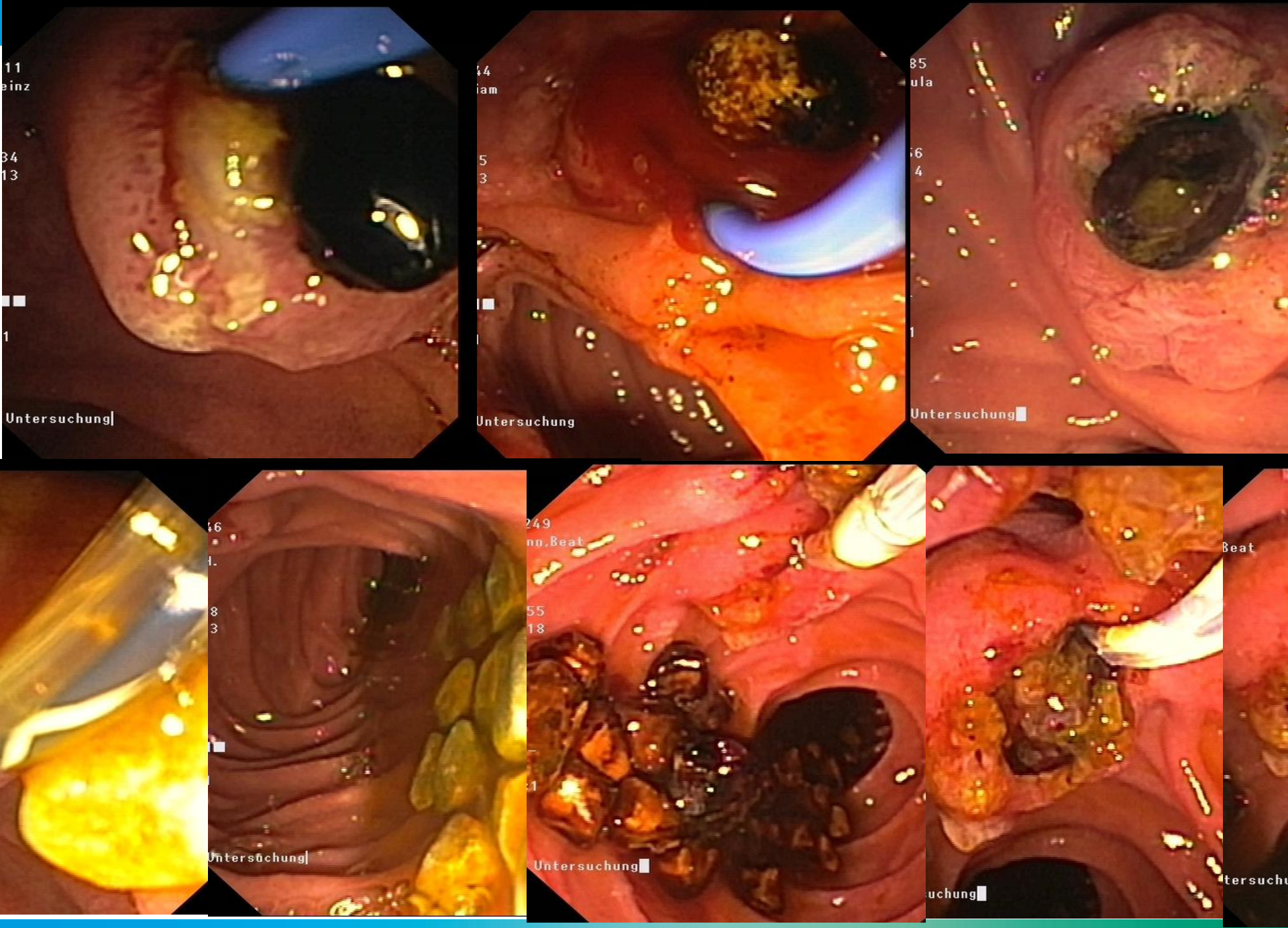
Untersuchung
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Untersuchung

INSELSPITAL
UNIVERSITÄTSSPITAL BERN
HOPITAL UNIVERSITAIRE DE BERNE
BERN UNIVERSITY HOSPITAL

Bauchzentrum
BERN

ERC-Steinbehandlung:

Cholangioskopie mit Lithotrypsie

Sylvia Müller, Reiner Wiest

What the patient wants….

Goal –	Aim in Treatment
Safe	no complications, side-effects
Comfort	short hospitalization
Low cost	economic burden low
Effective	successful treatment «at once»
Durable	no recurrence
	Longterm success
	……..
	No development of malignancy

Muss wirklich jeder Stein im Gallengang via ERCP entfernt werden ?

