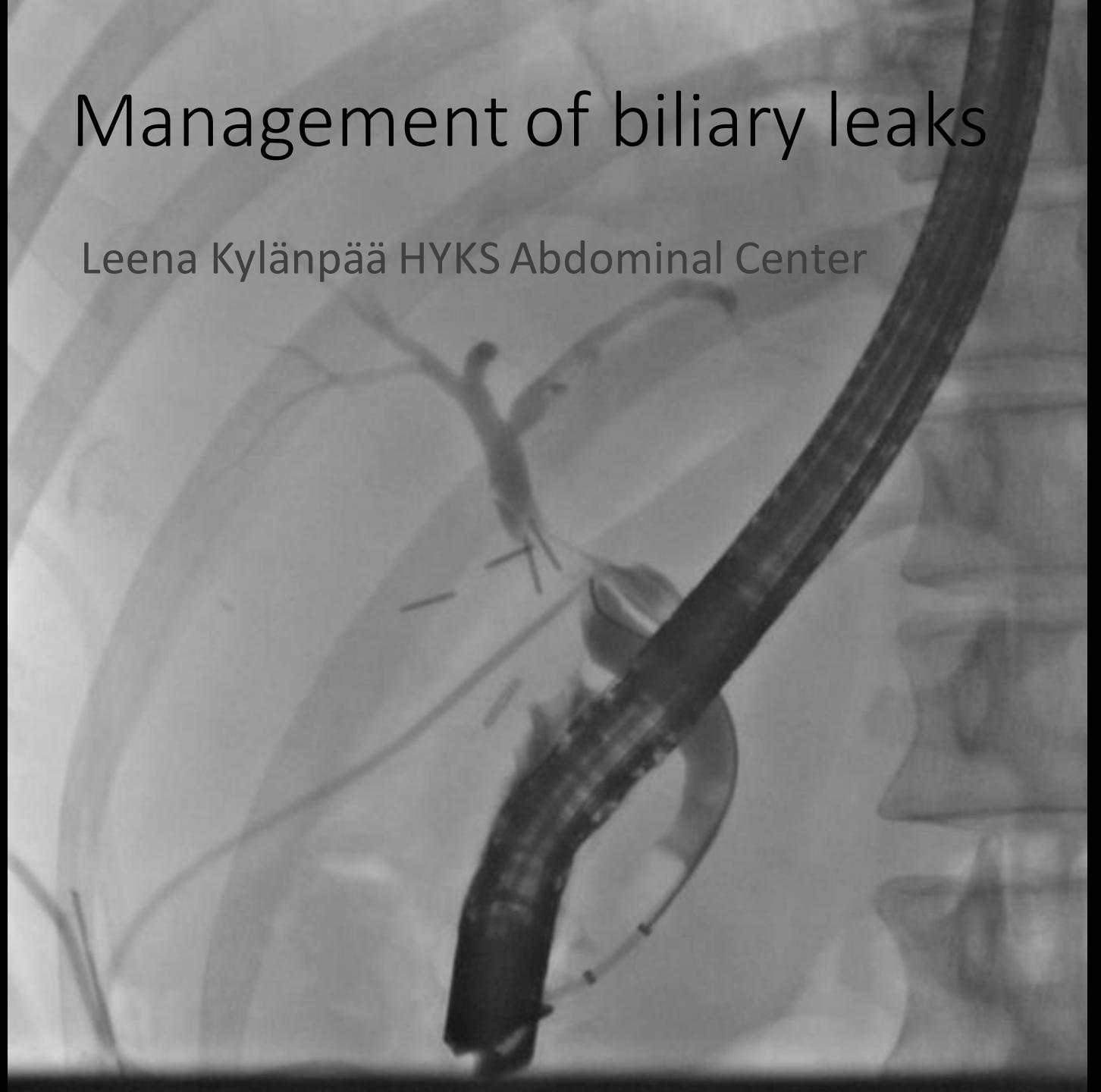
Management of biliary leaks

Leena Kylänpää HYKS Abdominal Center



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Postoperative biliary leak happens after:

- Cholecystectomy
- Liver resection
- Liver transplantation

Carl Langenbuch
(1882 cholecystectomy)

Erich Mühe (1985 LCC)

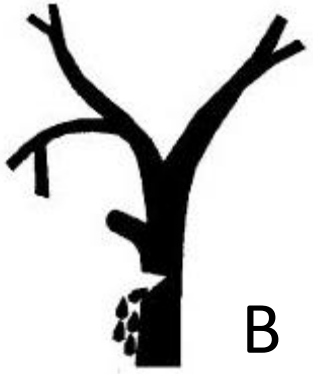
Biliary injury

Amsterdam – injury classification

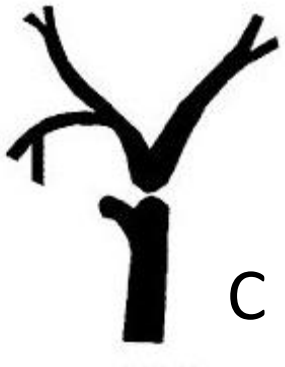
Type	Criteria
A	Cystic duct leaks or leakage from aberrant or peripheral hepatic radicles
B	Major bile duct leaks with or without concomitant biliary strictures
C	Bile duct strictures without bile leakage
D	Complete transection of the duct with or without excision of some portion of the biliary tree

A

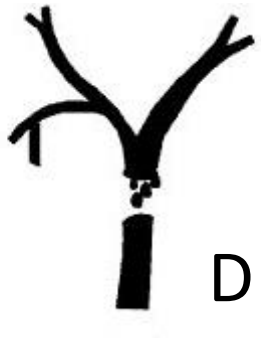
A



B



C

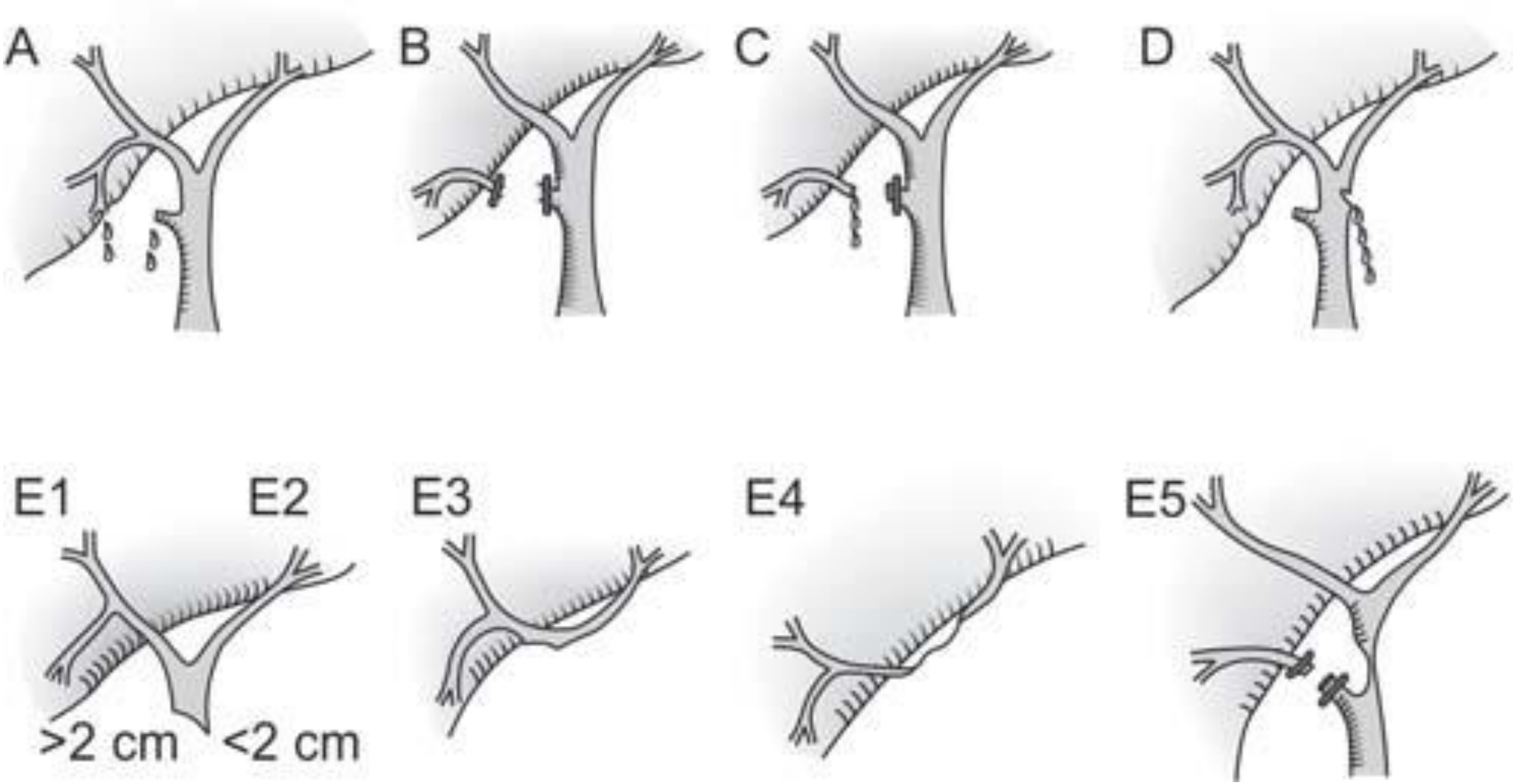


D

Amsterdam – injury classification

- The leak is graded as
  - ‘‘Low grade’’ (LG) if the leak is visible in cholangiography from the distal part of the common bile duct only after opacification of the intrahepatic biliary radicals.
  - ‘‘High-grade’’ (HG) leak is defined if the leak was seen before intrahepatic opacification

