# BILE

## THE INTERVENTIONAL RADIOLOGIST

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INTERVENTIONAL RADIOLOGY MAASTRICHT UMC+

# DISCLOSURES

- None

# 78 Y/O FEMALE

- Painful RUQ
- Fever
- Lab: Raised Leukocytes/CRP

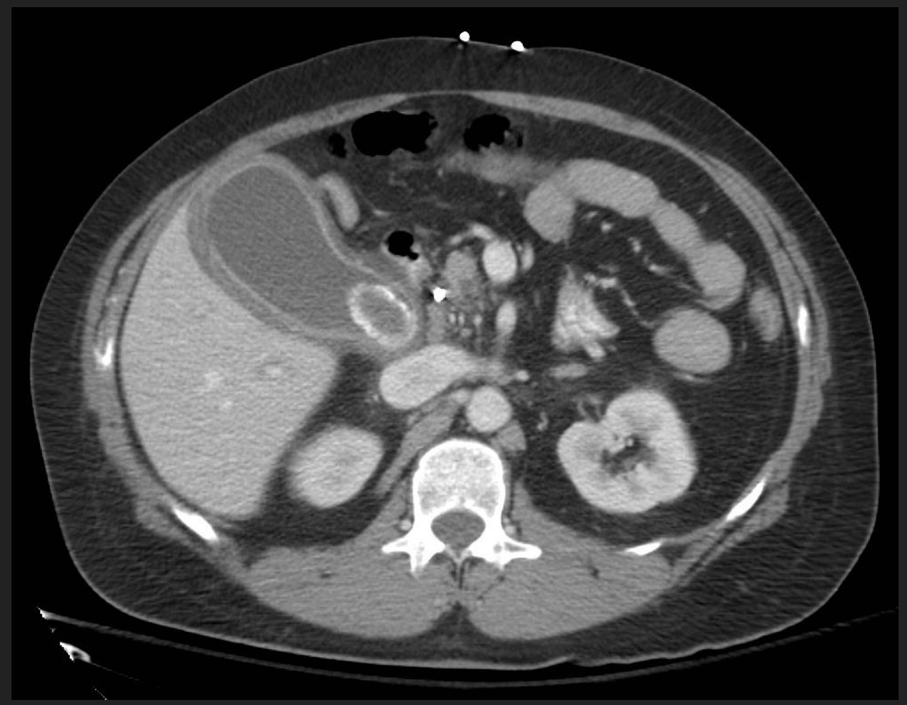
# CHOLECYSTITIS

- 3-9% patients ER w Abdominal pain
- 95% associated with stones
- Diagnosis
  - Fever, raised leukocytes/CRP, positive Murphy
  - US (sens 81%, spec 83%)
    - Stones, distension, wall thickening w hyperemia, impacted stone, PAIN
  - CT (sens 92%, spec 99%)
    - Stones, distension, wall thickening w hyperenhancement, pericholecystic fluid/stranding, liver parenchyma enhancement

KIEWIET JJS, LEEUWENBURGH MMN, BIPAT S, BOSSUYT PMM, STOKER J, BOERMEESTER MA. A SYSTEMATIC REVIEW AND META- ANALYSIS OF DIAGNOSTIC PERFORMANCE OF IMAGING IN AC
BENNETT GL, RUSINEK H, LISI V, ISRAEL GM, KRINSKY GA, SLYWOTZKY CM ET AL. CT FINDINGS IN ACUTE GANGRENOUS CHOLECYSTITIS. J ROENTGENOL 2002;178(20:275-81.

# US


# CT



# TREATMENT

- Cholecystectomy
  - acute <7 days
- Conservative
- Drainage
  - If conservative fails
  - high risk patients (ASA IV)
  - as diagnostic

# PERCUTANEOUS CHOLECYSTOSTOMY

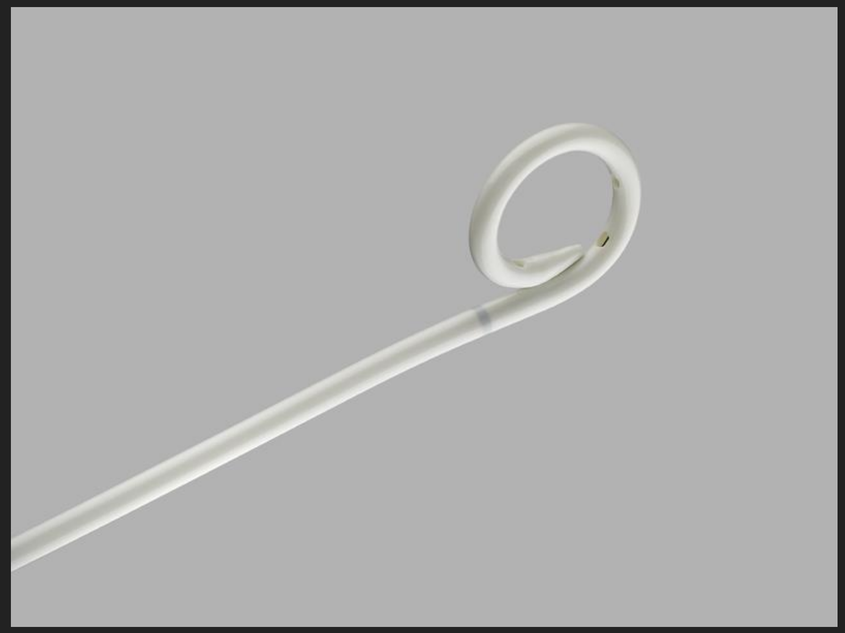
- Succes: 85%
- Transhepatic vs direct(transperitoneal)
  - TH: Faster tract formation, better fixation, no colon-damage

    VS
  - TP: less chance pneumothorax, bleeding, fistula
- Morbidity/mortality due to underlying disease
- Drain dislocation: up to 25%
  - Peritonitis 6%

HATZIDIKAS AA, KARAMPEKIOS S, PRASSEPOULOS P, XYNOS E, RAISSAKI M, VASILAKIS SI ET AL. MATURATION OF THE TRACT AFTER PERCUTANEOUS CHOLECYSTECTOMY WITH REGARD TO THE ACCE
WINDBLADH A, GULLSTRAND P, SVANVIK J, SANDSTRÖM P. SYSTEMATIC REVIEW OF CHOLECYSTOSTOMY AS A TREATMENT OPTION IN ACUTE CHOLECYSTITIS. HPB (OXFORD) 2009;11(3):183-93.

# HOW I DO IT

- Always ultrasound guided!
  - w radiographic support (Interventional suite)
- (Almost) always direct
- Local anaesthetic
  - Lidocain 1% 10 ml
- Locked pigtail 10 fr
  - Suture



# AFTER DRAINAGE

- Drain removal: 2 (TH) or 3(TP) weeks
  - w cholecystography
    - determine patency cystic duct

# 82 Y/O FEMALE PATIENT

- Cholangitis
  - Fever, raised bilirubin,leukocytes, CRP
  - US: bile duct dilatation
- Percutaneous Transhepatic Biliary Drainage (PTBD)

# CHOLANGITIS

- Systemic inflammation, cholestasis, dilatation
- Treatment: decompression + AB
- Decompression
  - ERCP (+papillotomy)/PTC/surgical
  - ERCP vs surgery: morb 34% vs 66%, mort 10 vs 32%
  - ERCP vs PTBD: no clear data

LAI EC, MOK FP, TAN ES, LO CM, FAN ST, YOU KT ET AL. ENDOSCOPIC BILIARY DRAINAGE FOR SEVERE ACUTE CHOLANGITIS. N ENGL J MED 1992;326(24):1582-6.

# CHOLEDOCHOLITHIASIS

- Prevalence: 3,4-16% patients w cholecystectomy indication
  - Usually in combination with gallbladder stones
- Predictive factors
  - Cholangitis, icterus, stones on US, dilatation, hyperbilirubinemia
- Diagnosis
  - (Clinical)
  - US (sens 38%, spec 100%)
  - EUS (sens 94, spec 95%)
  - MRCP (sens 92%, spec 94%)

RICKES S, TREIBER G, MONKEMULLER K, PEITZ U, CSEPREGI A, KAHL S ET AL. IMPACT OF THE OPERATOR'S EXPERIENCE ON VALUE OF HIGH RESOLUTION TRANSABDOMINAL ULTRASOUND IN THE DIAGNOSIS
TSE F, LIU L, BARKUN A, ARMSTRONG D, MOAYYEDI P. EUS: A META-ANALYSIS OF TEST PERFORMANCE IN SUSPECTED CHOLEDOCHOLITHIASIS. GASTROINTEST ENDOSC 2008;67(2):235-44.
GARROW D, MILLER S, SINHA D, CONWAY J, HOFFMAN BJ, HAWES RH ET AL. ENDOSCOPIC ULTRASOUND: A META-ANALYSIS OF TEST PERFORMANCE IN SUSPECTED BILIARY OBSTRUCTION. CLIN GASTROENT
ABBOUD PA, MALET PF, BERLIN JA, STAROSCIK R, CABANA MD, CLARKE JR ET AL. PREDICTORS OF COMMON BILE DUCT STONES PRIOR TO CHOLECYSTECTOMY: A META-ANALYSIS. GASTROINTEST ENDOSC 1

# CHOLEDOCHOLITHIASIS TREATMENT

- ERCP + papillotomy + stone extraction
  - +/- Cholecystectomy
- Percutaneous stone extraction if
  - ERCP not possible
    - Altered anatomy (Bilioenteric anastomosis, Gastric bypass etc..)
    - Not succesful ERCP
  - +/- Rendez-Vous

# PERCUTANEOUS CBD STONE EXTRACTION

- Preferentially under deep sedation, local anaesthetics
- PTBD left/right side
  - Left side less catheter dislocation(?)
  - Left side more comfortable
- Ultrasound and/or fluoroscopy guided
- Stone extraction:
  - balloonpapillotomy
  - stone extraction
    - w balloon
    - dormia basket/snares
    - Flushing

# PERCUTANEOUS TRANSHEPATIC STONE EXTRACTION

- Drainage tube external/internal drainage
  - at least 10 days
- Next day cholangiography
  - residual stones
    - multiple sessions if needed
    - Rendez-vous if needed/possible

# RESULTS/OUTCOME/COMPLICATIONS

Dig Surg. 2015;32(1):9-15. doi: 10.1159/000370129. Epub 2015 Jan 22.