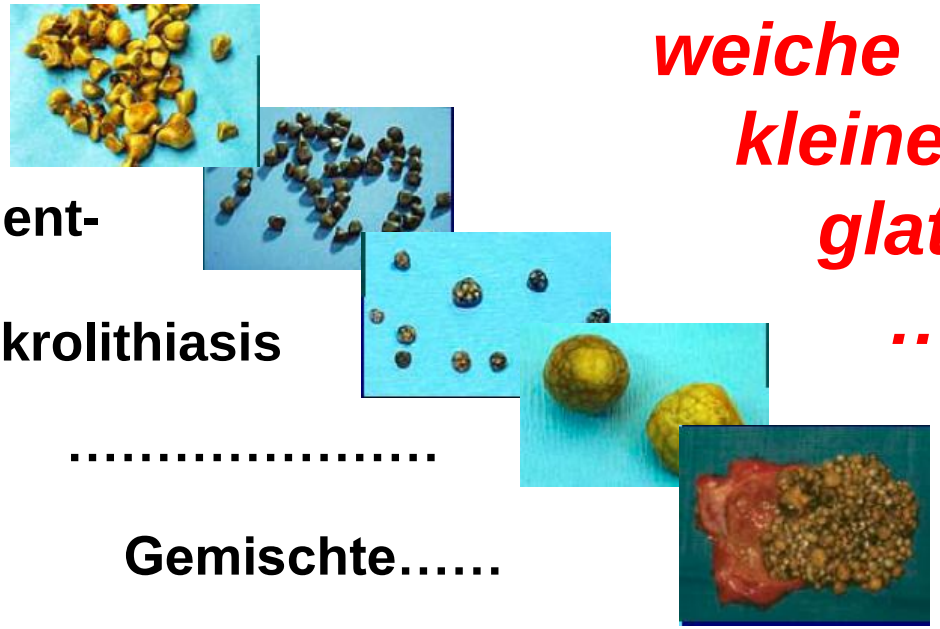
Cholesterin-

Bilirubin/Pigment-

Mikrolithiasis

……

Gemischte……



weiche
kleine
glatte
…….

Natural course of choledocholithiasis- Can one leave stones …….. Treatment ?

Gallriks study

3969 patients with CBDSs on IOC; 594 stones left in place

25% developed complications (inert 30 days)

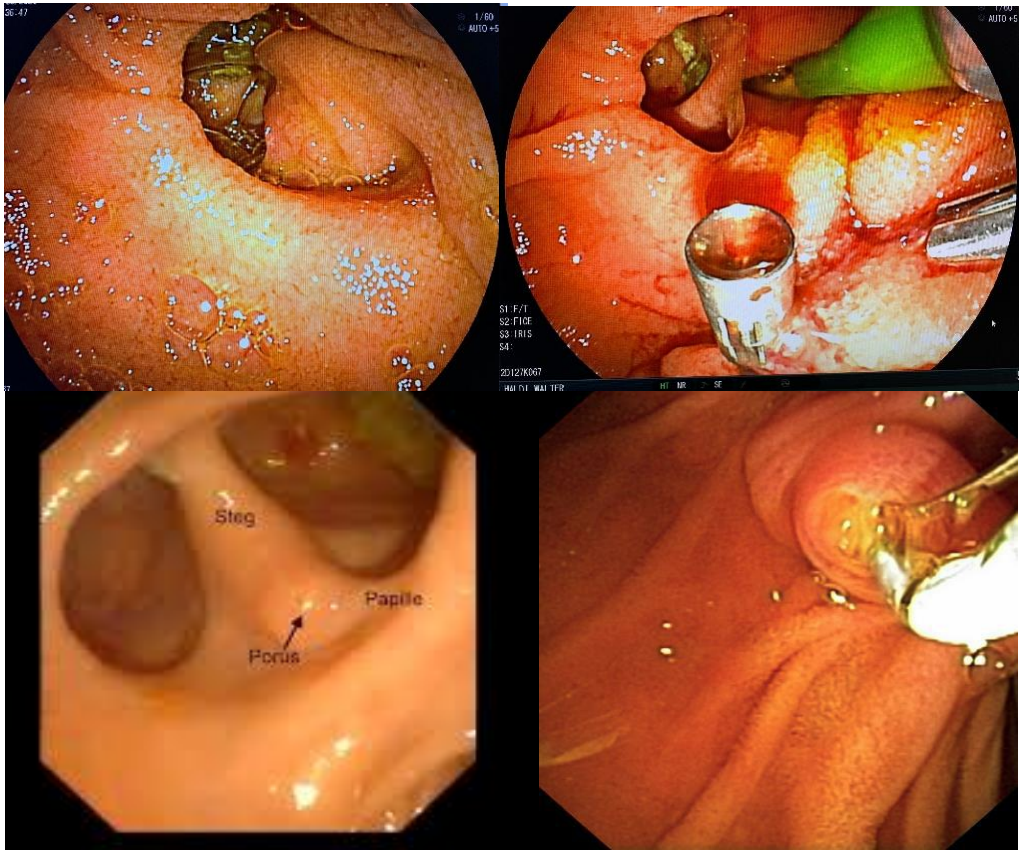
ESGE and ASGE recommends stone extraction to all patients with common bile duct stones, symptomatic or not

