Percutaneous transhepatic cholangiogram (PTC) and placement of biliary drain as treatment for pediatric post-liver transplant bile leak

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Case Presentation

HPI: 13-month-old male with PMHx of biliary atresia, s/p recent liver transplant 2 weeks prior presents with increased biliary drainage concerning for bile leak

PMH: End-stage liver disease, portal hypertension, failure to thrive

PSH: Orthotopic split liver transplant with Roux-en-Y hepaticojejenostomy, drainage catheter placement in IR, failed Kasai procedure

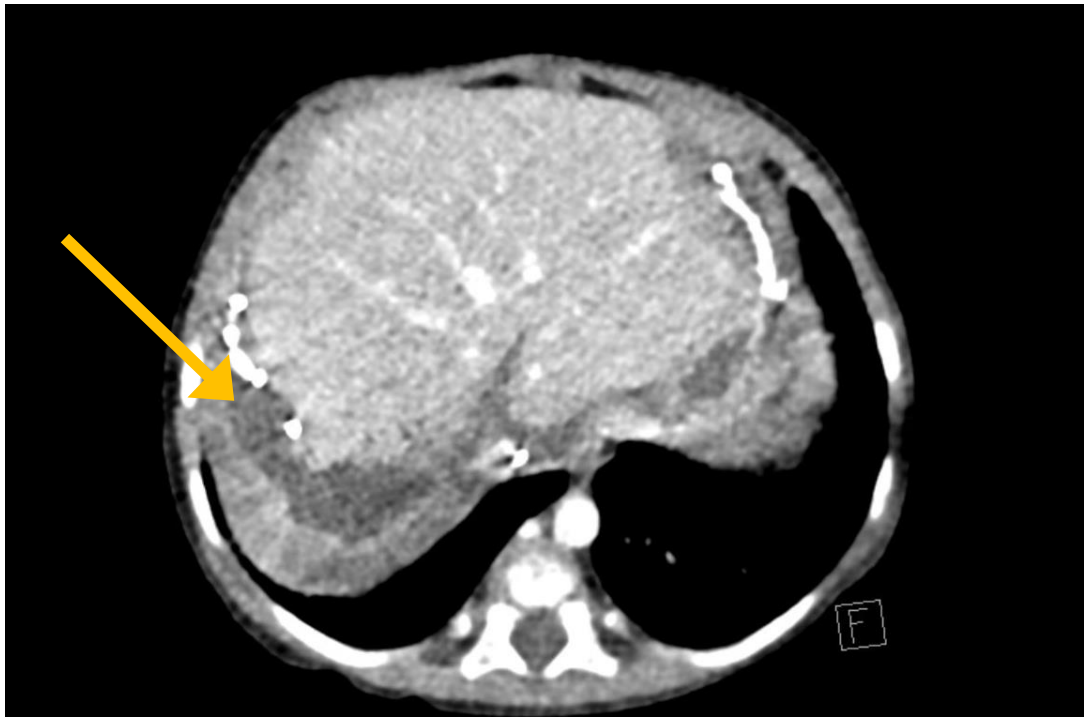
Meds: Amlodipine, meropenem, MgOH, prednisolone, TMP-SMX, tacrolimus, ursodiol, valganciclovir, docusate, famotidine