**Percutaneous treatment of common bile duct stones: results and complications in 110 consecutive patients.**

Kint JF[1], van den Bergh JE, van Gelder RE, Rauws EA, Gouma DJ, van Delden OM, Laméris JS.

⊕ Author information

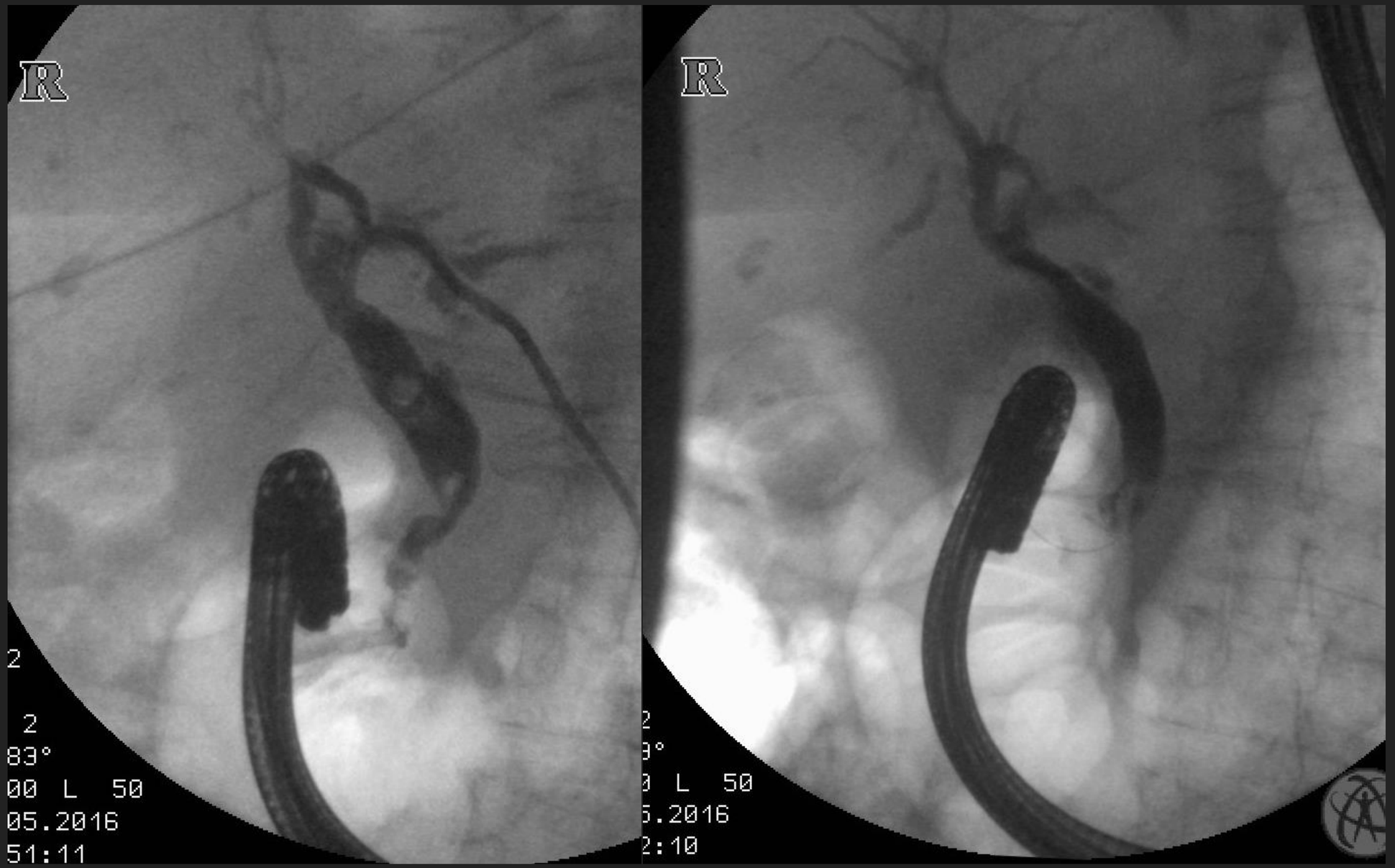
**Abstract**

**BACKGROUND/AIMS:** Choledocholithiasis is a common complication of cholecystolithiasis, occurring in 15-20% of patients who have gallbladder stones. Endoscopic retrograde cholangio-pancreatography is the standard treatment. When this is not possible or not feasible, percutaneous transhepatic stone removal is an alternative treatment. In this retrospective study, we analyze 110 patients who were treated with percutaneous transhepatic removal of Common Bile Duct (CBD) stones.

**PATIENTS AND METHODS:** Between March 1998 and September 2013 110 patients (61 men, 49 women; aged 14-96, mean age 69.7 years) with confirmed bile duct stones were included. PTC was done using ultrasound and fluoroscopy. Balloon dilatation of the papilla was done with 8-12 mm balloons. If stone size exceeded 10 mm, mechanical lithotripsy was performed. Stones were then removed by percutaneous extraction or evacuation into the duodenum.

**RESULTS:** In 104 patients (104/110; 94.5%) total stone clearance of the CBD was achieved. A total of 12 complications occurred (10.9%), graded with the Clavien-Dindo scale as IV, IVb, and V, respectively; hypoxia requiring resuscitation, sepsis and death due to ongoing cholangiosepsis (n = 1, 4, 1). Minor complications I, II, and IIIa included: small liver abscess, pleural empyema, transient hemobilia and mild fever (n = 1, 1, 2, 2).

**CONCLUSION:** Percutaneous removal of CBD stones is an effective alternative treatment, when endoscopic treatment is contra-indicated, fails or is not feasible. It is effective, has a low complication rate and using deep sedation potentially requires only a very limited number of treatment sessions.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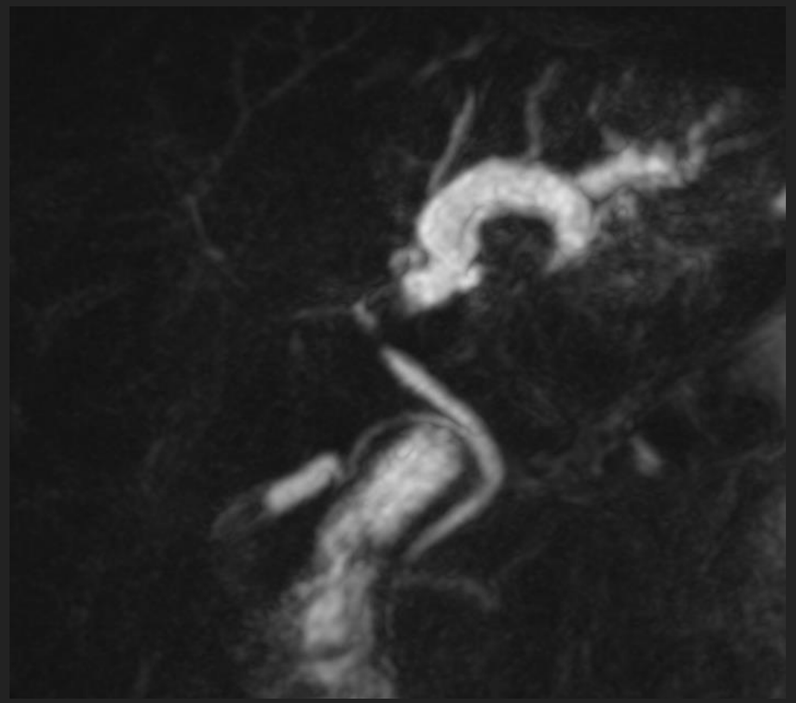
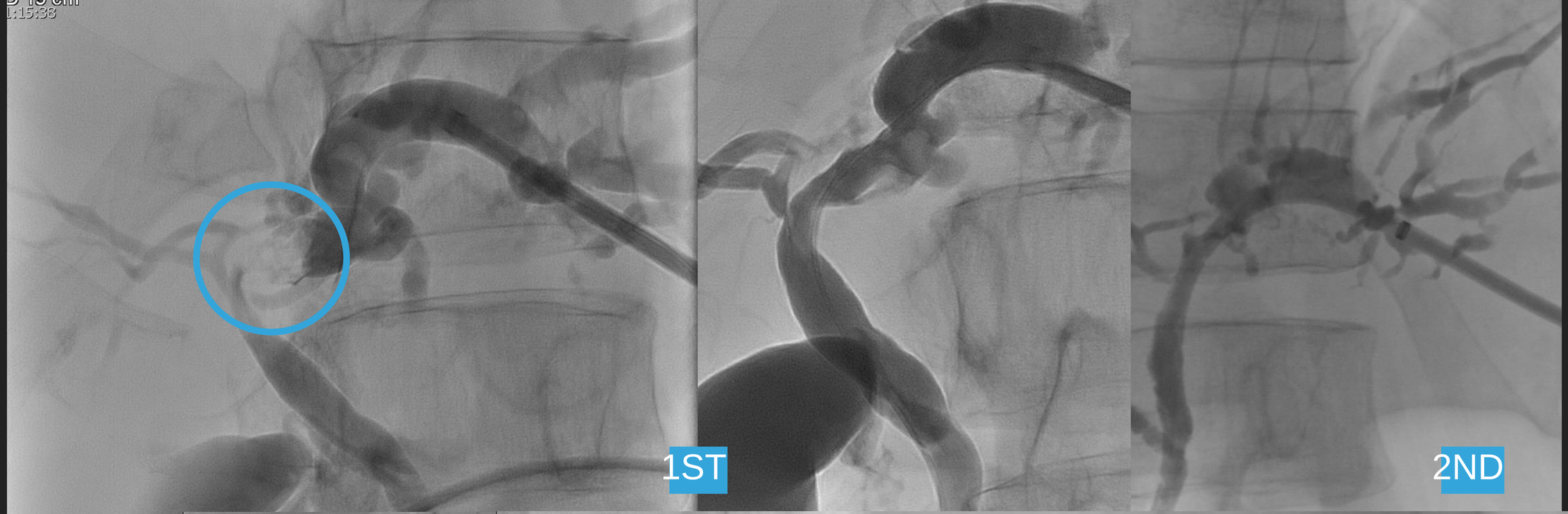
# MALE 37 Y/O