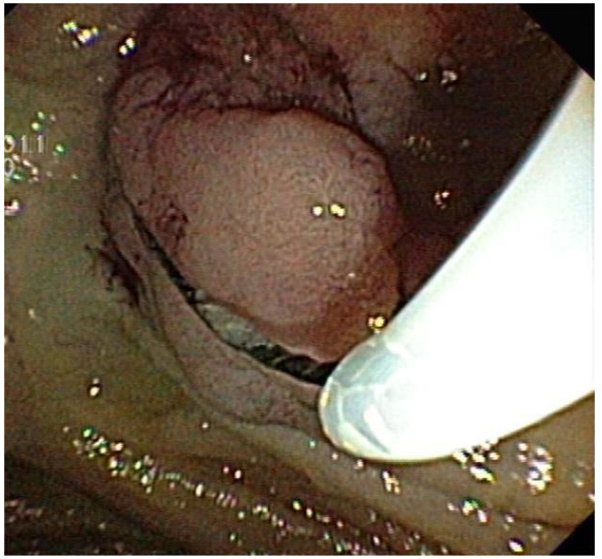
Likelihood increases with stone size but even 4 mm or less: 5.9% vs. 8.9% OR 0.52 (0.34-0.79)

Moller et al. JAMA Surg 2014

Bile duct access- First Step

Some approach does carry higher risks than others….