Strasberg-Bismuth classification

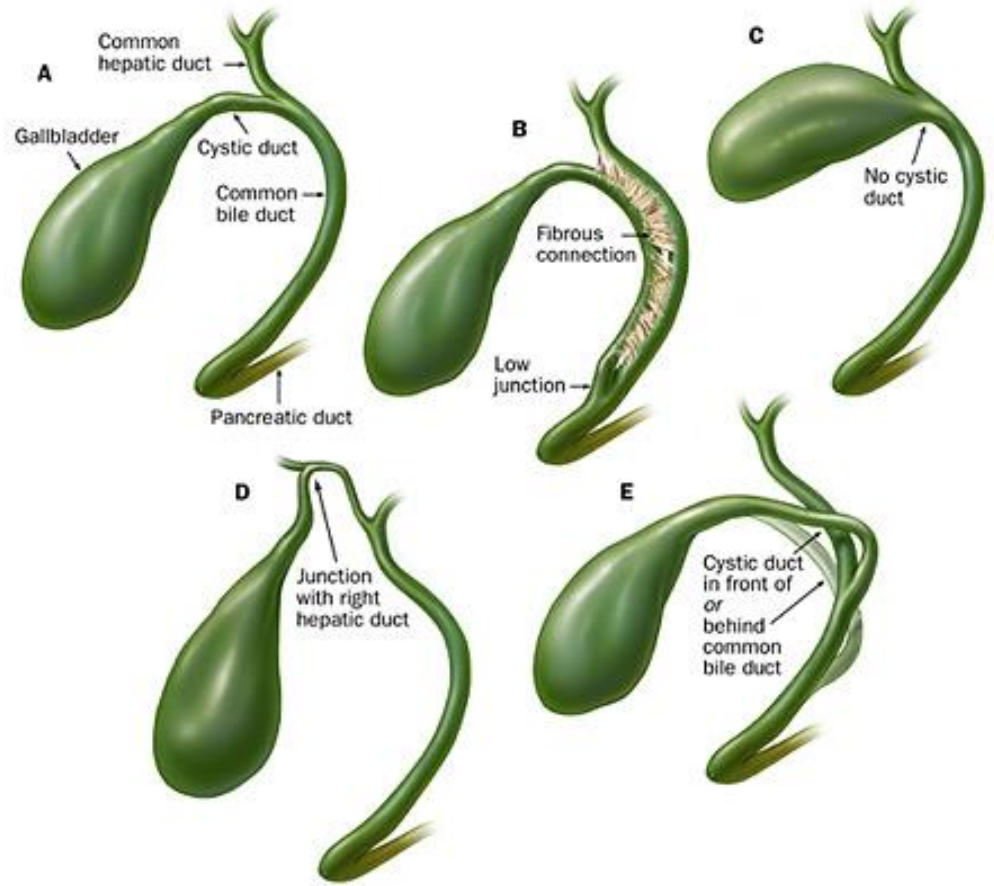


Risk factors for biliary injury

- Acute cholecystitis
- Acute pancreatitis
- Cholangitis
- Calot'n triangle fibrosis
- Bleeding
- Adhesions
- Difficult anatomy
- Stone in d. cysticus/ Mirizzi syndrome

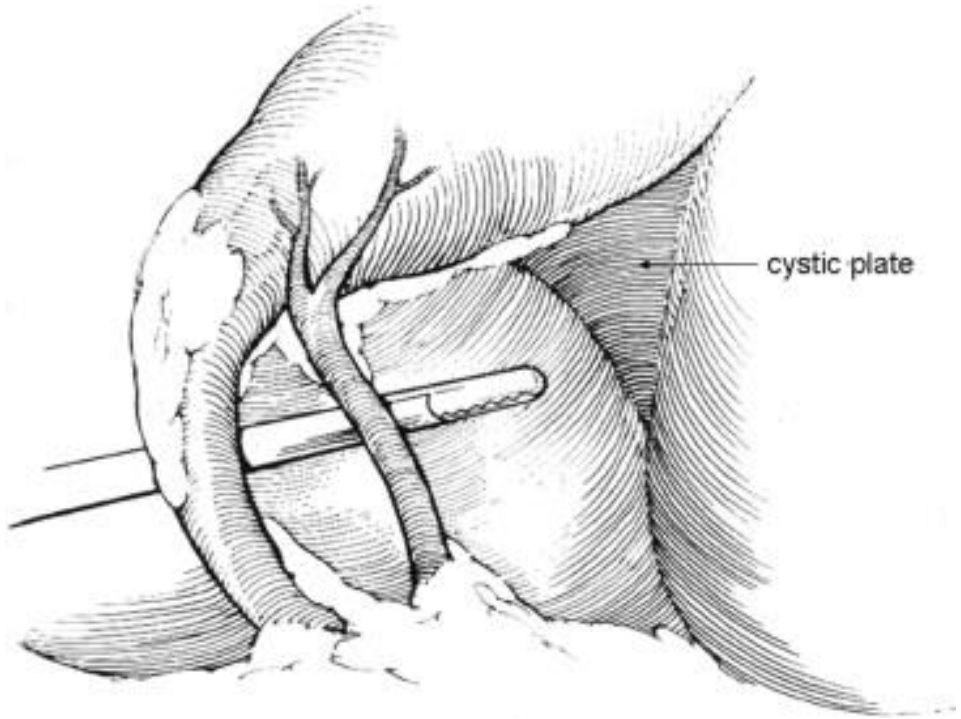
- Unexperienced surgeon
- Bad controlled clipping of the bile duct
- Coagulation used too near biliary duct