- Choroid melanoma
- Imaging for dissemination:
  - Left sided dilatation bile ducts
  - No mass visible

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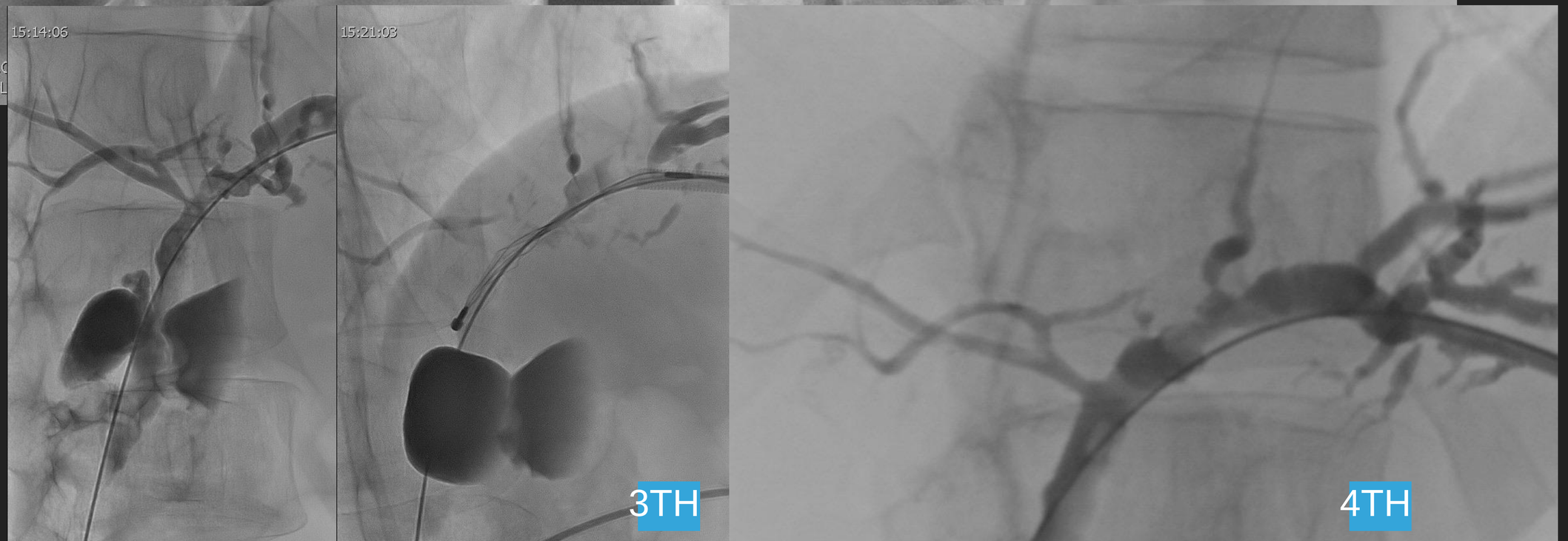
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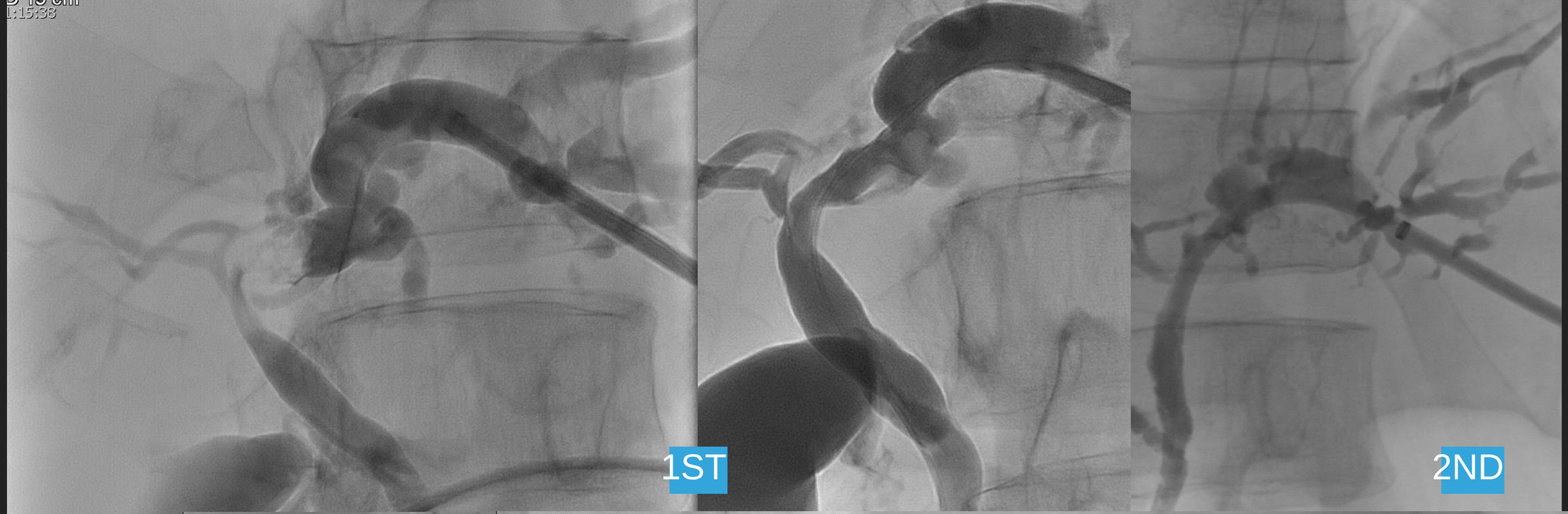
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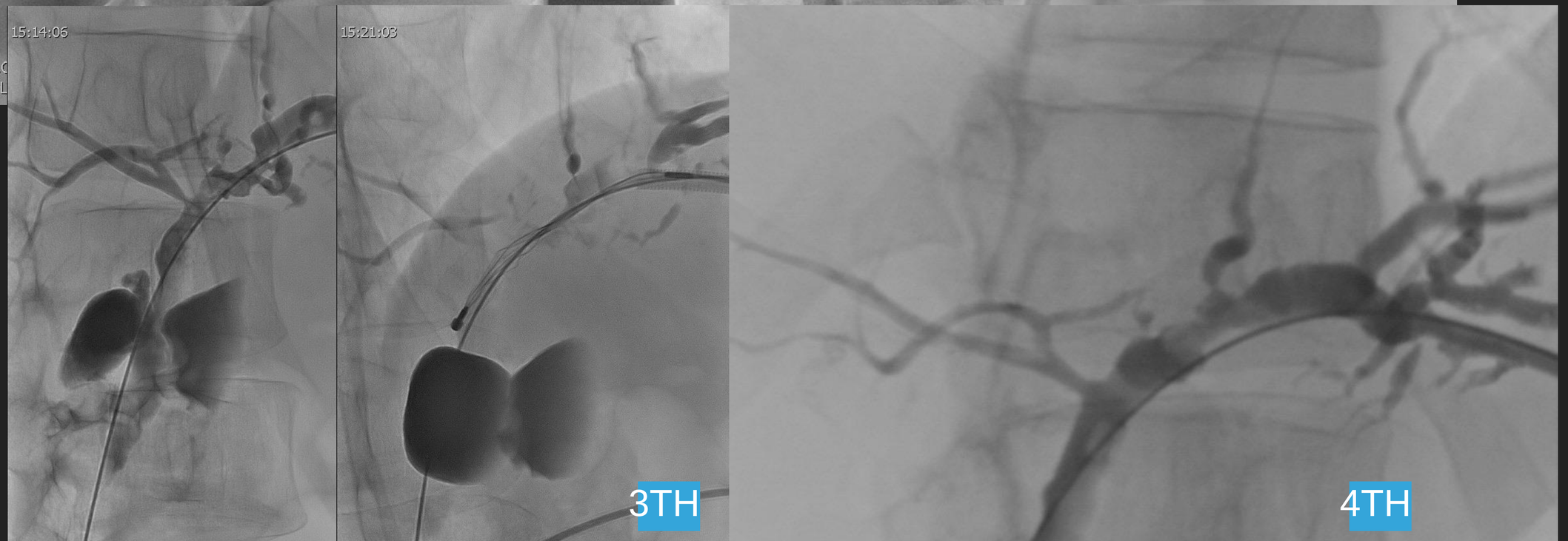
