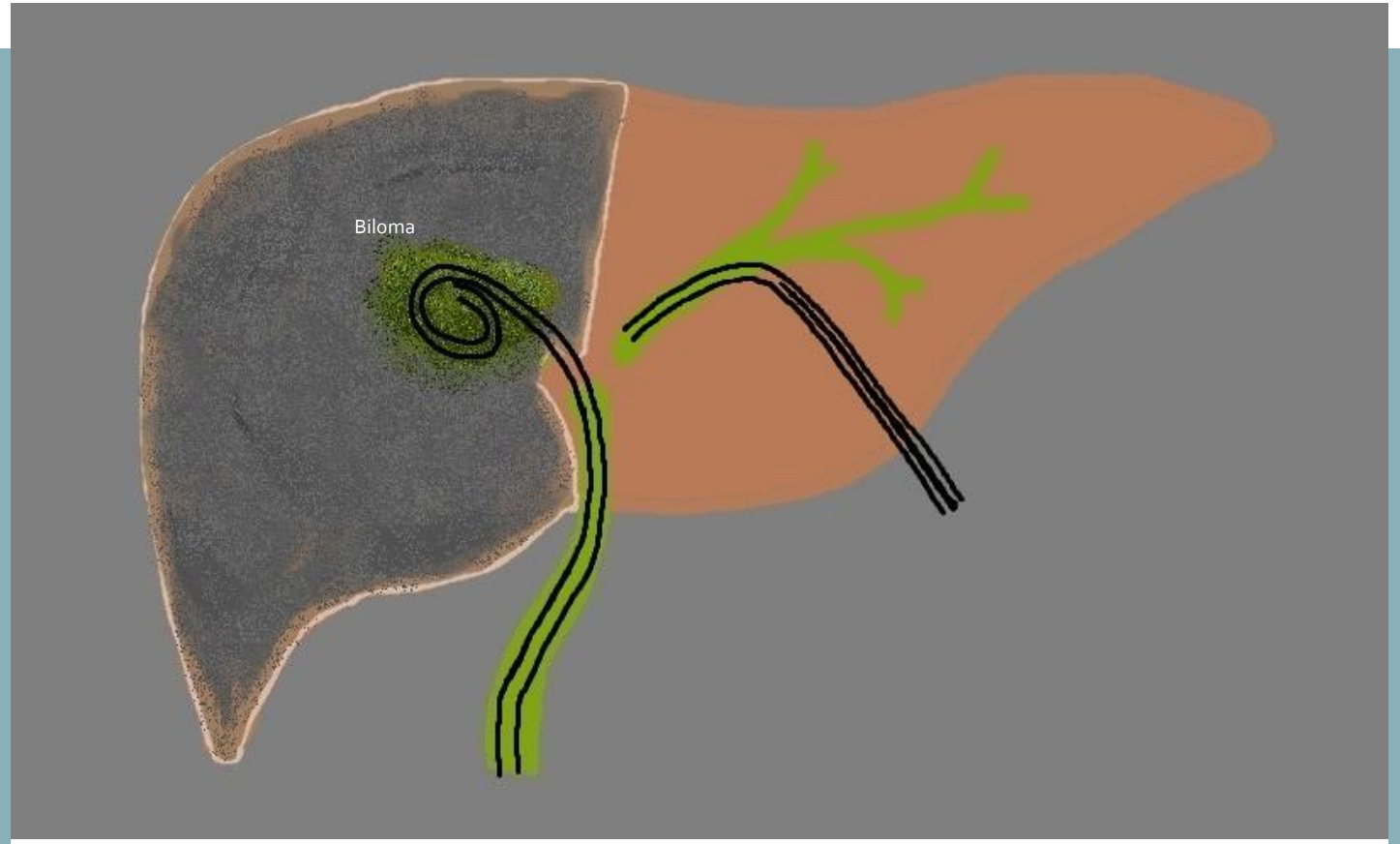
INTERVENTION: RENDEZVOUS

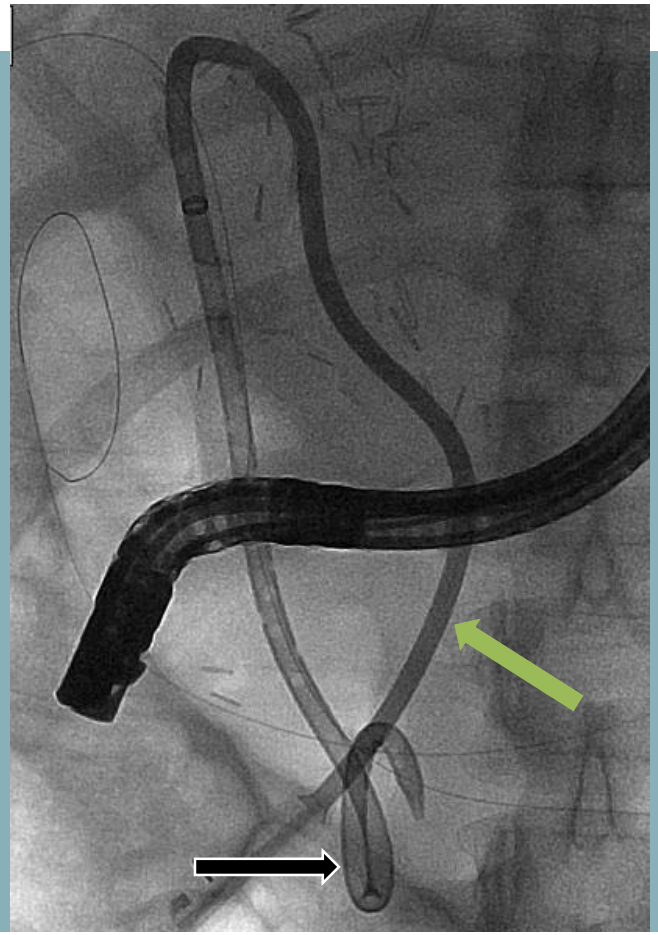


“Rendezvous Procedure” Internal-External Connection

Reverse pigtail coiled in the biloma is snared from the left percutaneous biliary access and retracted out the left biliary access site to complete the three-way connection from the 1) left biliary system, 2) to the biloma and 3) internally through the CBD to the duodenum

INTERVENTION: RENDEZVOUS

- The pigtail was snared and retracted out the left access to establish a platform to place a conventional left internal external biliary tube