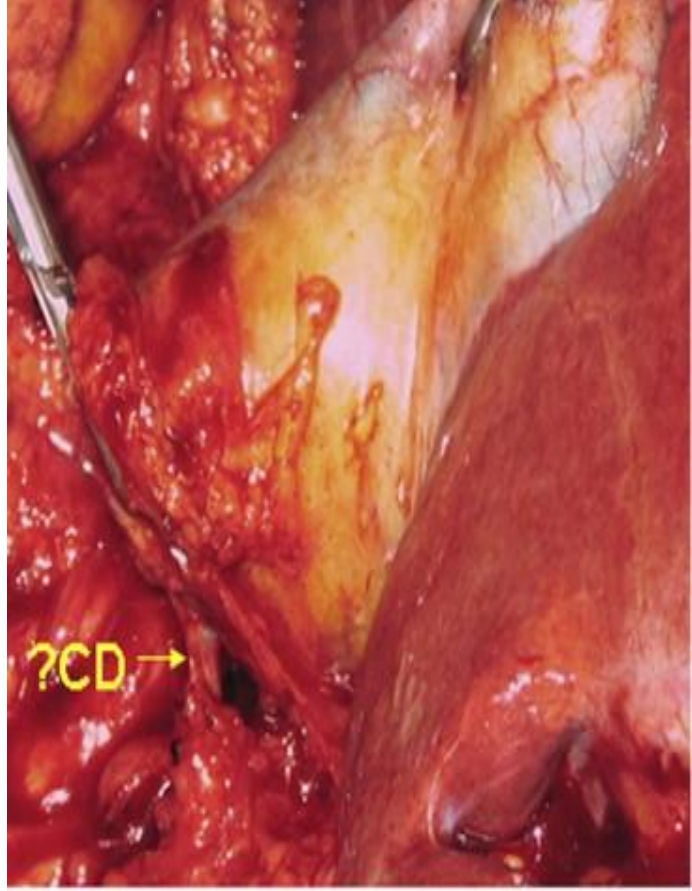
- Obesity
- Elderly patient

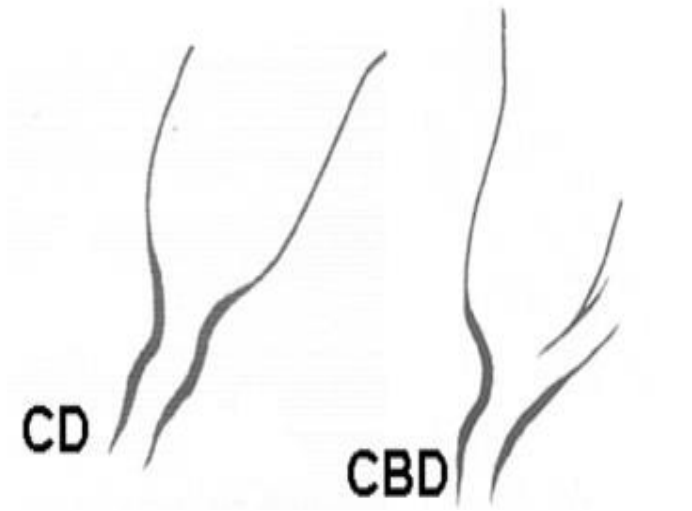


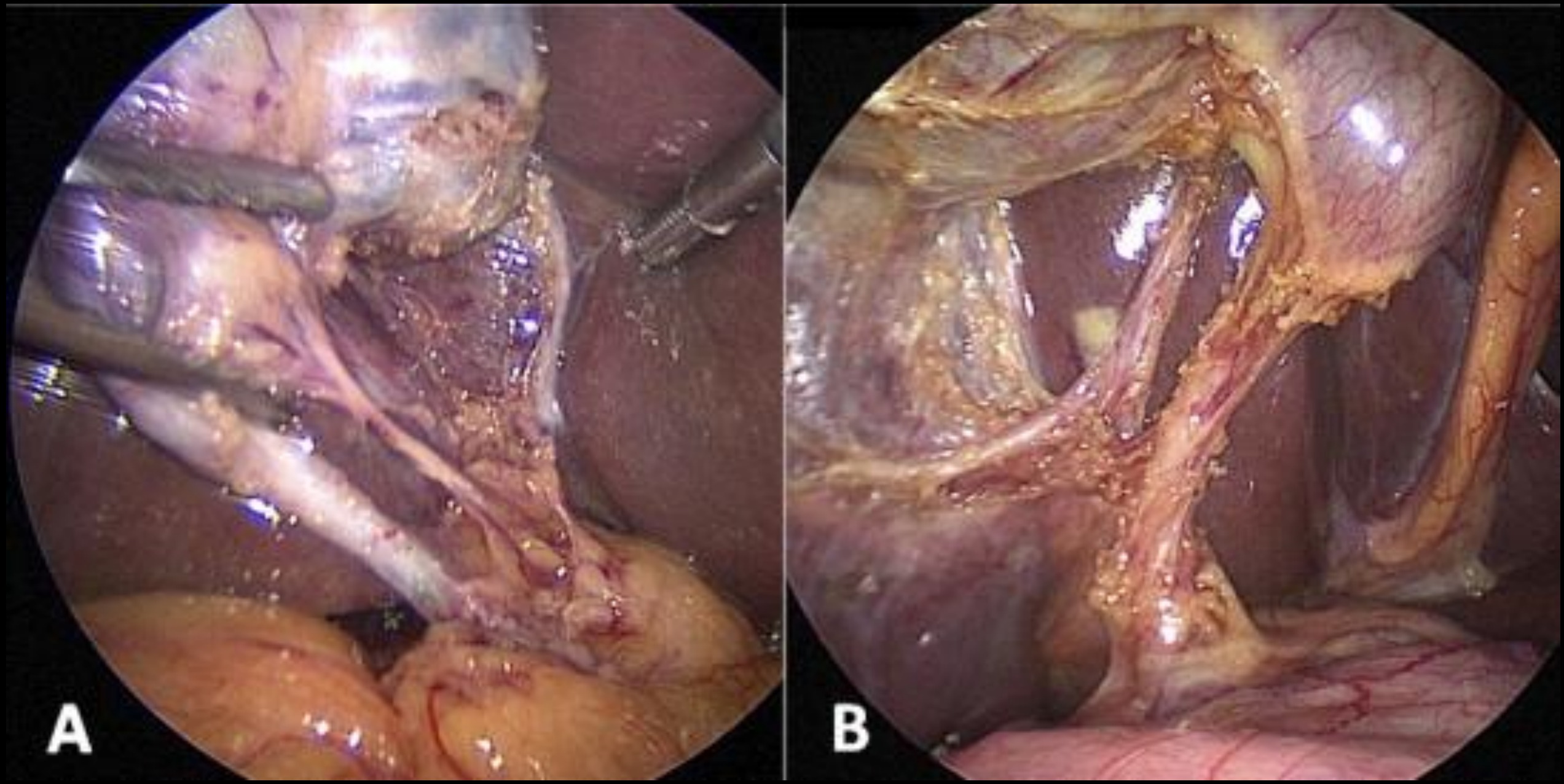
Critical view of safety

The hepatocystic triangle is cleared of fat and fibrous tissue.
The lower one third of the gallbladder is separated from the liver to expose the cystic plate.
Two and only two structures should be seen entering the gallbladder.








A
B

Recognizing the biliary injury

- Intraoperative (10-30%)
  - Conversion / ask for help
  - Avoid additional injury
  - Do cholangiography if possible
  - Place drain / T-tube
  - Send patient to hepatic surgeon
- Postoperative
  - Biliary leakage symptoms
    - Leakage: Abdominal swelling, nausea, fever, pain, peritonitis, drain /wound leakage of bile Symptoms of biliary obstruction
    - High liver enzymes, jaundice, cholangitis, secondary chirrosis

Biliary injury diagnosis

- US/ CT
  - Diagnosis of biloma and drainage
- MRCP (primovist)
  - Diagnosis of biloma and disruption of duct
- PTC
  - Examine proximal duct anatomy
- T-tube cholangiography
  - Examine duct anatomy
- ERCP
  - Clarify anatomy
  - Treatment

Biloma found: Let's drain!

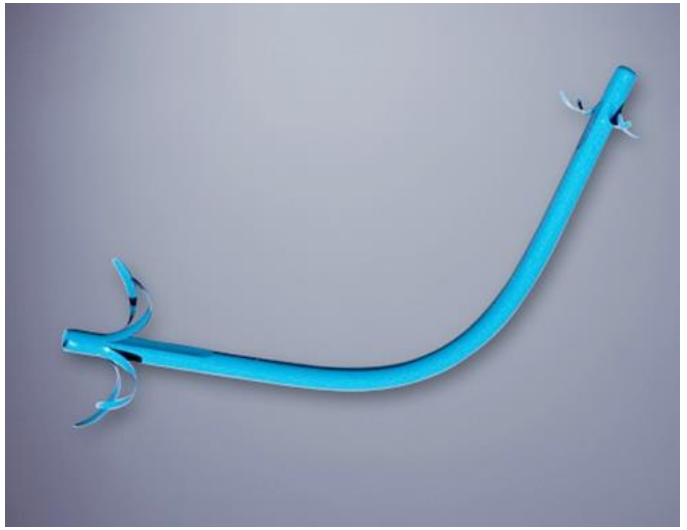
- Biloma: risk of infection
- Bile destroys tissue

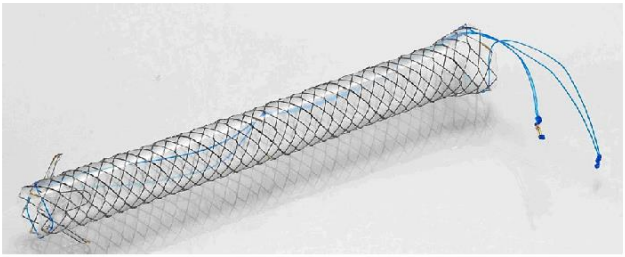
US + DRAIN + ERCP

- If peritonitis, laparoscopy, lavation and drainage + ERCP next day

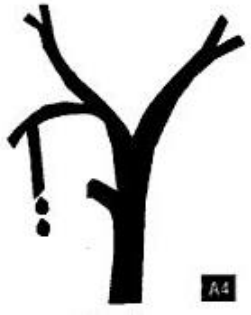
Endoscopic treatment

- D. cysticus and periferial leakage:
  - Sphincterotomy
  - Plastic stent / biodegradable stent
- Choledochal leak and stricture:
  - Plastic stent or fcSEMS
- Removal of choledochal stones
- PTC assisted Rendez vous technique
- Nasobiliary drainage





Amsterdam A- injury treatments



Sphincterotomy worse than stenting in all kind of leaks

Marks et al. Surg Endosc.1998;12:327-330

Kaffes et al. Gastrointest Endosc 2005;61:269-275

Dolay et al J Laparoendosc Adv Surg tech A. 2010;20:455-459

Sphincterotomy as good as stenting in moderate leaks

Sandha et al Gastrointest Endosc. 2004;60:567-575

Aksoz et al Dig Endosc. 2009;21:158-161

Sphincterotomy and stent vs only stent – no difference

Mavrogianni et al European journal of gastenterology et hepatology 2006

Sphincterotomy as good as sphincterotomy + stent in all Amsterdam A leaks

Rainio et al Dig Dis Sci 2017; published online


12:21:59
EXP:10.02.2009
EXP:12:21:59
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Philips Medical Systems
DSI R5.2.3
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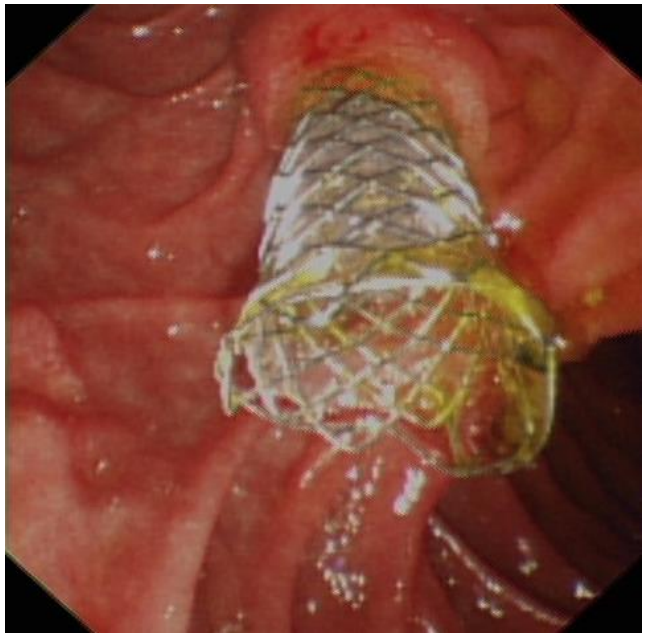
MEILAHTI_ENDOSKOPIA MES_ENDO_LPV_PH


45
12:2
EXP:10.02.
EXP:12:2
HUS_MEIL
Philips Medical Sys
DSI R
MEILAHTI_ENDOSKOPIA MES_ENDO_LPV

Amsterdam B leak

- Plastic stent
  - 7F vs 10F no difference
  - Stent duration 3 months

- Metal vs plastic
  - Minor leaks plastic
  - In large defects, fully covered metal stent
    - *Kahaleh et al Gastrointest Endosc 2007*
    - *Baron et al Clin Gastroentrol Hepatol 2006*
    - *Luigiano et al Surg Laparosc Endosc Percutan Tech 2013*
  - Stent duration 3-6 months