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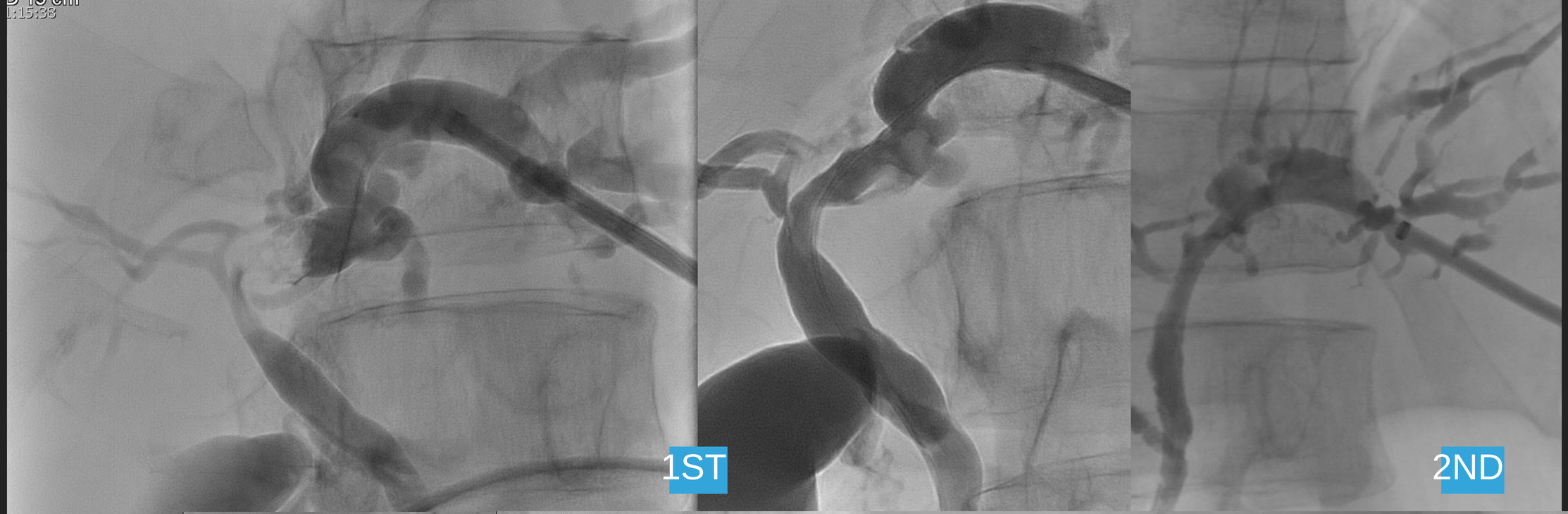
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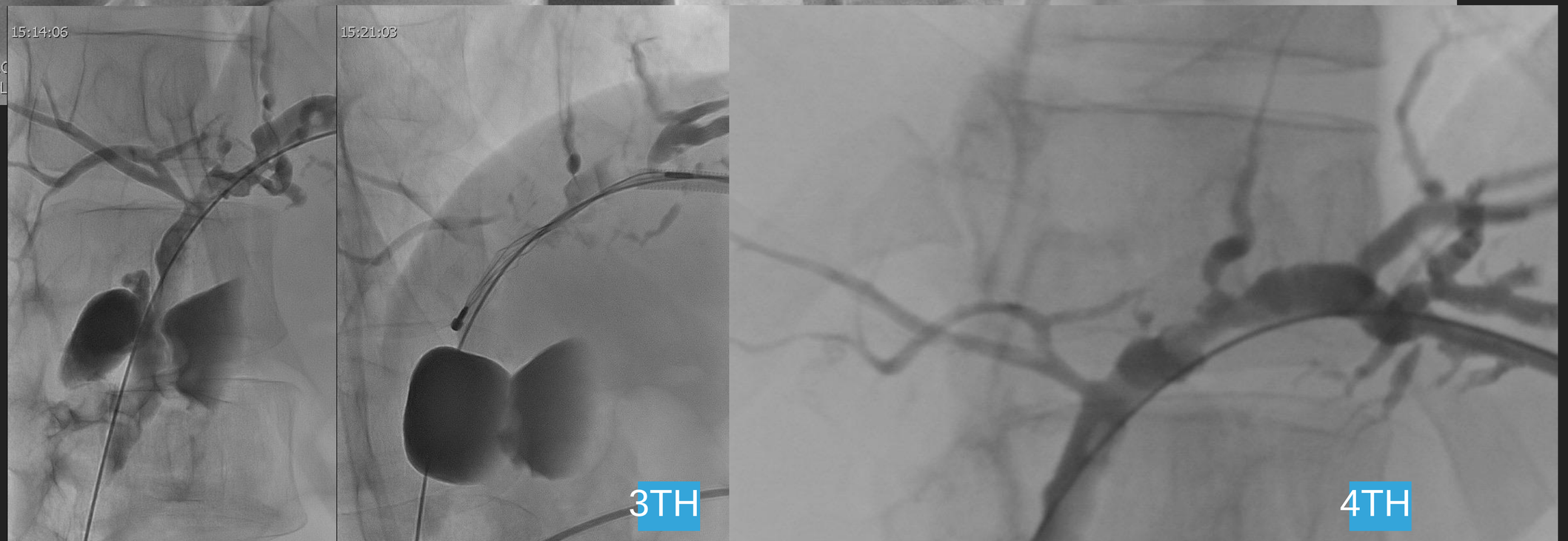
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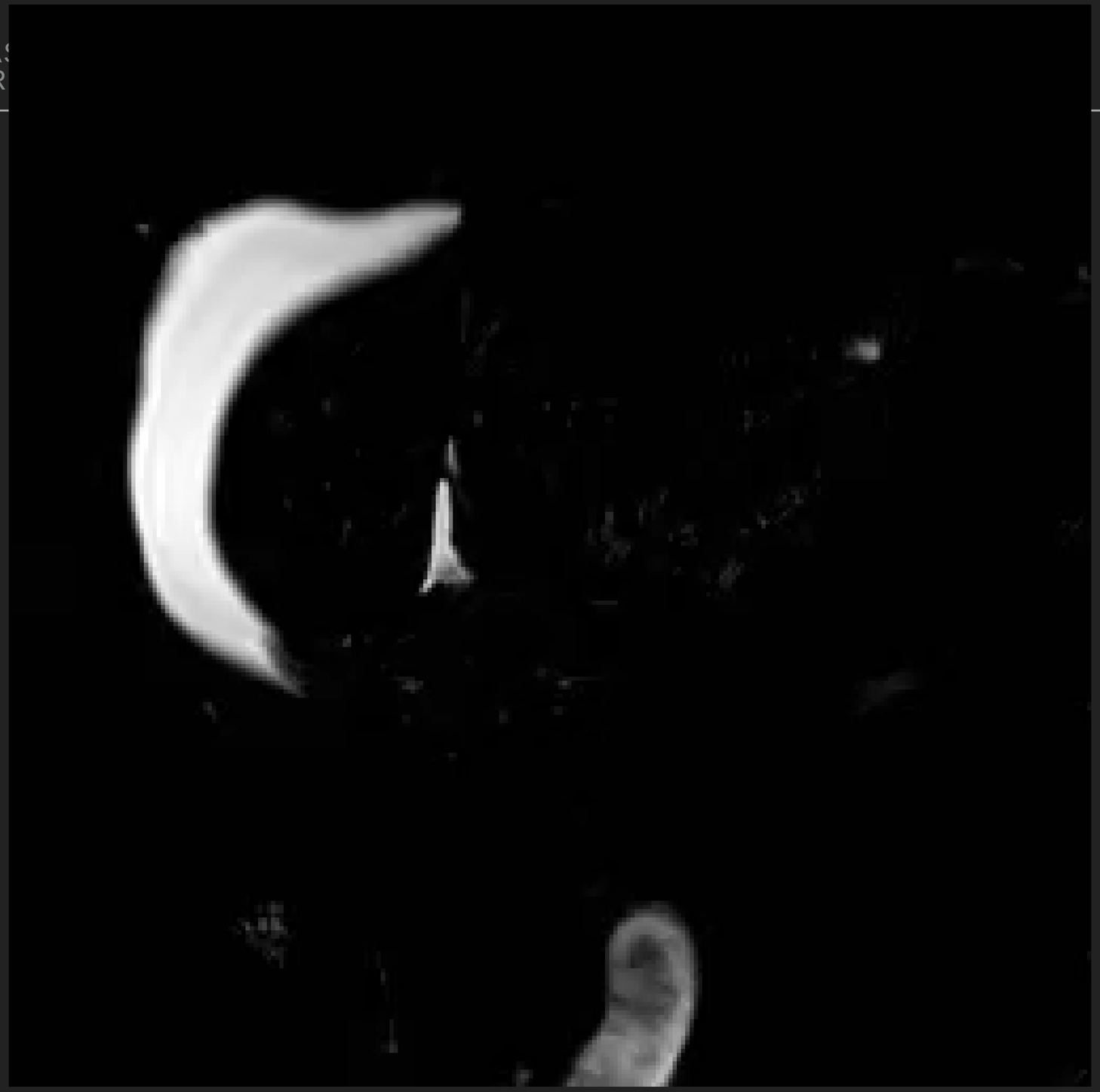
# INTRAHEPATIC STONES