- The pigtail was then advanced to the ligament of Treitz over an Amplatz wire and the tract was serially dilated to 14F
- Customized internal external biliary drain with extra side holes at the level of the biloma was positioned from left access through the biloma through the CBD and into the duodenum



Rendezvous procedure: customized internal external drainage catheter with pigtail (black arrow) now in duodenum, extending through the biloma, through the left biliary system(green arrow) and exiting percutaneously

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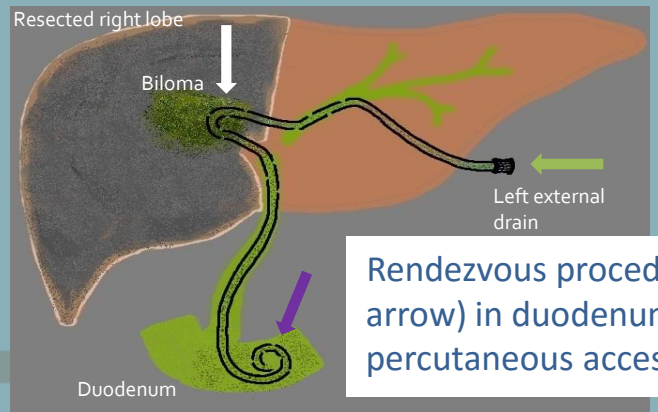
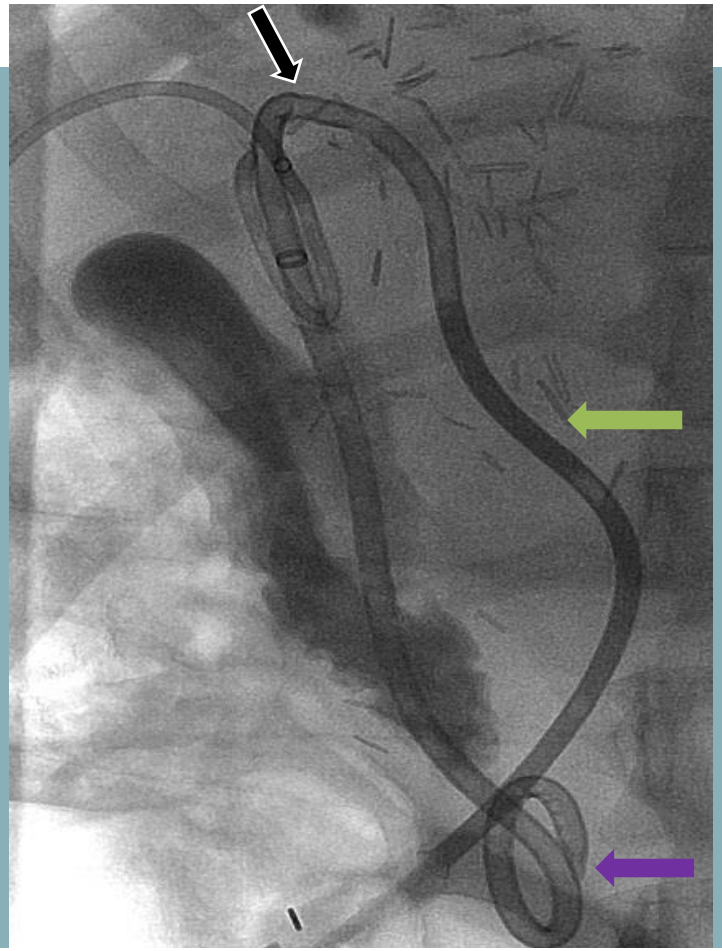
INTERVENTION: RENDEZVOUS