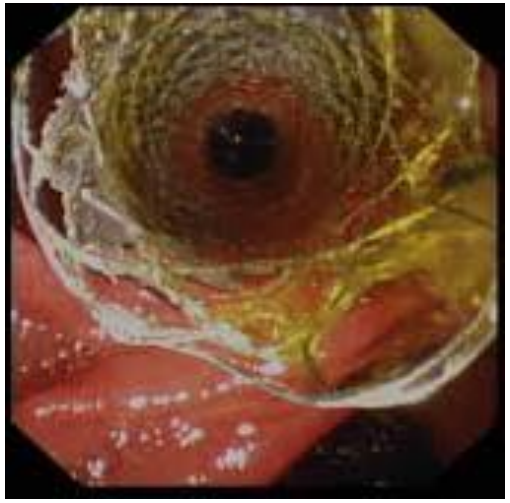

Philips
MEILAHTI_ENDOSKOPIA MES_

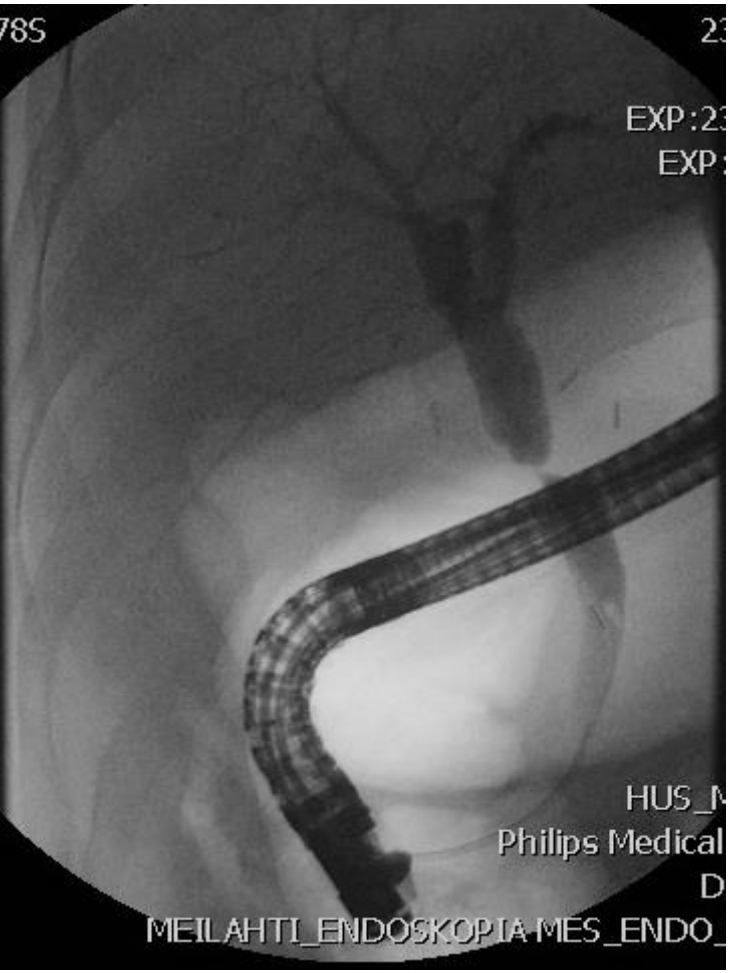

Philips
MEILAHTI_ENDOSKOPIA MES_

Amsterdam C stricture treatments

- Plastic stents, change every 3 months (1-6 stents)
- Fully covered metallic stent 3-6 months