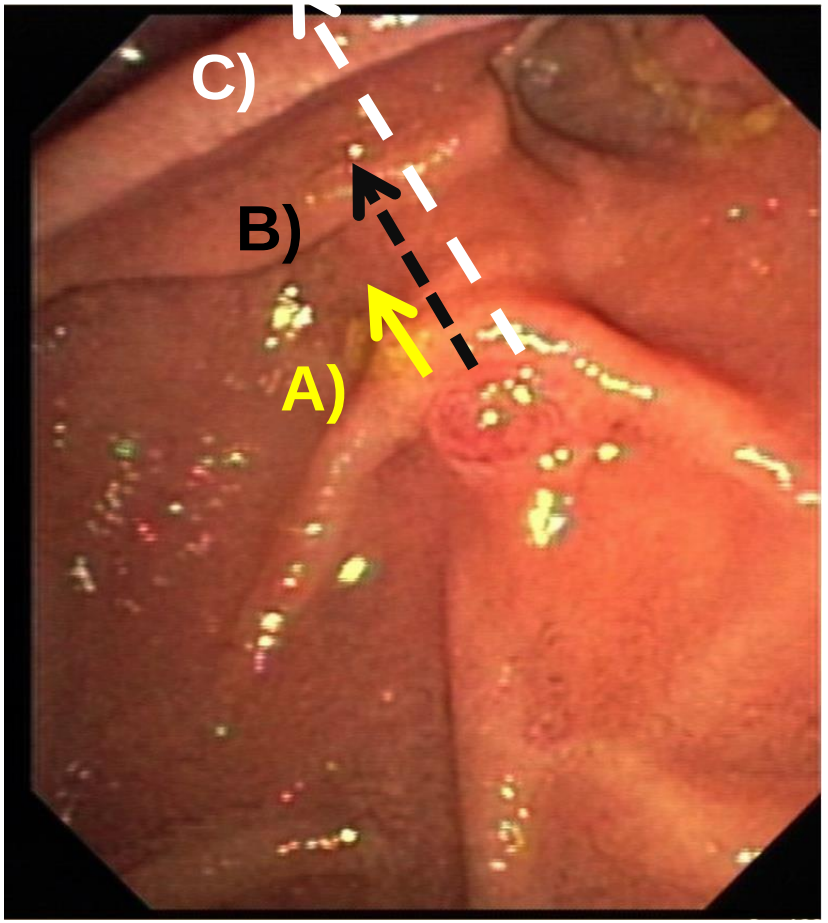




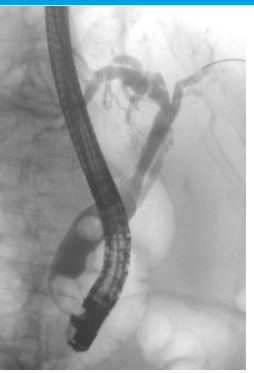
Sphincterotomy: you like a bit more ?

small or mid-sized
(1/3 to ½ distance to roof)
rather than large one

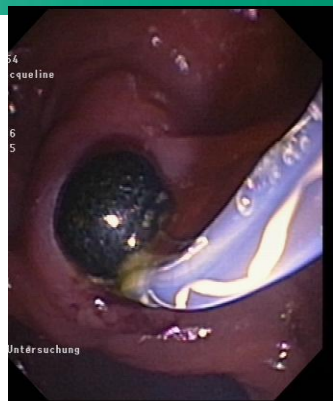
which independently
Associates with increase in AE
OR 3.4 (1.8-6.6)
Particularly bleeding
OR 6.2 (2.4-16.3)



SAFETY FIRST



Was definiert einen «schwierigen» Was einen «easy» Stein ?



Steine < 10 mm und nicht impaktiert

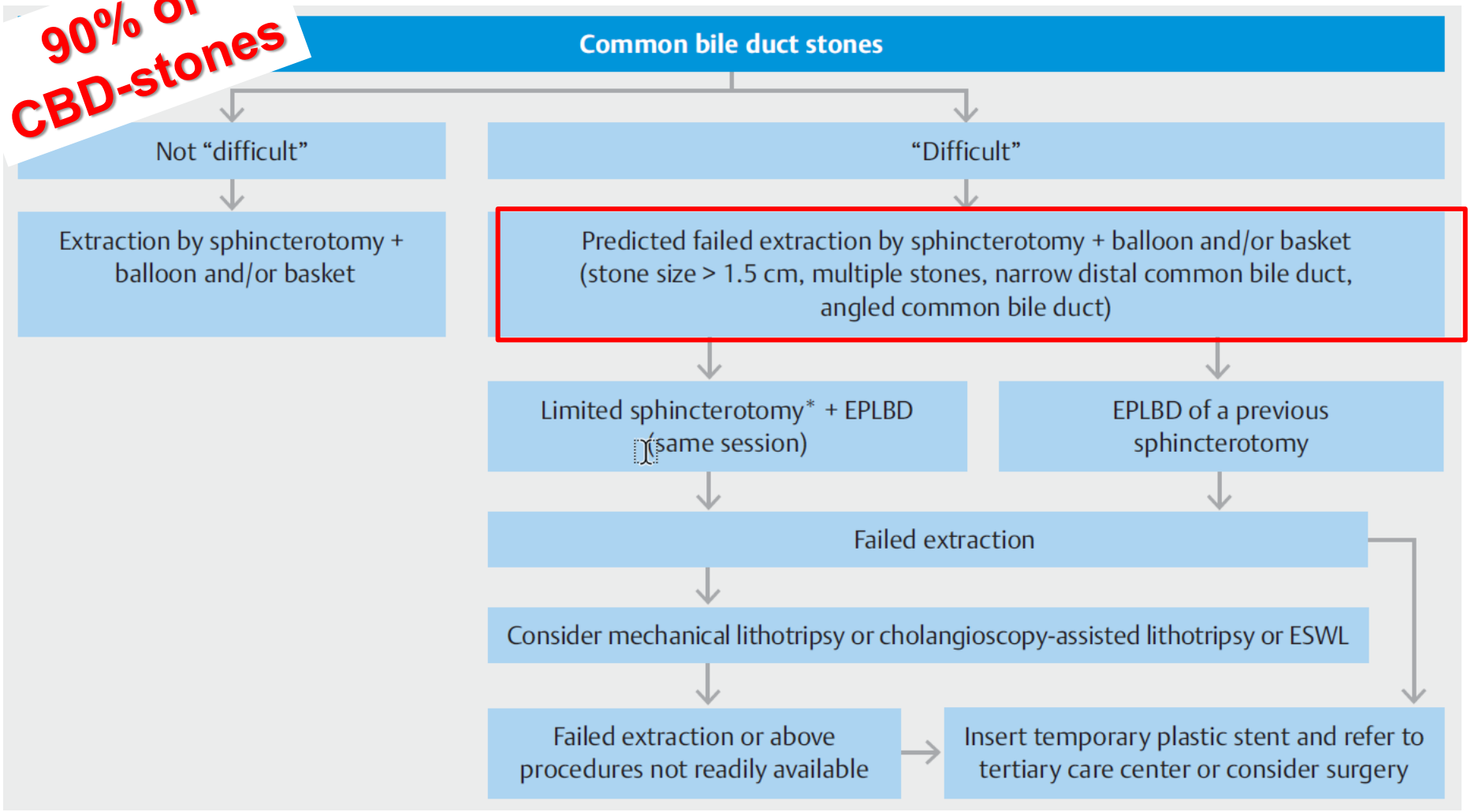
sind nicht schwierig = «easy»