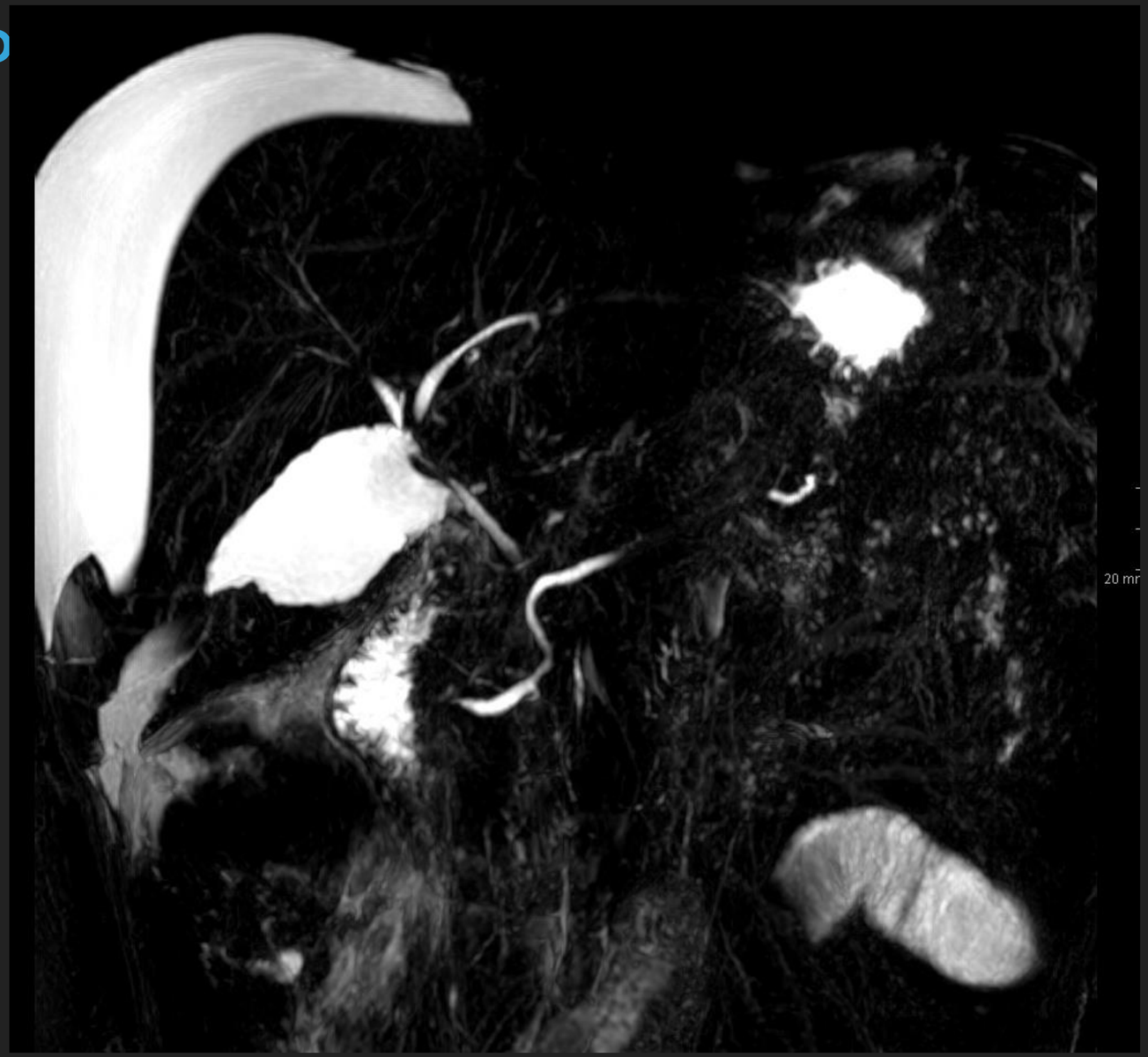
- Perform PTBD where needed!
- Same techniques as CBD stones
  - Dilatation up to 6/7 mm max!

# MALE 44 Y/O

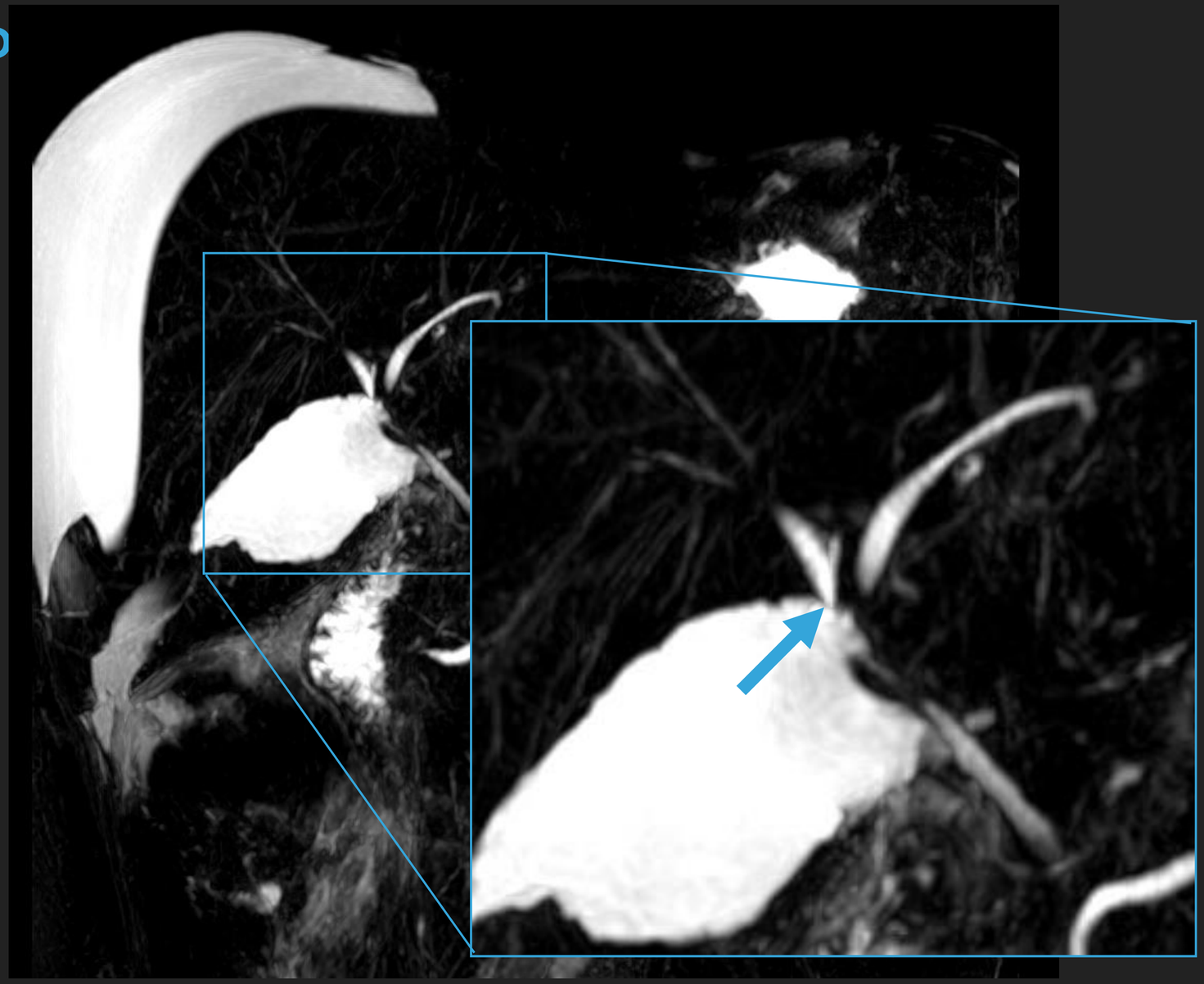
- Post cholecystectomy
- abdominal fluid collection