Kahaleh et al Gastrointest Endoscopy 2005, 2008

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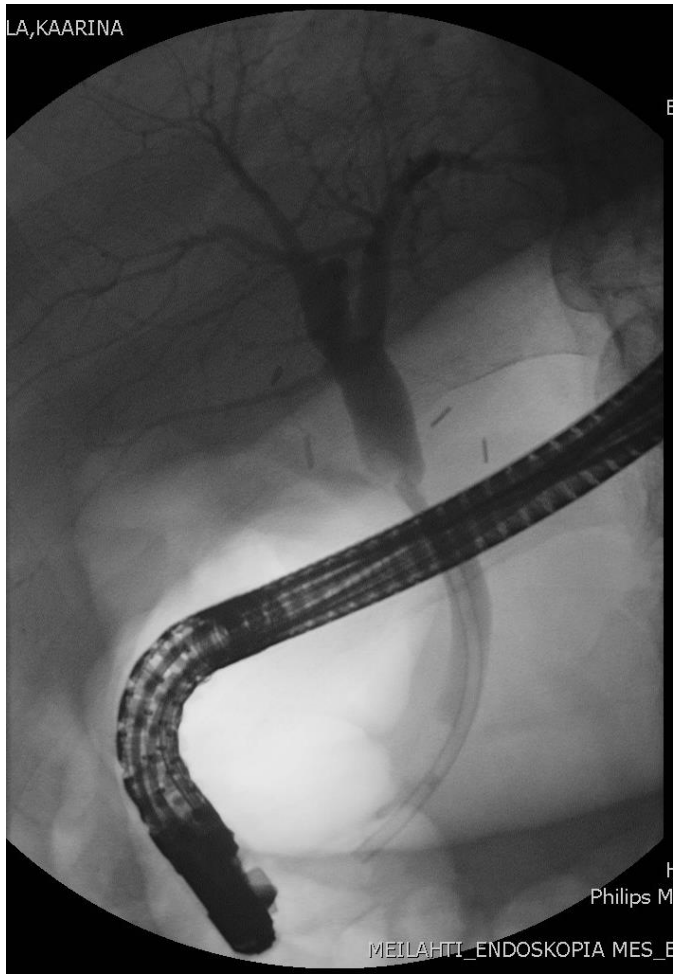
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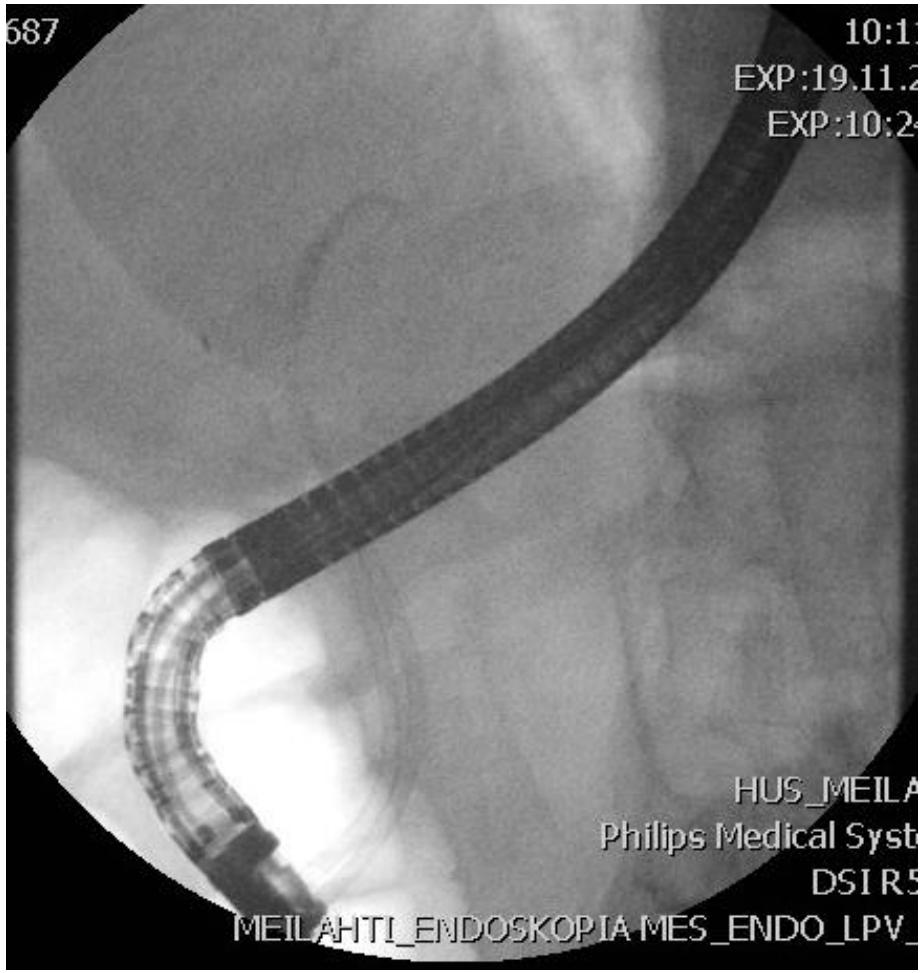
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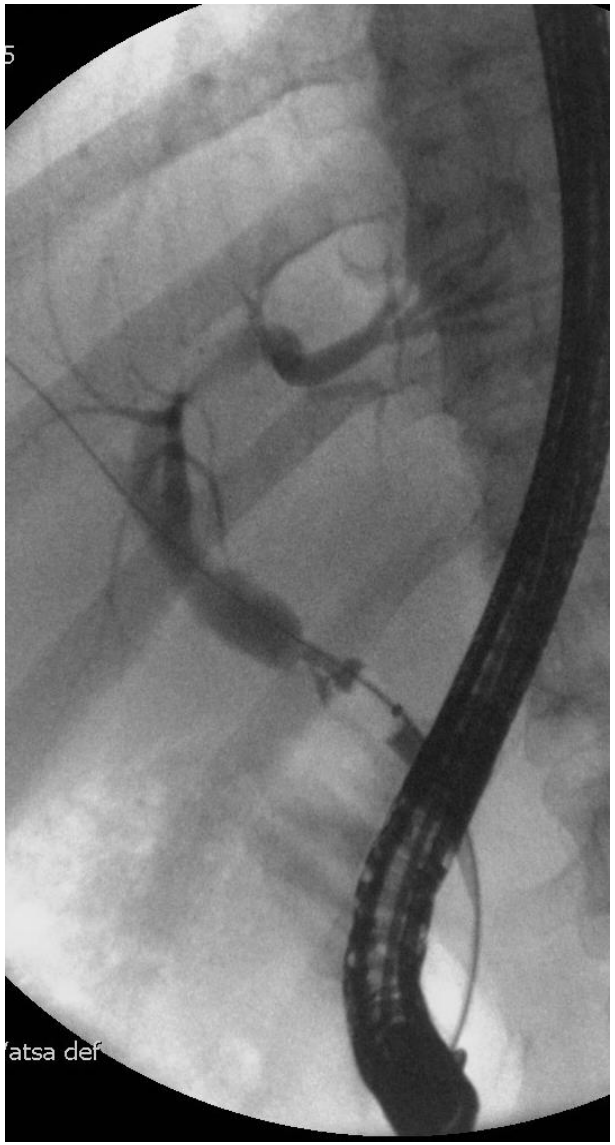
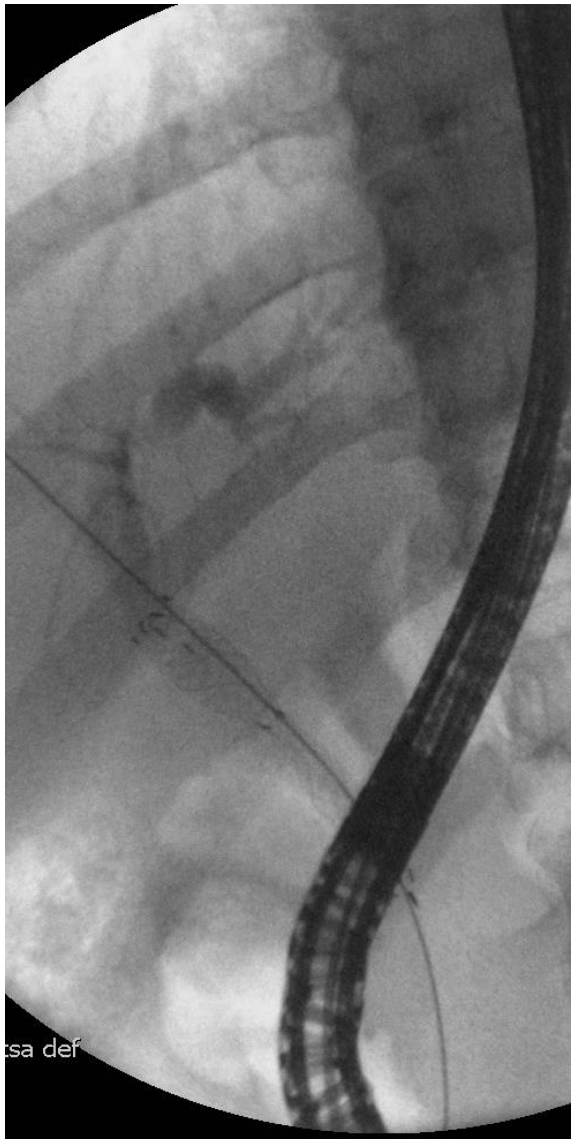
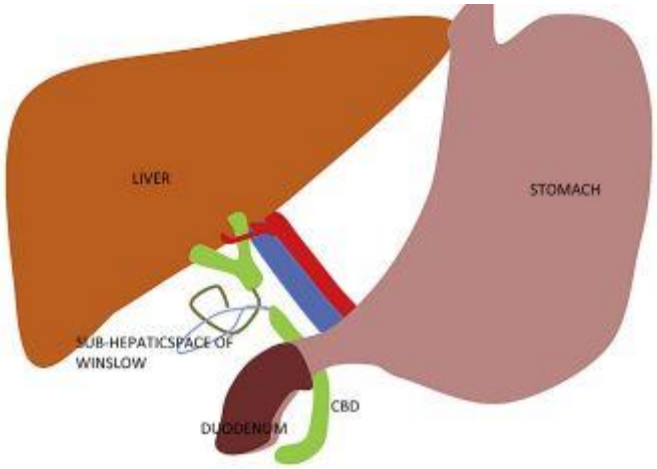
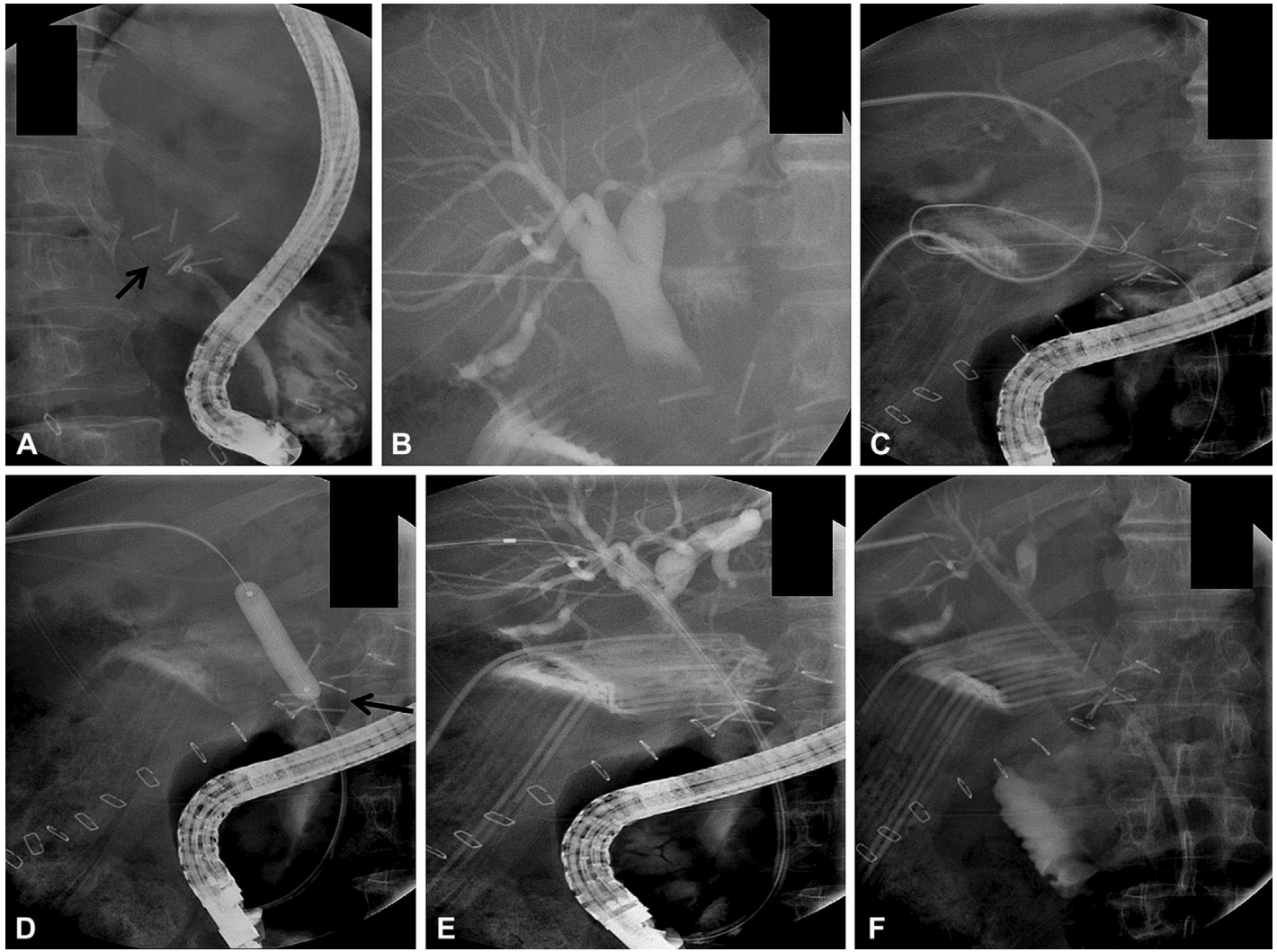


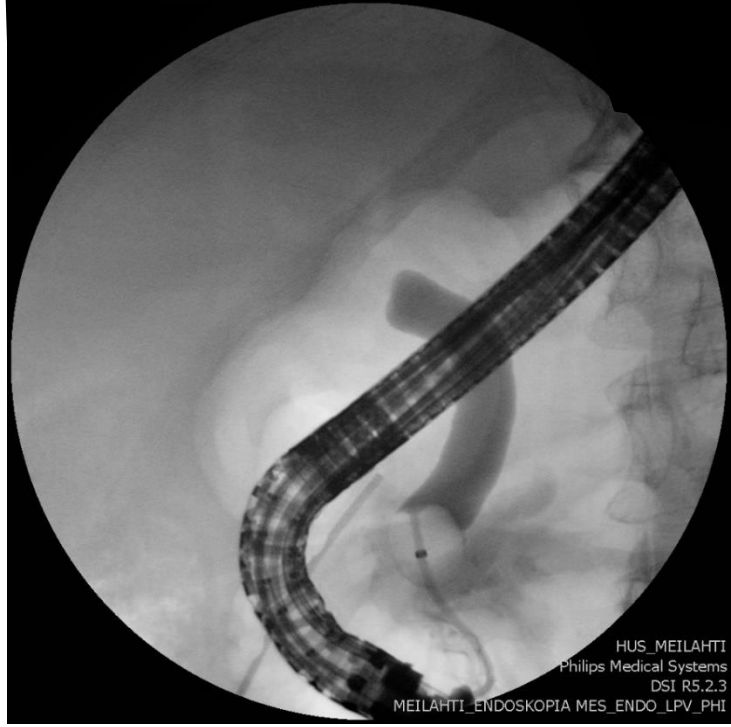


Donatelli et al Combined endoscopic and radiologic approach for complex bile duct injuries: Gastrointest Endosc. 2014;79:855-864