- Completion cholangiogram with internal external left biliary system to biloma to CBD to duodenum drain which re-established communication of the left intrahepatic ductal system to the CBD
- Percutaneous right biloma drain with cope loop





Rendezvous procedure: internal-external biliary drain with pigtail (purple arrow) in duodenum, extends through biloma (black arrow) & out the left percutaneous access(green arrow). Right percutaneous drain is also seen.

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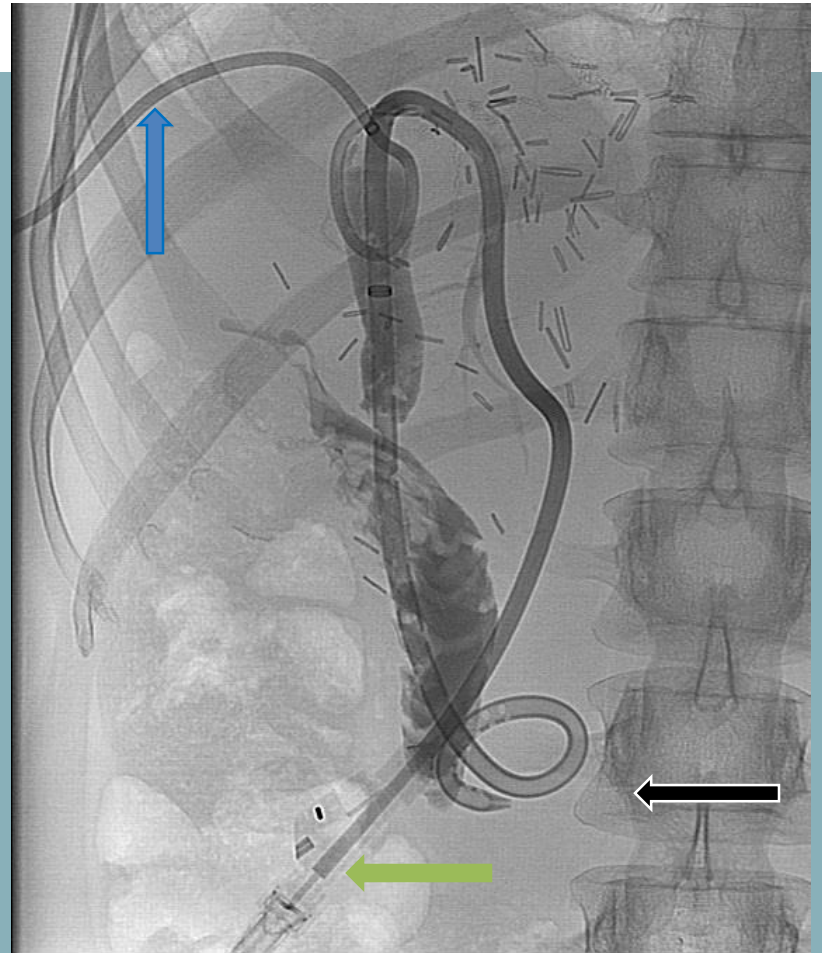
INTERVENTION: RENDEZVOUS

- 10 days post procedure, cholangiogram demonstrates complete decompression of the prior biloma and patent biliary drainage to the duodenum
- The right biloma drain was removed at this time



Cholangiogram: internal-external biliary drain with pigtail (black arrow) in duodenum, extends through CBD and exits the left percutaneous access (green arrow). Right percutaneous drain is also seen (blue arrow)

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QUESTION SLIDE

What are the indications for percutaneous biliary drainage

A. To perform portal vein thrombectomy
B. To gain hepatic artery access
C. To decompress obstructed biliary tree
D. To remove the gallbladder

CORRECT!