Case Presentation

Hospital course thus far

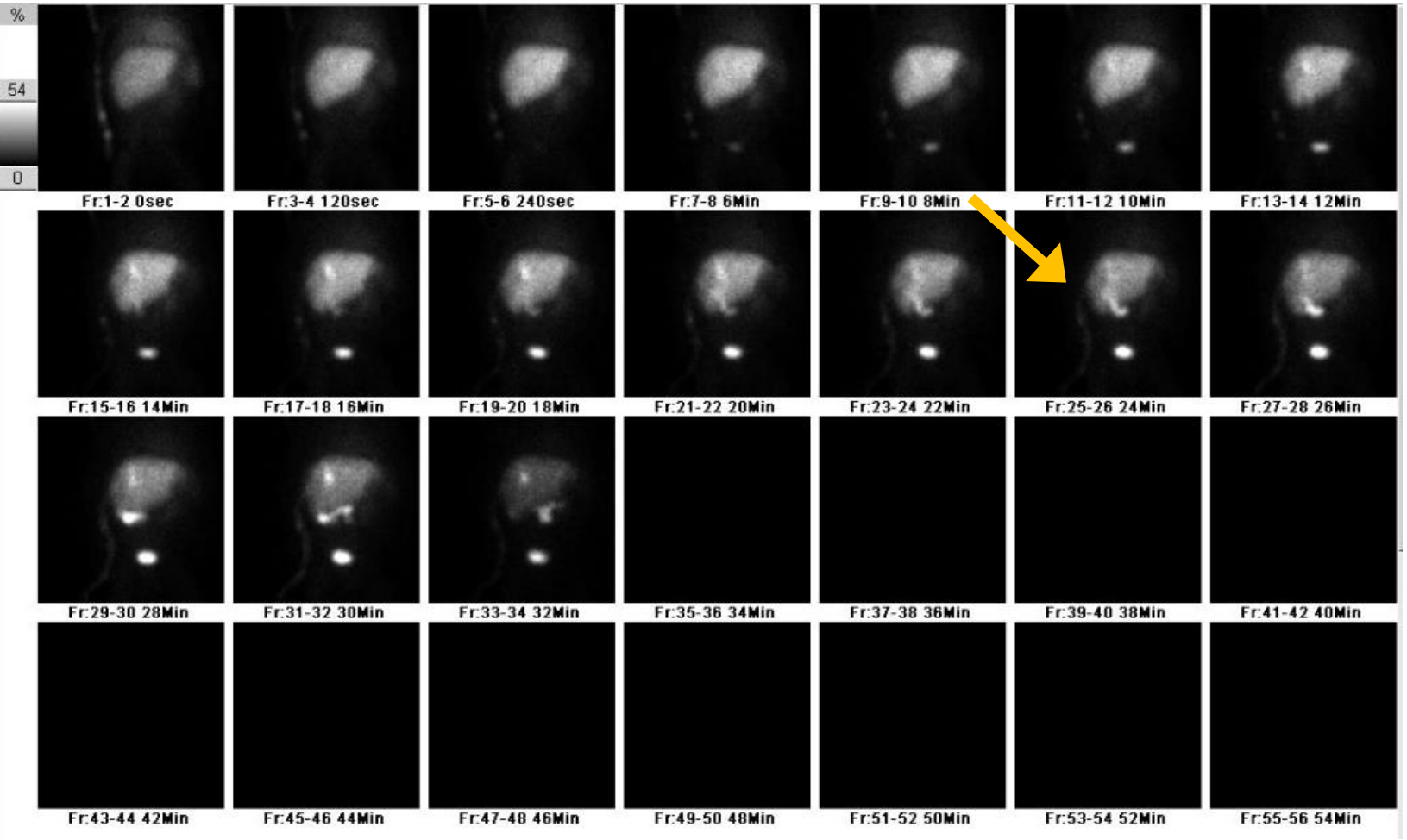
- 13-month-old male was admitted for orthotopic split liver transplant with Roux-en-Y hepaticojejunostomy
- Post-transplant, abdominal CT showed perihepatic fluid collection for which a drain is placed by IR
- Days later, drain starts producing increased bilious output - CT and HIDA scan **(on next slides)** show persistent fluid collection
- Exploratory laparotomy is performed to manage leak: sutures are placed to close tissue and drain is replaced