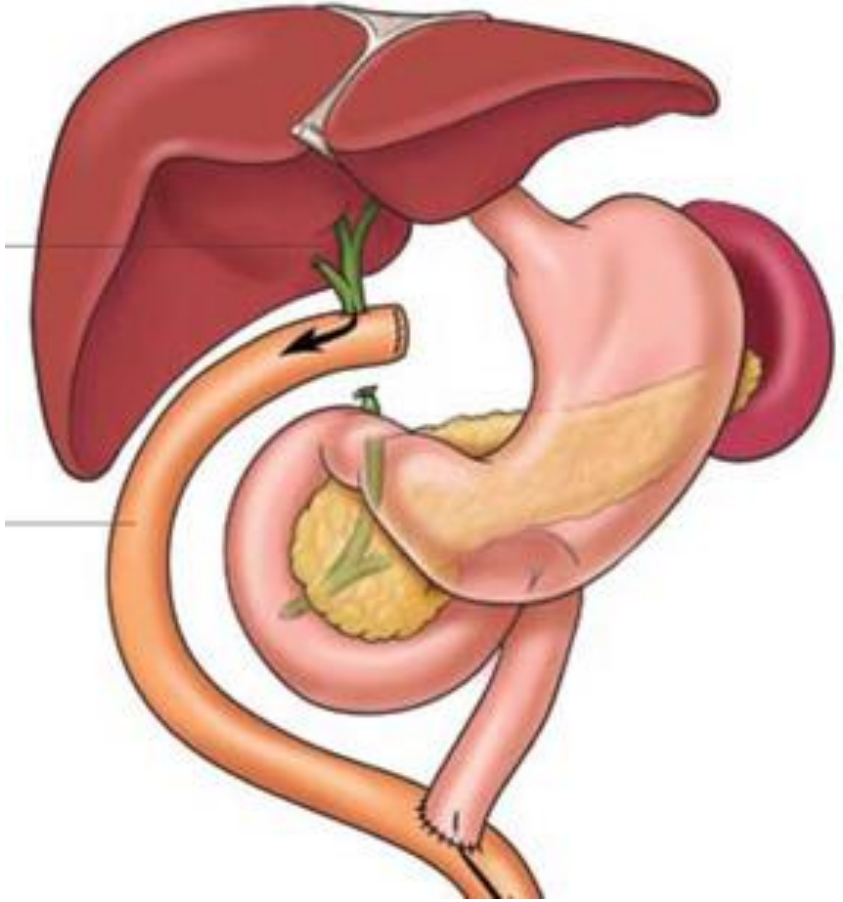


Amsterdam D – Operative treatment



Operative treatment

- Immediately during the initial operation
- Primary repair during the 1. week
  - Hepaticojejunostomy
  - Biliobiliary anastomosis
  - Suturing (+ T-drain)
- Late repair after 2-3 months
  - Treatment of sepsis
  - Drains
  - Hepaticojejunostomy



Send to a specialist because:

Liver surgeon vs GI surgeon :

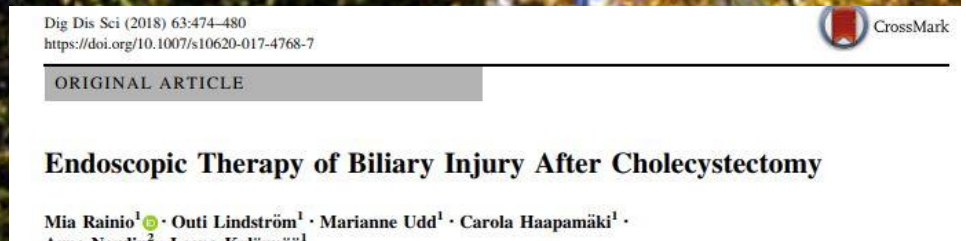
Treatment successful >90% vs 17-30%

Perera et al. Specialist Early and immediate repair of Post-laparoscopic Cholecystectomy Bile Duct Injuries is associated with an improved long-term outcome, Annals of surgery 2011

- Stricture 75% vs 18% (Early non-specialist vs Specialist)
- Recurrent cholangitis 50% vs 11%
- Morbidity 75% vs 21%

Biliary injury in HYKS (2004-2014) 102 patients

- Incidense 1.1%
- B,C ja D injuries 0.28%
- Specializing vs senior surgeo : 22% vs 78% (52% gi surgeon)
- 16 hospitals / 60 surgeons
- 1 case / surgeon (1-7)



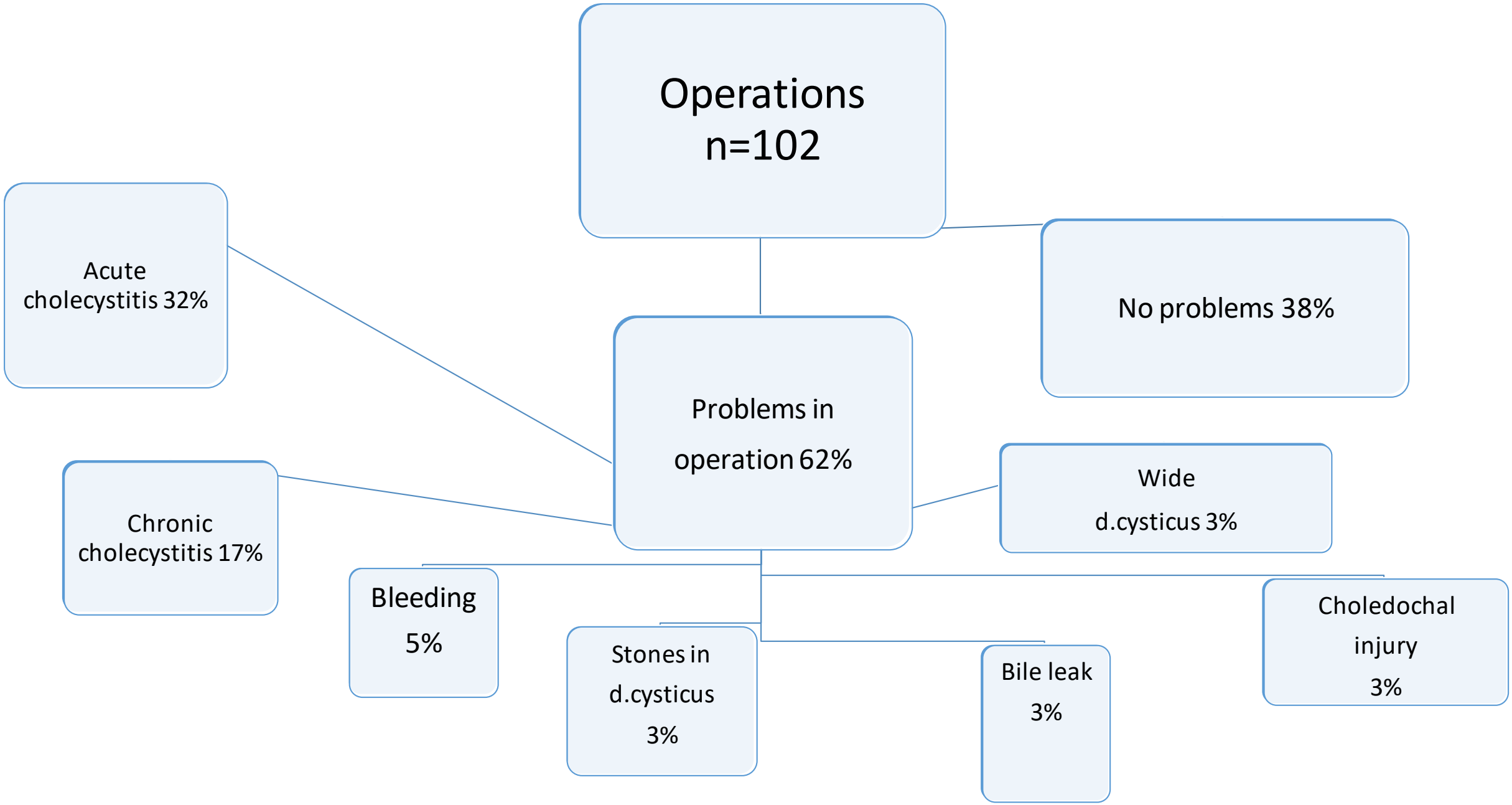
Dig Dis Sci (2018) 63:474–480
https://doi.org/10.1007/s10620-017-4768-7

CrossMark

ORIGINAL ARTICLE

Endoscopic Therapy of Biliary Injury After Cholecystectomy

Mia Rainio[1] · Outi Lindström[1] · Marianne Udd[1] · Carola Haapamäki[1] ·


Operations
n=102
No problems 38%
Problems in
operation 62%
Acute
cholecystitis 32%
Chronic
cholecystitis 17%
Wide
d.cysticus 3%
Bleeding
5%
Stones in
d.cysticus
3%
Bile leak
3%
Choledochal
injury
3%

Drain – time delay to ERCP

- 47% got drain in primary operation
- Time delay from operation to ERCP
  - Median 7 days
  - Median 4 days if drain in the operation

Biliary injury finding in ERCP

- Leak in d. cysticus or Luschkan 59% + 21%
- Leak in choledochus / hepaticus communis 17%
- Biliary stricture 14%
- Choledochus totally cut 4%