# MRCP



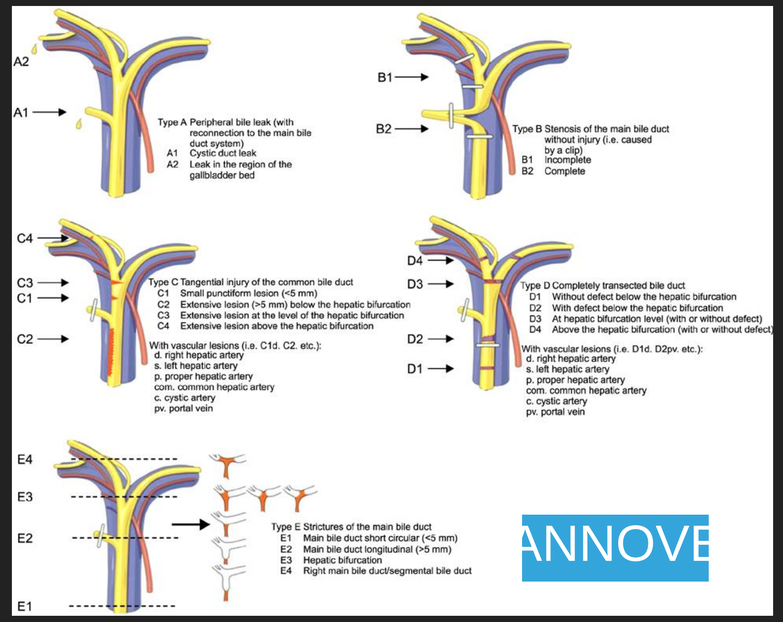
# MRCP



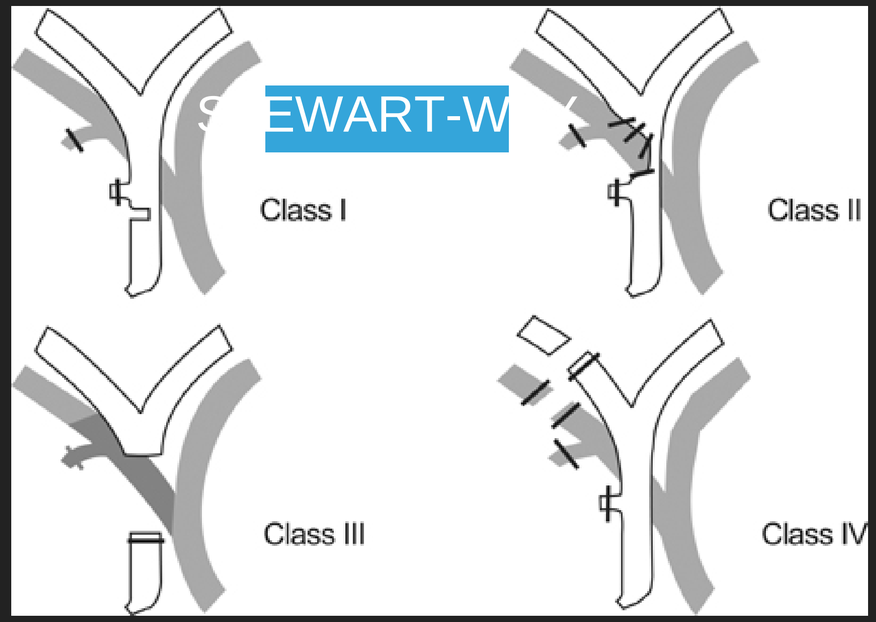
# BILE DUCT INJURY

- Most iatrogenic
  - incidence 0,04-1,5% cholecystectomy
  - recognised during surgery in only 42%
- Types (Amsterdam Classification)
  - A: Leaks of cystic duct or aberrant/peripheral radicles
  - B: Major bile duct leaks w or w/o stricture
  - C: stricture, no leakage
  - D: Complete transection
- Bismuth, Strasberg, McMahon, Stewart-Way, Hannover, Mattox…

BERGMAN JJ1, VAN DEN BRINK GR, RAUWS EA, DE WIT L, OBERTOP H, HUIBREGTSE K, TYTGAT GN, GOUMA DJ TREATMENT OF BILE DUCT LESIONS AFTER LAPAROSCOPIC CHOLECYSTECTOMY. GUT. 1996 JAN;38(1)




ANNOVE

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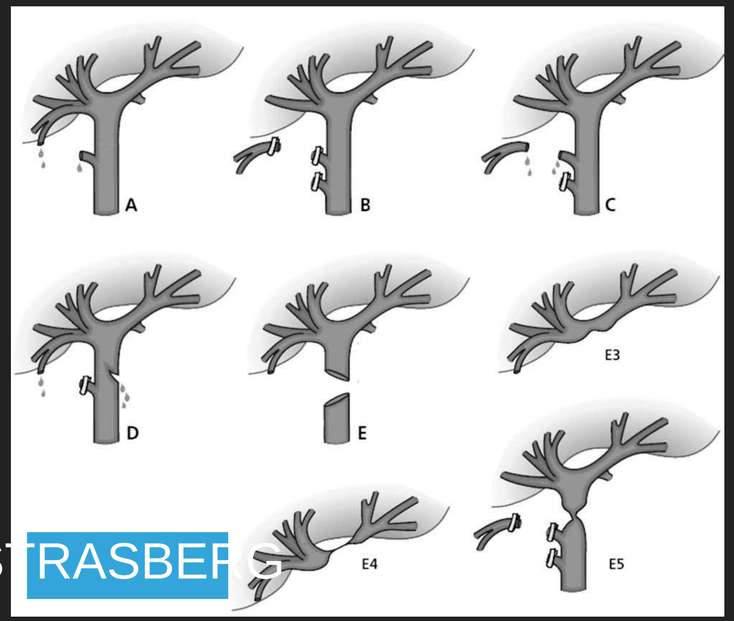
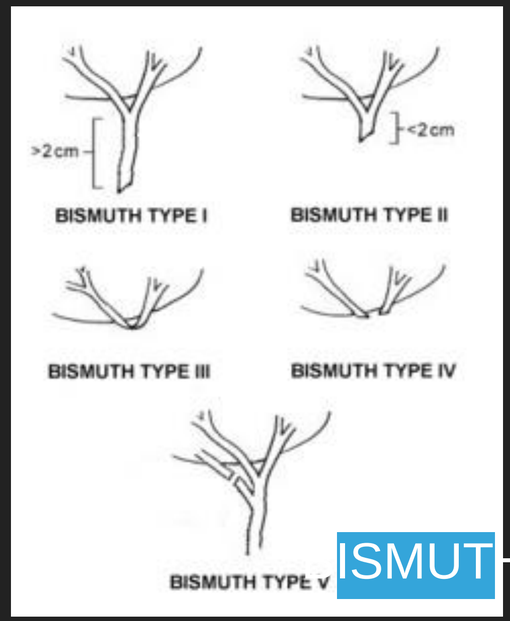