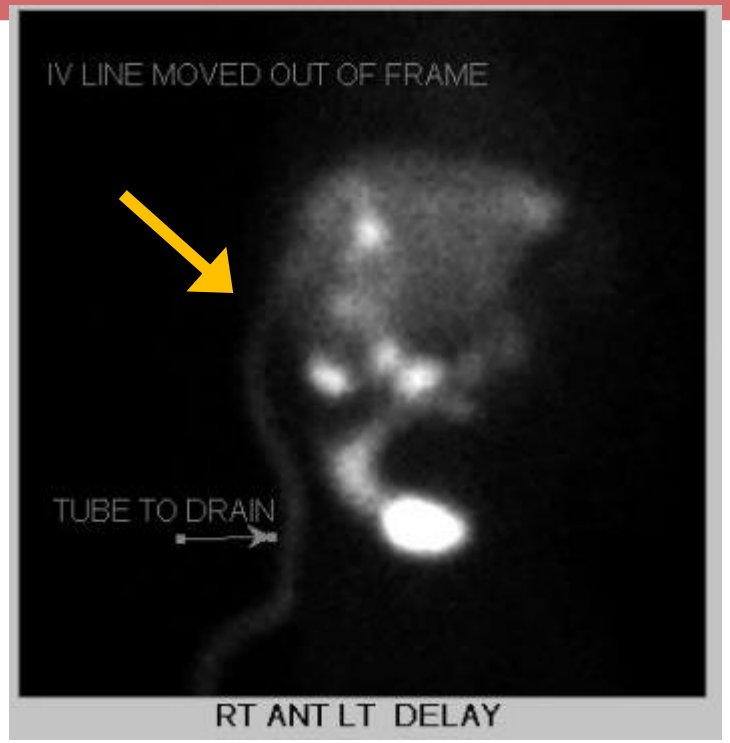
Split liver CT



- Redemonstration of postsurgical changes of an orthotopic split liver transplant as well as a Roux-en-Y hepaticojejunostomy
- Encapsulated perihepatic fluid collection present

Hepatobiliary iminodiacetic acid (HIDA) scan





- Findings consistent with bile leak at right aspect of liver transplant, with activity in surgical drain

Case Presentation - patient's current condition

Vitals: BP 99-105/56-70, HR 110-140, RR 26, 100% RA, T 36.3 – 36.8

Physical Exam:

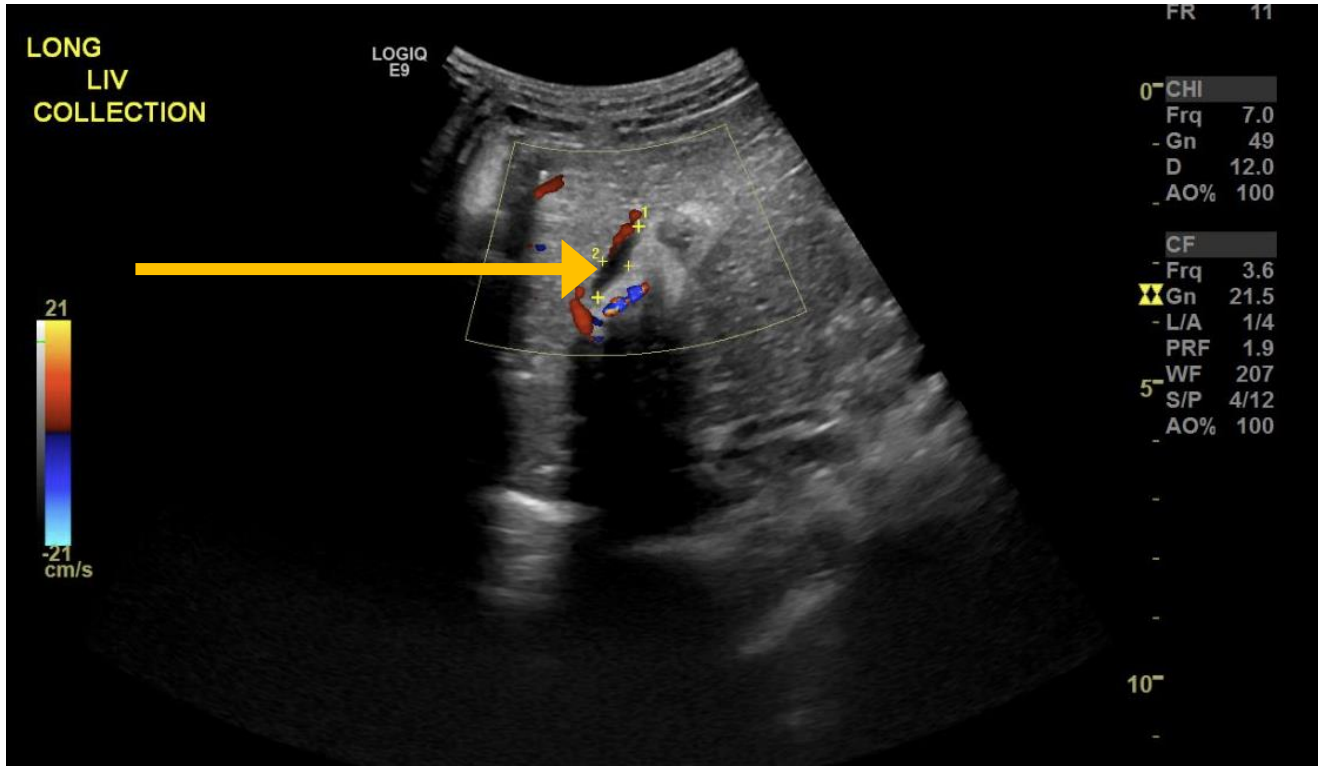
- General: No acute distress, small for age, thin
- Eye: Extraocular movements are intact, mild icterus
- Respiratory: Lungs CTA bilaterally, no wheeze, respirations are non-labored
- Cardiovascular: Regular rate, regular rhythm, S1 auscultated, S2 auscultated, no murmur, good pulses equal in all extremities, no edema
- Gastrointestinal: **Soft, mildly tender on right side, distended, drain in RLQ with output yielding ~100cc of dark bilious-appearing fluid over 24 hours**