- Bile duct stone 17%

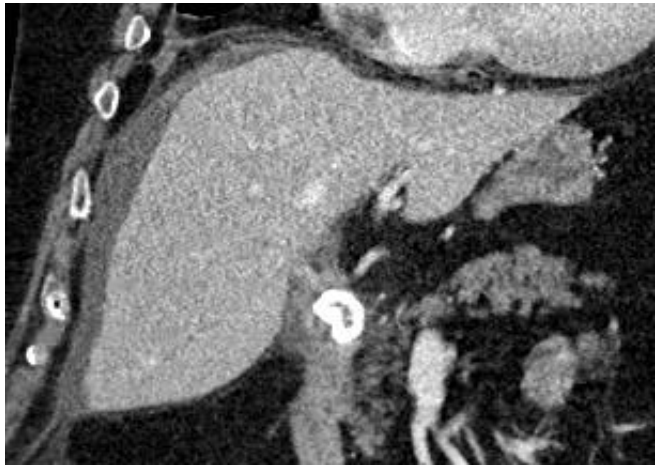
Treatment

- 100% succeeded if endoscopic treatment initiated
- 7 ERCPs remained diagnostic
- ERC treatment
  - Sphincterotomy 56%
  - Sphincterotomy and stenting 37%
- 5 patients had hepaticojejunostomy

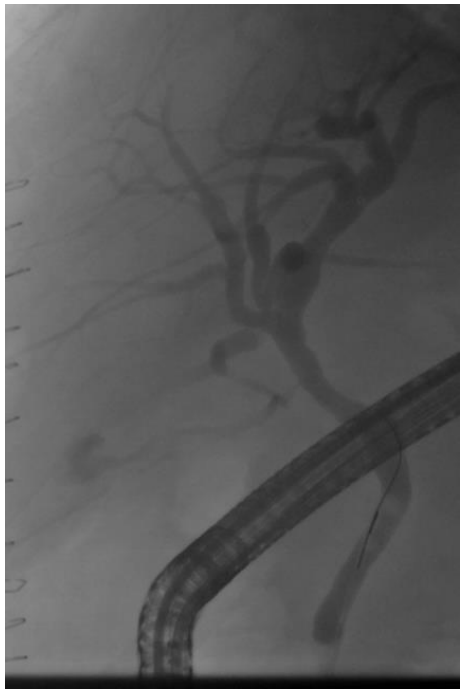
- In Amsterdam A leaks: sphincterotomy vs sphincterotomy and stenting

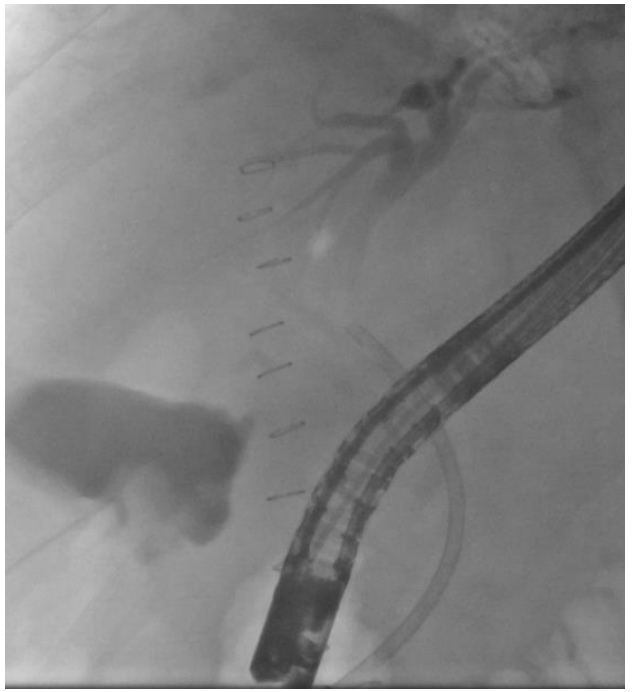
- equally good results

Interesting Case



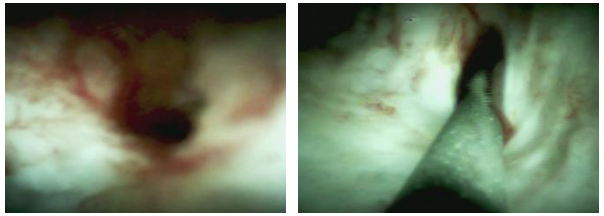
- Open cholecystectomy 1.10.2017
  - Perforated gallbladder and biliary peritonitis
  - Drain placed
- Bile leak to the drain, abdominal pain
- 6.10.2017 ERC, sphincterotomy and stent





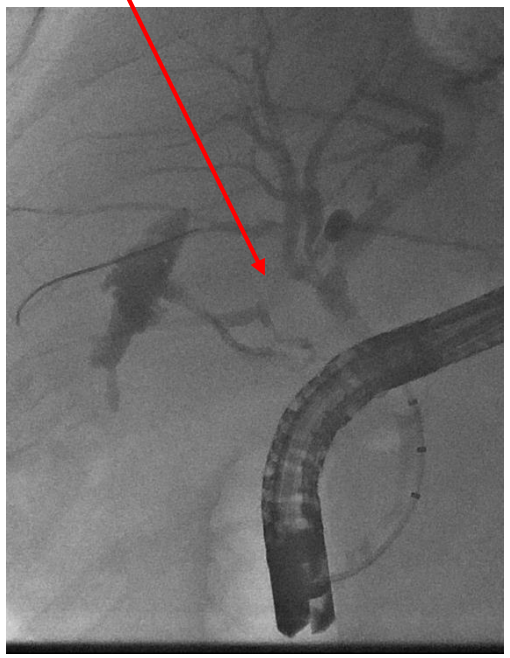
Interesting Case

- Bile leak continues
- 20.10.2017 ERC, cholangioscopy

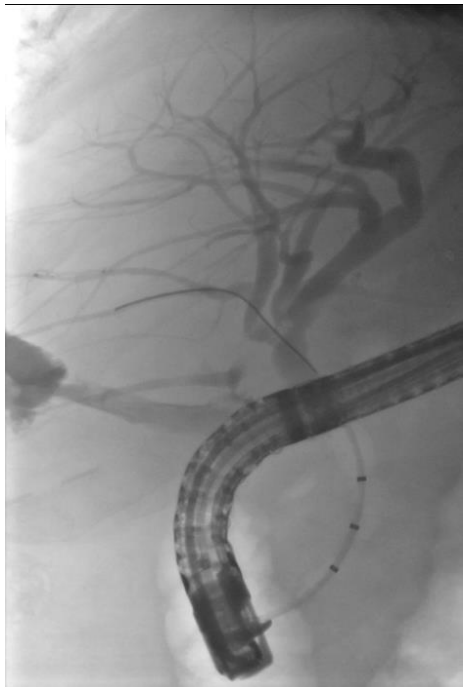


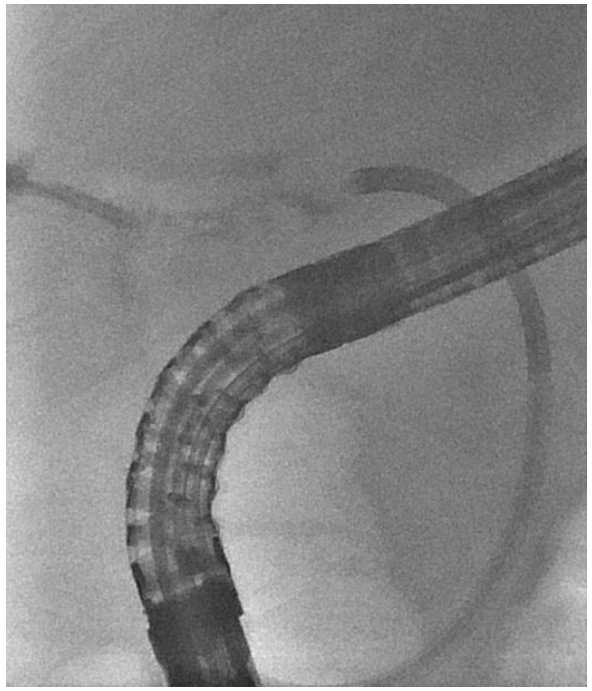
6.10.2017 ERCP

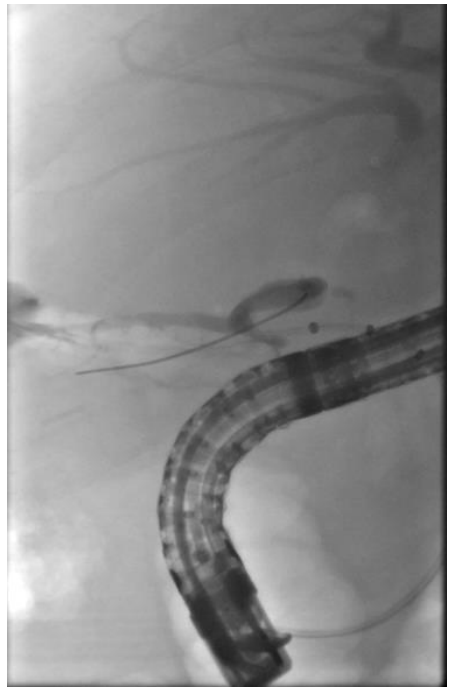
Gap, segment 5-7 ?