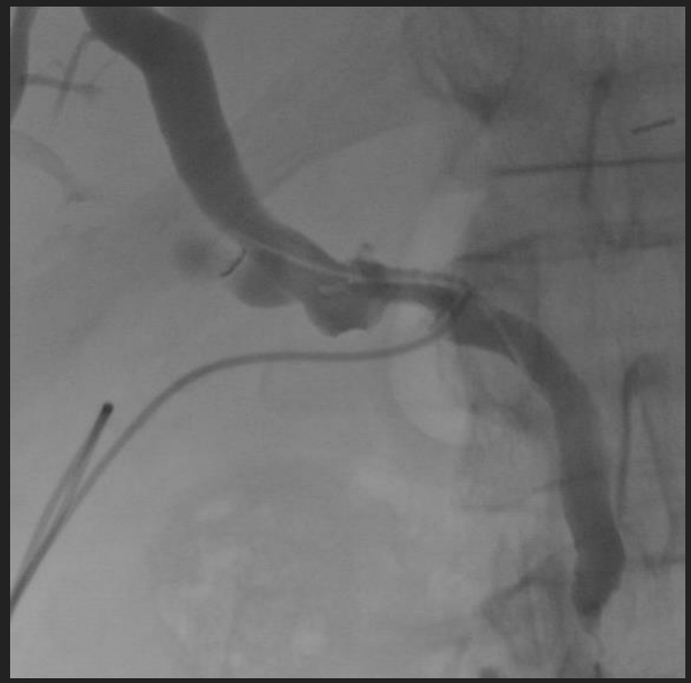

STRASBER G




ISMUTH

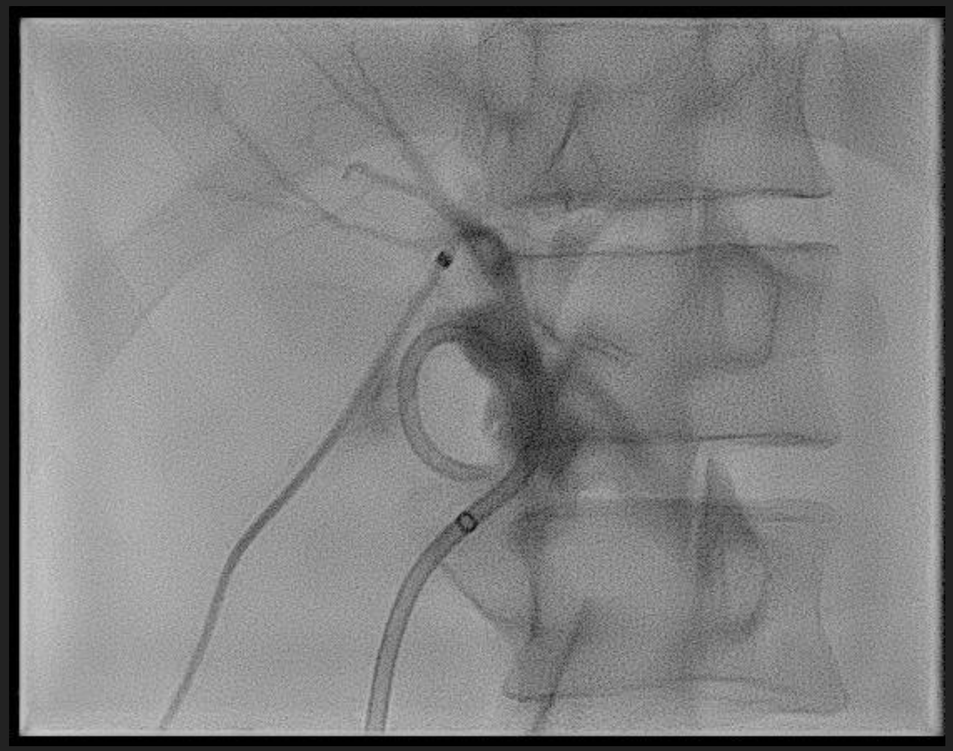
# BILE DUCT INJURY - TREATMENT

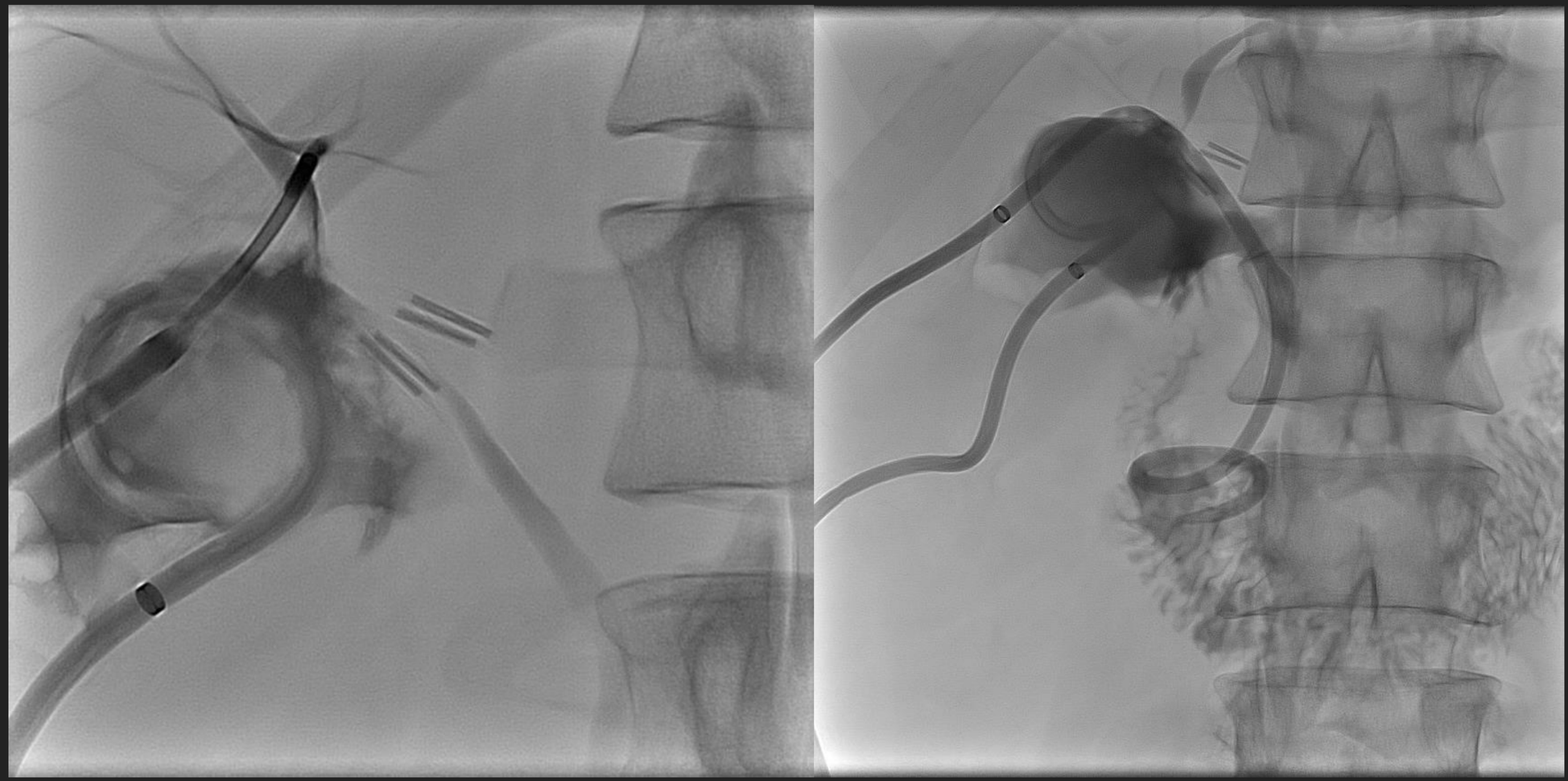
- Peroperative:
  - Direct anastomosis over T-drain
  - Hepaticojejunostomy
- A/B/C:
  - ERCP + stentplacement (type A: nasobiliary drain)
    - successA/B/C: 94/80-90/50%
- D: reconstructive surgery
- A-D: Percutanous approach



# AMSTERDAM TYPE D LESION (STRASBERG C)

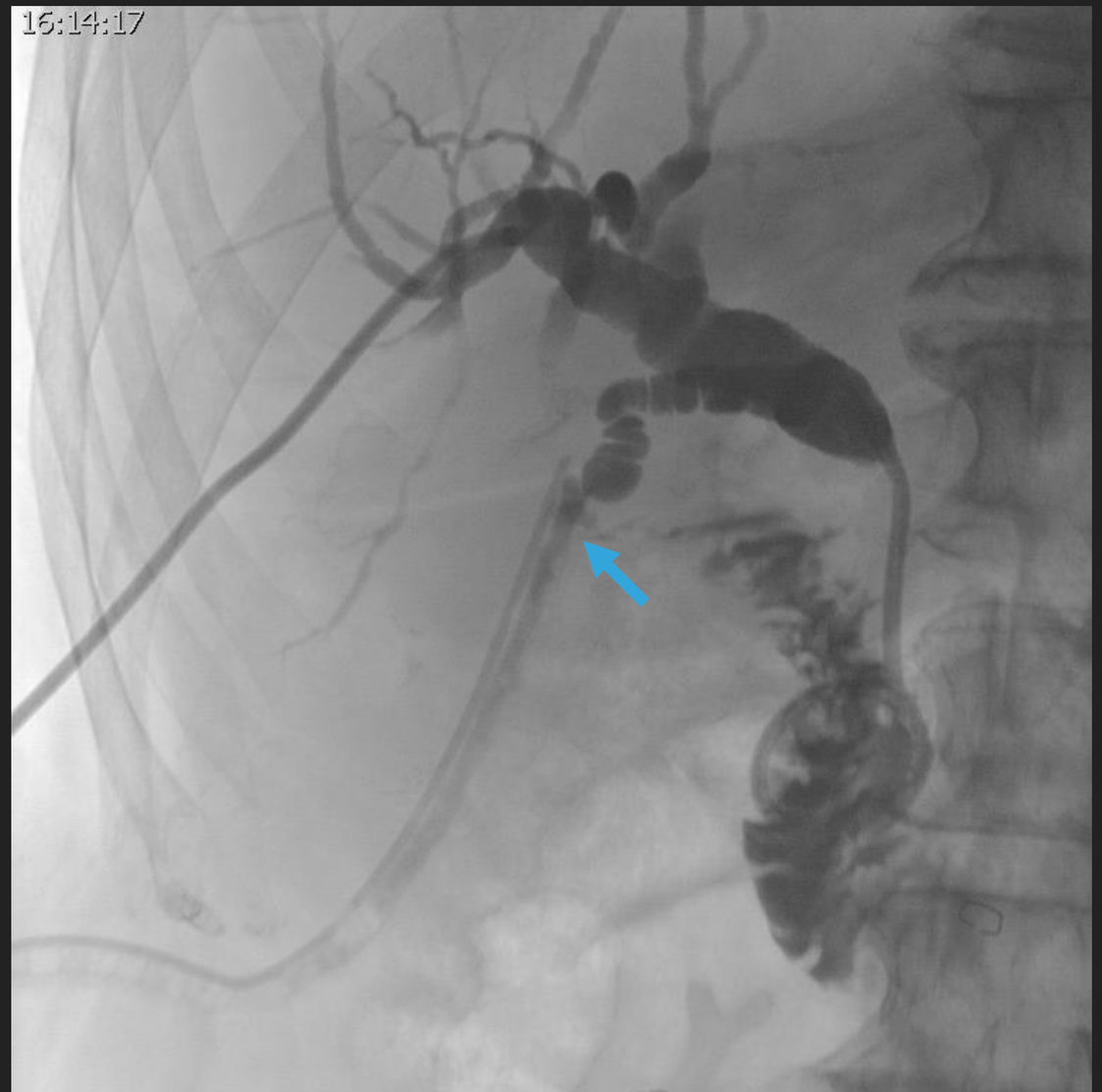
- 1st step: peritoneal drain!
  - as close to the point of leakage as possible
  - containment
- PTBD
  - Non dilated ducts
    - Deep sedation
  - which segment
    - MRCP!
- External drainage - internal drainage (weeks-months)
  - Use peritoneal drain as “marker”