Case Presentation

Pertinent Labs:

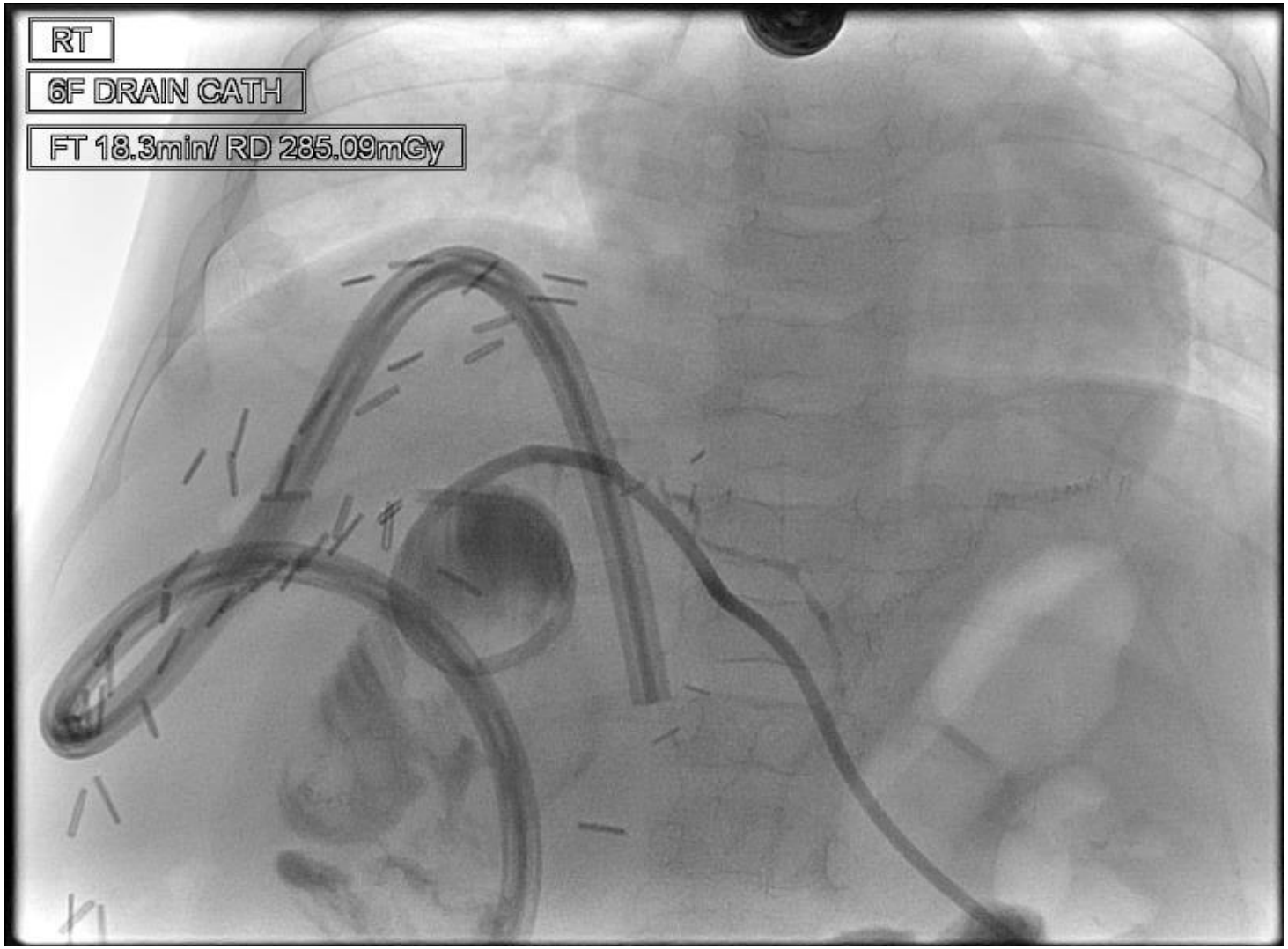
- Total bilirubin (drain fluid) : 20.9 mg/dL (up from 15.7 mg/dL)
- BMP: Na 140, K 4.4, Cl 106, Bicarb 26, Mg 1.8, Phos 5.1
- CBC: Hb 8.5, Ht 26.3%, WBC 7.4, platelets 306
- Bun 23 mg/dL, Creatinine <0.20
- Direct Bili 0.33 mg/dL, GGT 96, ALT 38, AST 36, alk phos 161
- Tacrolimus levels within normal limits