Steine < 6-8 mm benoetigen i.R. kein Koerbchen

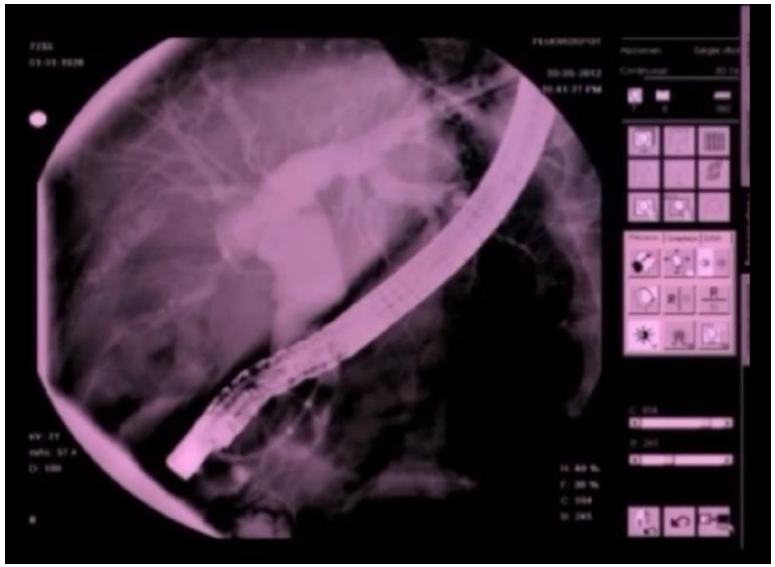
Nach Sphinkterotomie

Extraktions-balloon in Grösse des DHC

90% of CBD-stones



Endoscopic papillary large *Balloon-Dilatation (EBD)*



RECOMMENDATION

ESGE recommends that an adequate exit for the stones that are to be removed should be provided according to the papilla and common bile duct anatomy and the stone size.

Strong recommendation, low quality evidence.

Niedrige Hemmschwelle (persönl.Anmerkung)

Balloongrösse < DHC-diameter
Mit Sphinkterotomie (ausser KI)
Mind. 30 (-60) Sekunden Dauer
sonst erhöhtes Komplikationsrisiko

System. Review (30 Studien)
Sphinkterotomie mit vs. ohne EBD
Geringer AE-, Komplikationsrate
8.3% vs 12.7%, OR 1.6, p<0.001

Reduziert Bedarf an Lithotrypsie um 30-50%, p<0.001

Give stone (extraction balloon) splace/place to work

Kim et al. WJG 2013; Karsenti Endoscopy 2017; ESGE-guidelines 2019

ORIGINAL ARTICLE: Clinical Endoscopy

Covered self-expanding metal stents for the management of common bile duct stones

Karen Hartery, MD,[1] Chung Sen Lee, MD,[1] Glen A. Doherty, MD,[1] Frank E. Murray, MD,[2] Garret Cullen, MD,[1] Stephen E. Patchett, MD,[2] Hugh E. Mulcahy, MD[1]

Dublin, Ireland

44 patients received covered SEMSs (10mm, length 60mm)

After a median in-stent duration of 8 weeks

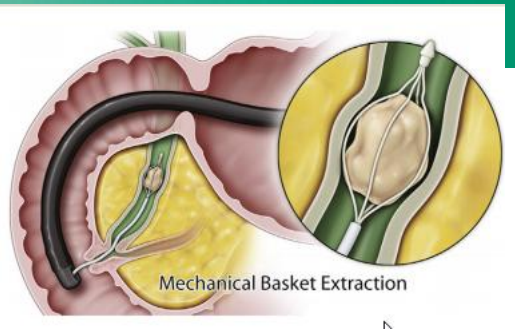
36/42 stents (82%) removed with successful duct clearance