- **Answer C:** decompress an obstructed biliary tree is one appropriate indication for percutaneous biliary drainage. Percutaneous biliary drainage is not used for portal vein thrombectomy, hepatic artery access or gallbladder removal. Additional indications for percutaneous biliary drainage are listed below.
- Indications for percutaneous biliary drainage
  - Provide adequate biliary drainage or decompress obstructed biliary tree
  - Divert bile from and place stent in bile duct defect
  - Provide access to the biliary tract for therapeuty including:
    - Dilate biliary strictures
    - Remove bile duct stones
    - Stent malignant lesions
    - Brachytherapy
    - Endoluminal tissue sample or foreign body retrieval
    - Provide a portal of access to the biliary tract for mid- to long-term diagnostic purposes

Return to Case

Wael E. A. Saad, MD, Michael J. Wallace, MD, Joan C. Wojak, MD, Sanjoy Kundu, MD, and John F. Cardella, MD, Quality Improvement Guidelines for Percutaneous Transhepatic Cholangiography, Biliary Drainage, and Percutaneous Cholecystostomy, J Vasc Interv Radiol 2010; 21:789 –795

SORRY, THAT'S INCORRECT

- **Answer C:** decompress an obstructed biliary tree is one appropriate indication for percutaneous biliary drainage. Percutaneous biliary drainage is not used for portal vein thrombectomy, hepatic artery access or gallbladder removal. Additional indications for percutaneous biliary drainage are listed below.
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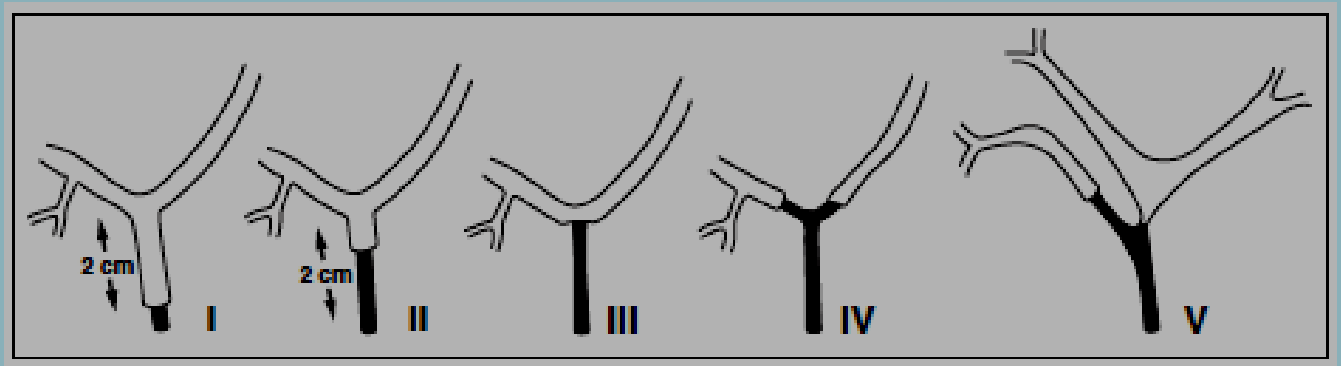
TEACHING POINT

- Biliary stricture classification



- Type I: > 2 cm distal to the hepatic confluence
- Type II: within 2 cm from hepatic confluence
- Type III: involve a patent confluence
- Type IV: involve and obstruct the confluence
- Type V: involve the hepatic duct associated with stricture on aberrant intrahepatic branch

Alampady Krishna Prasad Shanbhogue, Sree Harsha Tirumani, Srinivasa R. Prasad, Najla Fasih, and Matthew McInnes, Benign Biliary Strictures: A Current Comprehensive Clinical and Imaging Review, AJR online, AJR 2011; 197:W295–W306

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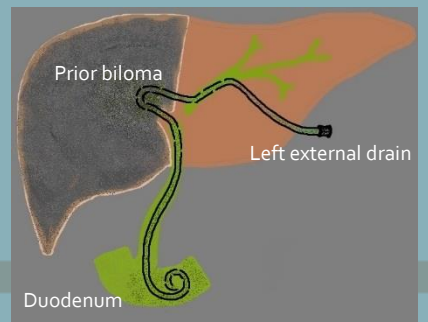
FOLLOW-UP

- After 10 days, follow-up cholangiogram demonstrated complete decompression of the biloma and the right biliary drain was removed
- The internal-external drain has been capped and the patient is now asymptomatic after the successful placement of a left internal-external biliary drain

Cholangiogram: internal-external biliary drain with pigtail in duodenum, extending through CBD, through the biloma and exiting the left percutaneous access.



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REFERENCES

- Wael E. A. Saad, MD, Michael J. Wallace, MD, Joan C. Wojak, MD, Sanjoy Kundu, MD, and John F. Cardella, MD, Quality Improvement Guidelines for Percutaneous Transhepatic Cholangiography, Biliary Drainage, and Percutaneous Cholecystostomy, J Vasc Interv Radiol 2010; 21:789 –795
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