Wire does not enter







Leak stops

Interesting Case

- Follow-up ERCP 1/2018, 4/2018, 8/2018 and 11/2018

Big branches,
not going to atrophy easily

Dilatation until 6mm
– 2-wire catheter – 2 wires

2 stents 7fr (12 and 15 cm)
exchange every 3 months

No leak 26.11.2018
Liver enzymes normal

Liver transplantation, anastomotic stricture and leakage

- Many times strange curve in extrahepatic duct

Kaffes
3-4 cm
8/10 mm wide

Liver transplantation, Patient case

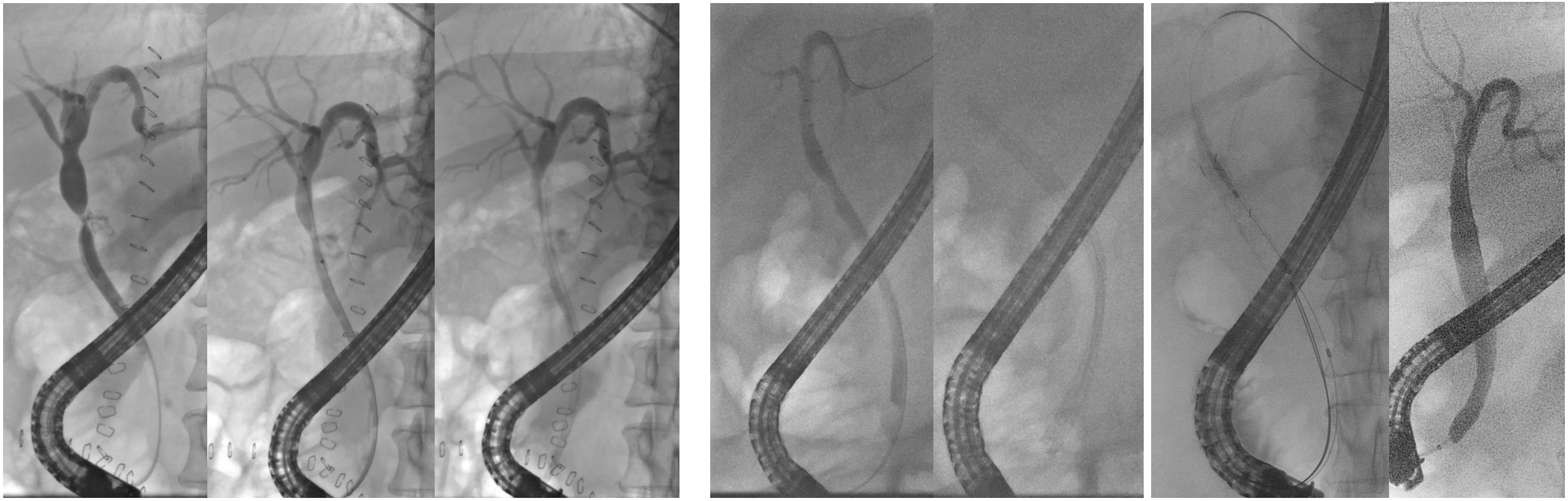
- Liver transplantation, liver enzymes high after 2 weeks

Stricture and small leak

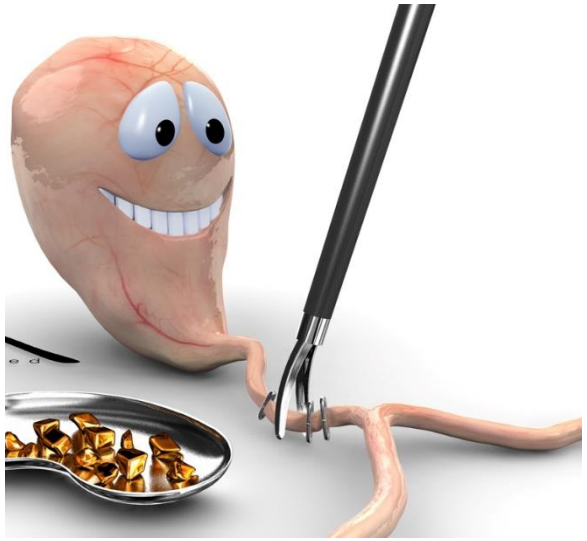
Dilatation and plastic stent

3 months later 2 plastic stents

3 months later
Kaffes 8mm for 6 months



Take Home message:



- Operate systematically
- Conversion if there is any doupt of the anatomy
- Place a drain if you think about it
- Contact liver surgeon early if there is damage
- Most of the injuries can be treated endoscopically
- GI-surgeons, liver surgeons, endoscopists and radiologists should work closely together

Lähteet:

- Baillie J (2013) Endoscopic approach to the patient with bile duct injury. Gastrointest Endosc Clin N Am 23:461-472, DOI:10.1016/j.giec.2013.01.002 [doi]
- Barkun AN, Rezieg M, Mehta SN, Pavone E, Landry S, Barkun JS, Fried GM, Bret P, Cohen A (1997) Postcholecystectomy biliary leaks in the laparoscopic era: risk factors, presentation, and management. Gastrointest Endosc 45:277-282, DOI:http://dx.doi.org/10.1016/S0016-5107(97)70270-0
- Bergman JJ, van den Brink GR, Rauws EA, de Wit L, Obertop H, Huibregtse K, Tytgat GN, Gouma DJ (1996) Treatment of bile duct lesions after laparoscopic cholecystectomy. Gut 38:141-147, DOI:10.1136/gut.38.1.141
- Daly SC, Deziel DJ, Li X, Thaqi M, Millikan KW, Myers JA, Bonomo S, Luu MB (2016) Current practices in biliary surgery: Do we practice what we teach?Surg Endosc 30:3345-3350, DOI:10.1007/s00464-015-4609-8 [doi]
- Dominguez-Rosado I, Sanford DE, Liu J, Hawkins WG, Mercado MA (2016) Timing of Surgical Repair After Bile Duct Injury Impacts Postoperative Complications but Not Anastomotic Patency. Ann Surg 264:544-553, DOI:10.1097/SLA.0000000000001868 [doi]
- Donatelli G, Vergeau BM, Derhy S, Dumont JL, Tuszynski T, Dhumane P, Meduri B (2014) Combined endoscopic and radiologic approach for complex bile duct injuries (with video). Gastrointest Endosc 79:855-864, DOI:10.1016/j.gie.2013.12.034 [doi]
- Dumonceau JM, Tringali A, Blero D, Deviere J, Laugiers R, Heresbach D, Costamagna G, European Society of Gastrointestinal Endoscopy (2012) Biliary stenting: indications, choice of stents and results: European Society of Gastrointestinal Endoscopy (ESGE) clinical guideline. Endoscopy 44:277-298, DOI:10.1055/s-0031-1291633 [doi]
- Fiocca F, Salvatori FM, Fanelli F, Bruni A, Ceci V, Corona M, Donatelli G (2011) Complete transection of the main bile duct: minimally invasive treatment with an endoscopic-radiologic rendezvous. Gastrointest Endosc 74:1393-1398, DOI:10.1016/j.gie.2011.07.045 [doi]
- Fischer CP, Fahy BN, Aloia TA, Bass BL, Gaber AO, Ghobrial RM (2009) Timing of referral impacts surgical outcomes in patients undergoing repair of bile duct injuries. HPB (Oxford) 11:32-37, DOI:10.1111/j.1477-2574.2008.00002.x [doi]
- Kaffes AJ, Hourigan L, De Luca N, Byth K, Williams SJ, Bourke MJ (2005) Impact of endoscopic intervention in 100 patients with suspected postcholecystectomy bile leak. Gastrointest Endosc 61:269-275, DOI:http://dx.doi.org/10.1016/S0016-5107(04)02468-X
- Lau WY, Lai EC, Lau SH (2010) Management of bile duct injury after laparoscopic cholecystectomy: a review. ANZ J Surg 80:75-81, DOI:10.1111/j.1445-2197.2009.05205.x [doi]
- Nordin A, Grönroos JM, Mäkisalo H (2011) Treatment of Biliary Complications after Laparoscopic Cholecystectomy. Scandinavian Journal of Surgery 100:42-48, DOI:10.1177/145749691110000108
- Perera MT, Silva MA, Hegab B, Muralidharan V, Bramhall SR, Mayer AD, Buckels JA, Mirza DF (2011) Specialist early and immediate repair of post-laparoscopic cholecystectomy bile duct injuries is associated with an improved long-term outcome. Ann Surg 253:553-560, DOI:10.1097/SLA.0b013e318208fad3 [doi]
- Rauws EAJ, Gouma DJ (2004) Endoscopic and surgical management of bile duct injury after laparoscopic cholecystectomy. Best Practice & Research Clinical Gastroenterology 18:829-846, DOI:http://dx.doi.org/10.1016/j.bpg.2004.05.003
- Siiki A, Rinta-Kiikka I, Sand J, Laukkarinen J (2015) Biodegradable biliary stent in the endoscopic treatment of cystic duct leak after cholecystectomy: the first case report and review of literature. J Laparoendosc Adv Surg Tech A 25:419-422, DOI:10.1089/lap.2015.0068 [doi]
- Stewart L (2014) Iatrogenic biliary injuries: identification, classification, and management. Surg Clin North Am 94:297-310, DOI:http://dx.doi.org/10.1016/j.suc.2014.01.008
- Strasberg SM, Brunt LM (2010) Rationale and use of the critical view of safety in laparoscopic cholecystectomy. J Am Coll Surg 211:132-138, DOI:10.1016/j.jamcollsurg.2010.02.053 [doi]
- Tornqvist B, Stromberg C, Persson G, Nilsson M (2012) Effect of intended intraoperative cholangiography and early detection of bile duct injury on survival after cholecystectomy: population based cohort study. BMJ 345:e6457, DOI:10.1136/bmj.e6457 [doi]
- Truant S, Boleslawski E, Lebuffe G, Sergent G, Pruvot FR (2010) Hepatic resection for post-cholecystectomy bile duct injuries: a literature review. HPB (Oxford) 12:334-341, DOI:10.1111/j.1477-2574.2010.00172.x [doi]