By simple balloon-extraction-maneuver (no lithotripsy)

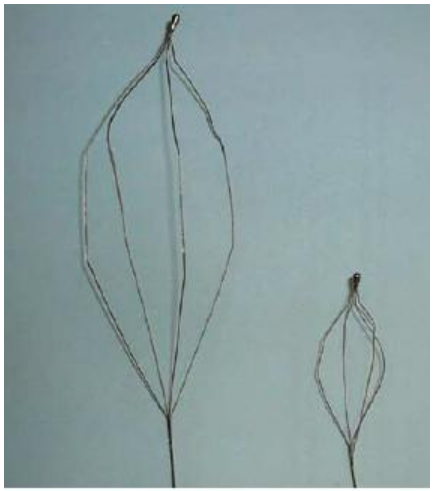
10/44 (23%) stent migration (without clinical consequence)

Prefer stenting and sequential approach (in absence of cholangioscopy) – easing stone extraction due to fragmentation by stents

Mechanical Lithotrypsy: when and how ?



40x32mm stone



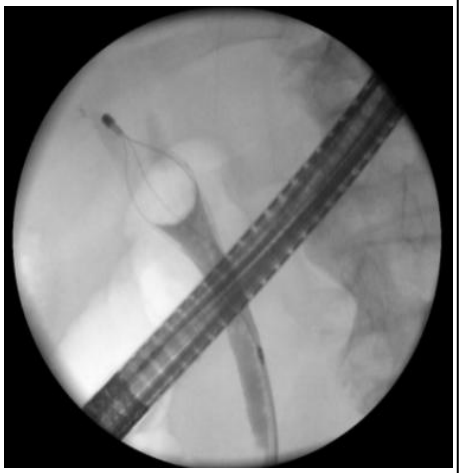
60 mm gastric bezoar basket

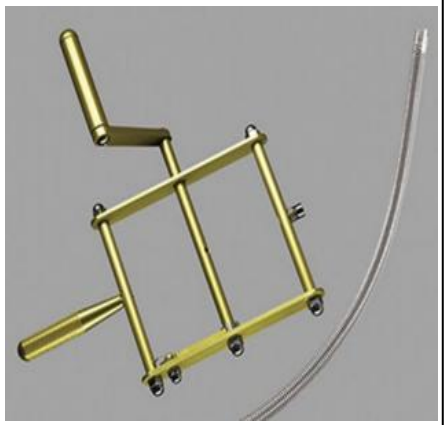
No Cholangioscope available, hence basket-approach

To do or Not to Do ?

Yung et al. WJG 2012

Entrapped basket: what now ? emergency lithotrypsy or …..rescue





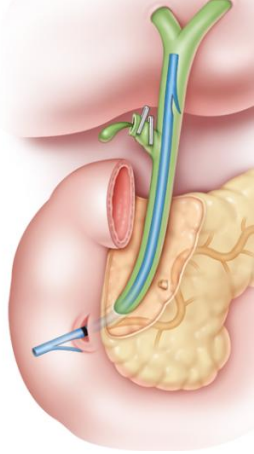
Stubborn stones: breakages of a mechanical lithotripter by an exceptionally hard gallstone

Natalie Allen,[1] Stephen Pettit,[2] Abid Ali[2]

BMJ Case Rep. 2014

Laparotomy for surgical removal

Notfall-Lithotrypsie – Wie geht das ?



Mechanical Lithotrypsy: predictors of failure and alternative……

- **Stone size: > 25 mm (> CBD)**
- **Impactation/ wall adherent**
- **Unusual hardness, shape**
- **Anatomy: stricture**