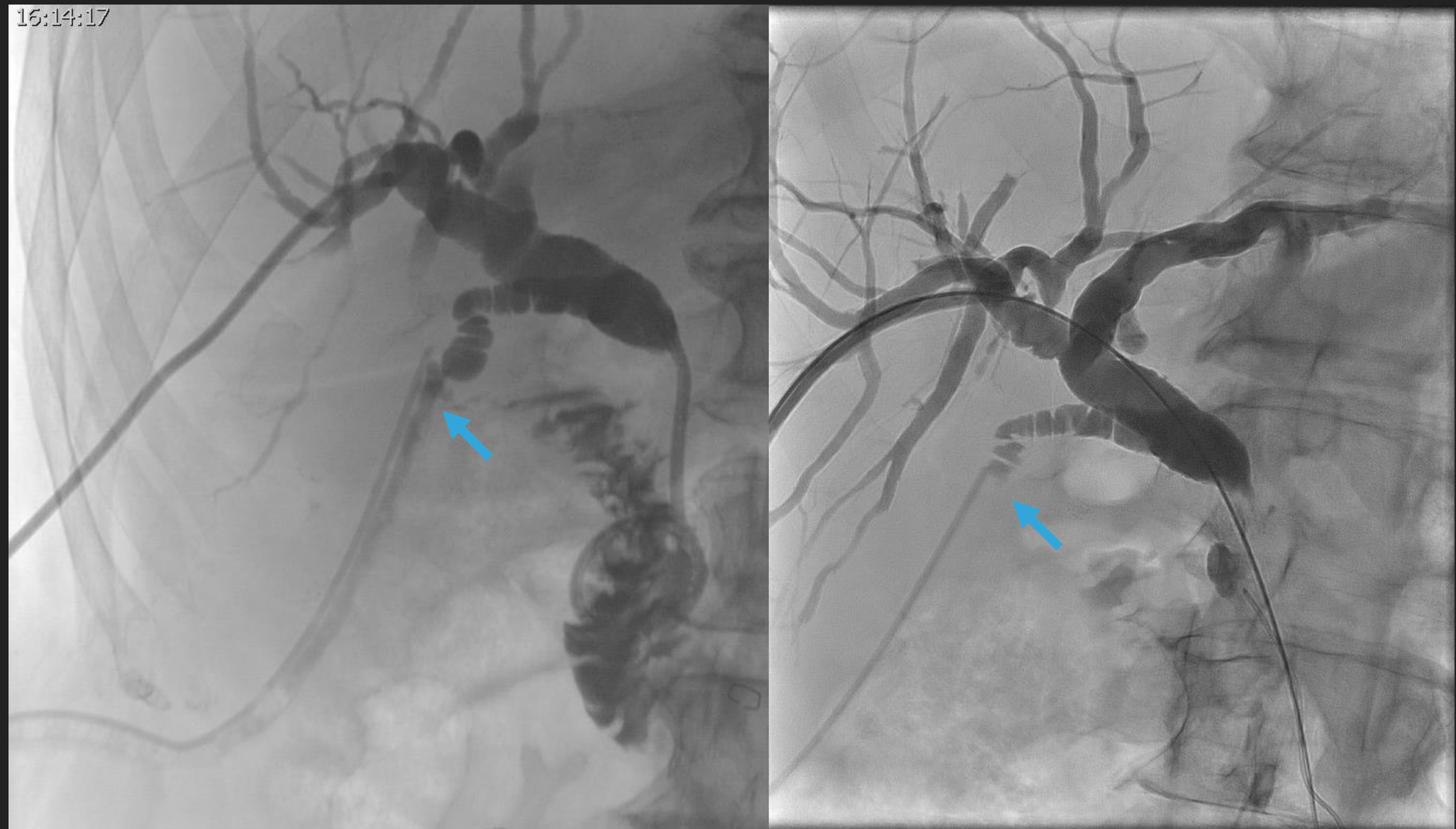


# 8 WEEKS LATER

# TYPE A LESION



# 2 WEEKS LATER…

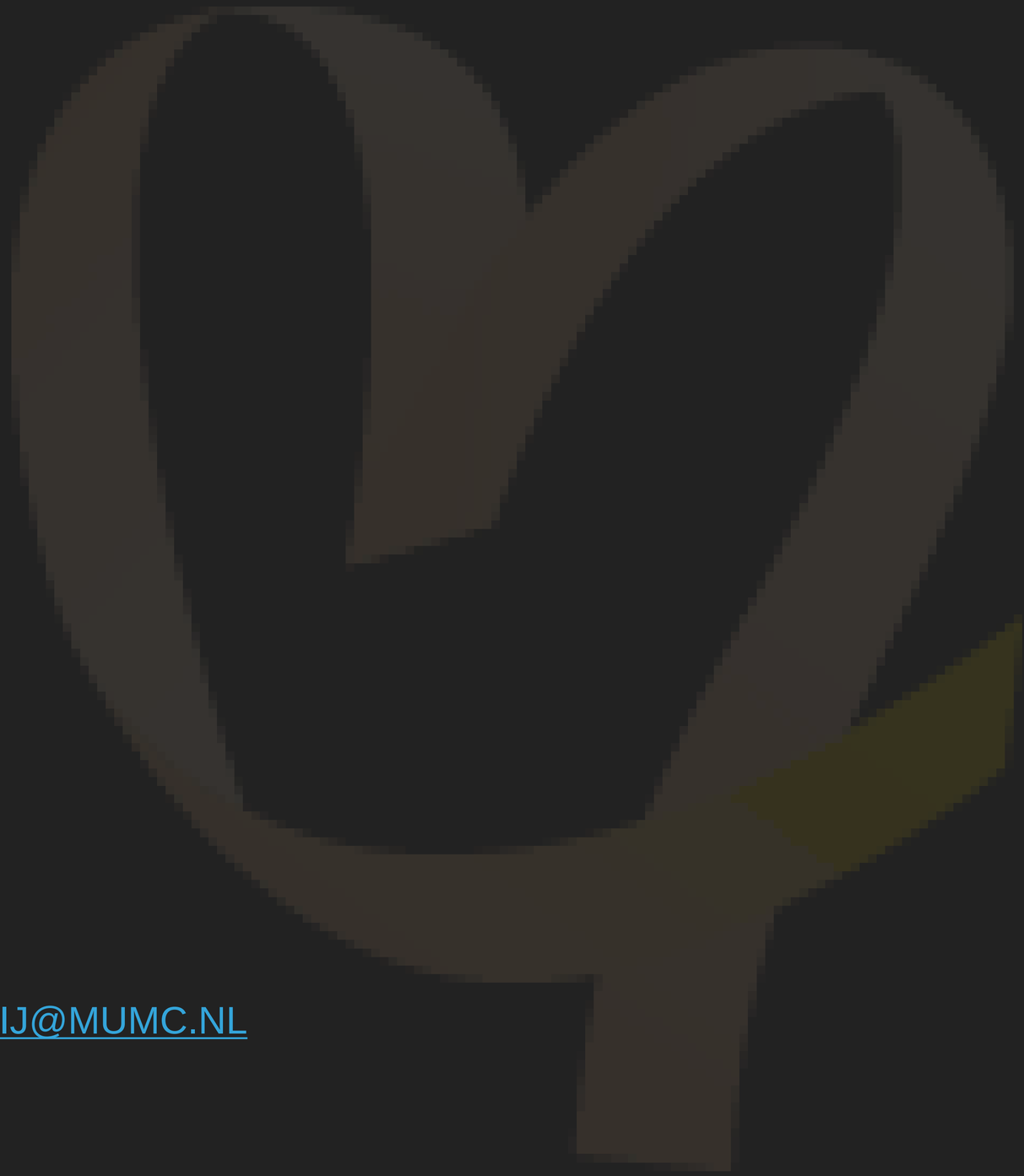


# TO CONCLUDE…

- Gallbladder drainage after failure of conservative treatment, as diagnostic, in high risk patients
  - Transhepatic/Transperitoneal
- PTBD in choledocholithiasis if ERCP is not possible/succesful (eg . altered anatomy)
- PTBD Preferentially under deep sedation, left side (less dislocation/more comfortable)
  - Leave drain at least 10 days

# TO CONCLUDE…

- Percutaneous CBD stone removal is effective and safe
  - one/multiple sessions
  - Peripheral stones
- PTBC is effective in bile duct lesions
  - Start with peritoneal drain (near hilum)
  - Longstanding drainage external - internal



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