Liver ultrasound is performed to assess fluid leak



- Evaluation of the liver transplant demonstrates heterogeneous echotexture without obvious intrahepatic bile duct dilatation
- Right perihepatic fluid collection has decreased in size
- Second irregular smaller fluid collection now present

Percutaneous transhepatic cholangiography is performed and biliary drain is placed



- Successful, uncomplicated, image-guided placement of a 6-French internal/external biliary drain

Hospital Course

- Since placement of PTC biliary drain, drainage from previous drain remains decreased
- Repeat PTBD cholangiogram is planned for 8 weeks later
- PICC line is placed
- Patient will continue prednisone and tacrolimus for immune suppression as well as post-transplant antibiotic and antiviral prophylaxis
- Patient was sent home on meropenem treatment which should be continued as long as drains are in place

Brief Discussion/Clinical Pearls

Indications for pediatric liver transplant

- Transplant is indicated for patients with end-stage liver disease
  - Pediatric patients constitute 7.8% of all liver transplants[1]
  - Goal is to increase life expectancy or quality of life[2]

- Liver failure could be due to:
  - Biliary atresia as in this patient
  - Intractable portal hypertension
  - Recurrent life-threatening cholangitis, SBP, failure to thrive

- The preferred biliary reconstruction method in pediatric patients is Roux-en-Y hepaticojejunostomy

Brief Discussion/Clinical Pearls

Liver transplant can lead to vascular or biliary complications

- 5-year survival rate is 76.4% for a first pediatric transplant versus 64.5% for a repeat transplant[1]

- Vascular structures can be compromised
  - Most common: hepatic artery thrombosis and stenosis

- Biliary complications include strictures, leaks, obstructions and more
  - *Risk factors*: prolonged ischemia time, hepatic artery thrombosis or stenosis, CMV infection, or chronic rejection

Brief Discussion/Clinical Pearls

Ultrasound (US) is useful at many stages of pediatric liver transplant

- Useful in donor, recipient, and complication evaluation[1]
- Safe for pediatric patients due to absence of radiation
- Low cost and highly accessible
- However, ultrasound quality is operator dependent

Brief Discussion/Clinical Pearls

In pediatric patients, PTC is a go-to modality for evaluation and intervention in post-liver transplant biliary complications[3]

- ERCP is not possible due to the Roux-en-Y biliary enteric anastomosis
- PTC is minimally invasive
- Post-PTC biliary drainage management is a long-term commitment
    - many drain changes or repeat cholangioplasty may be necessary
- A 2022 single-center 10yr study found PTC and biliary duct catheterization successful in all orthotopic liver transplants (301 cases)[4]

References

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