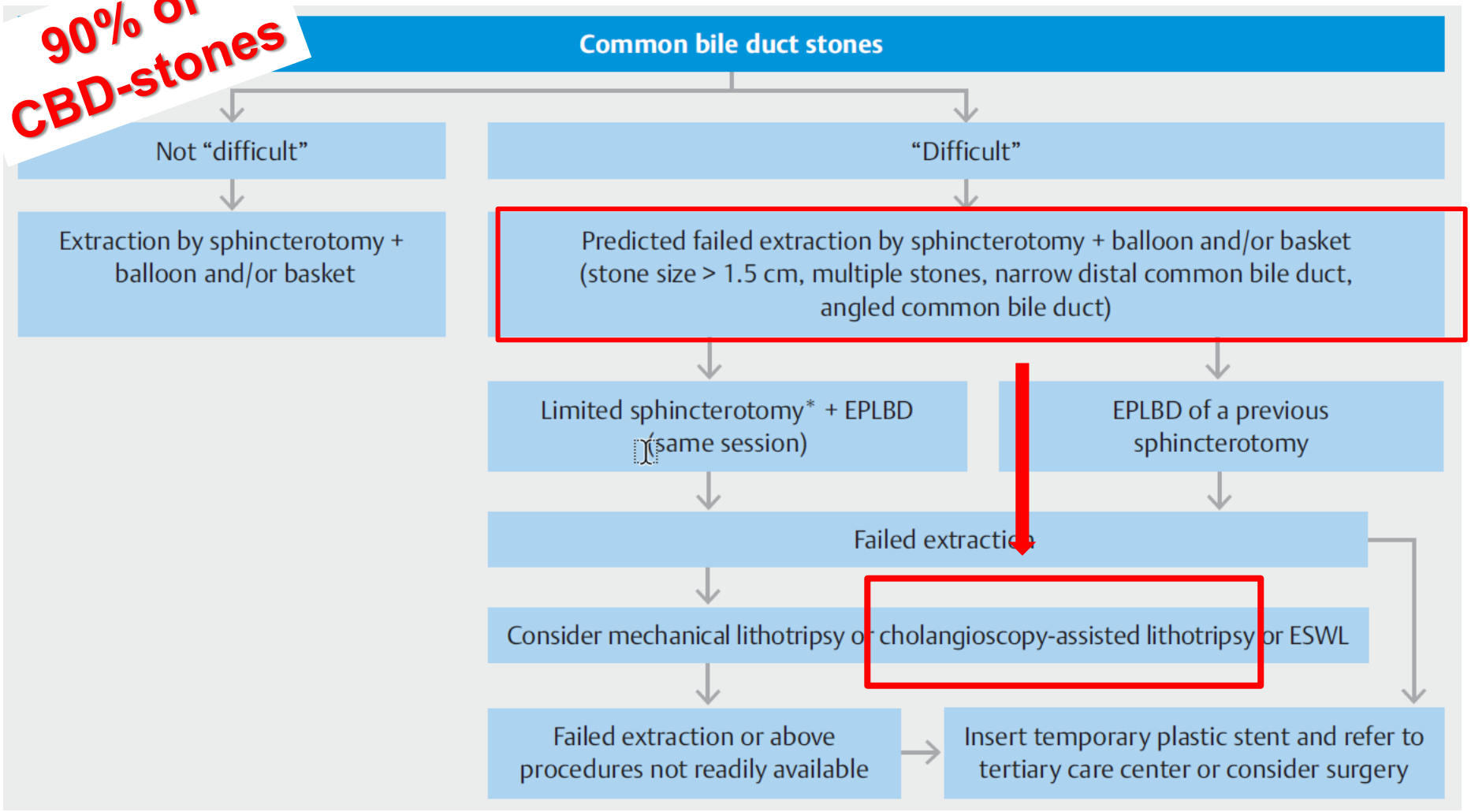
Biliary endoprothesis does impact on size of large difficult stones

- **Majority (40-80%) of large stones are fragmented by stenting easing stone clearance during second ERCP**

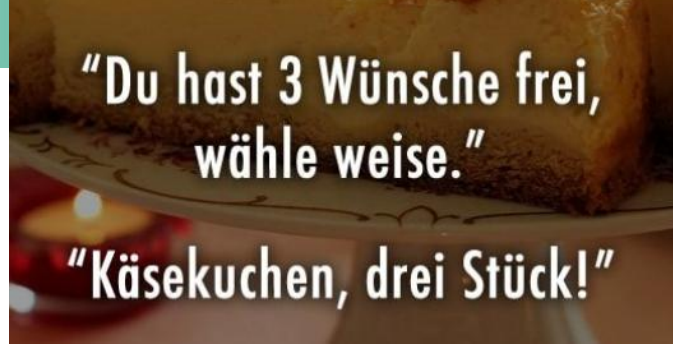
- Retrospective data: double plastic stenting (maybe) superior to single stenting in maintaining stent patency rate
  but: similar rate of fragmentation

Garg et al. GIE 2004 Katsinelos P Surg Endos 2003. Ye Turk J Gastro 2016

90% of CBD-stones

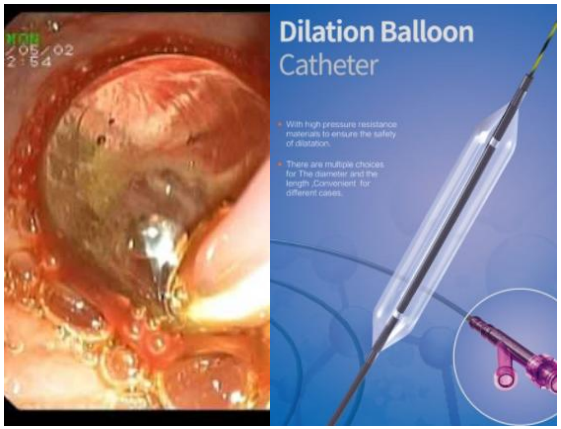


Material, devices to be used for difficult stones…….



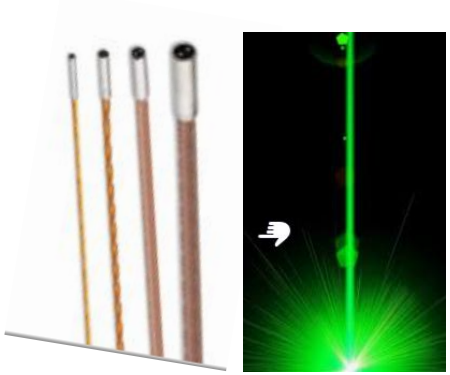
Make your wish – 3 wishes free……. To success

Exit (open)



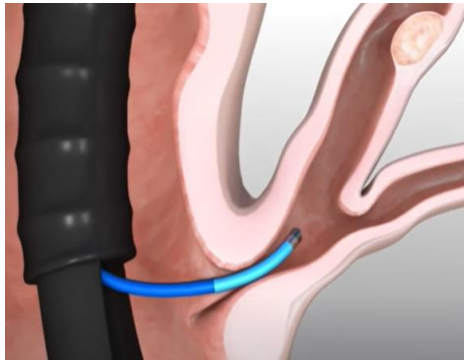
Vision/control

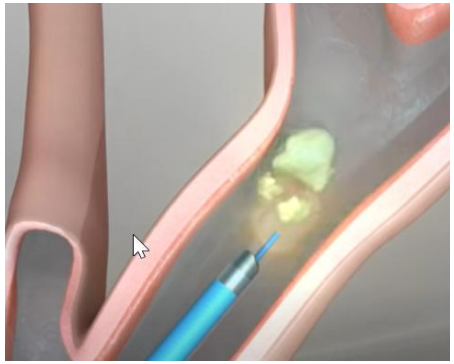
Burst/Lithotryp.



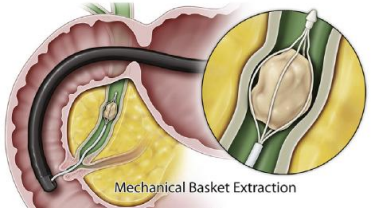
EHL Laser

Handling difficult stones
Advantage and use of Cholangioscopy

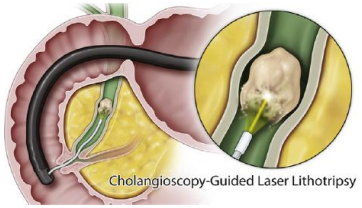




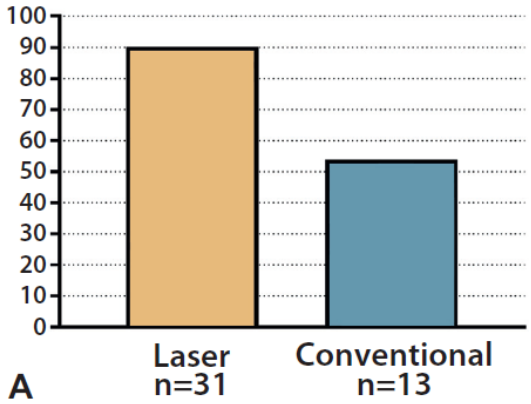
- **10.5 Fr sheat**
- **4 way manouverability**
- **Magnification X4**
- **Aqua-irrigation**
- **High-resolution optic**
- **working channel 1.2 mm**



Cholangioscopy-assisted lithotrypsy



	Conventional-Basket n=18	Cholangioscopy - (laser) n=42
Mean stone diameter (mm)	19 + 9	18 + 6
Total stone volume (cm 3)	3.2 (0.9+5.3)	3.4 (1.7-6.5)
Multiple stones	12 (66.7%)	25 (59.3%)

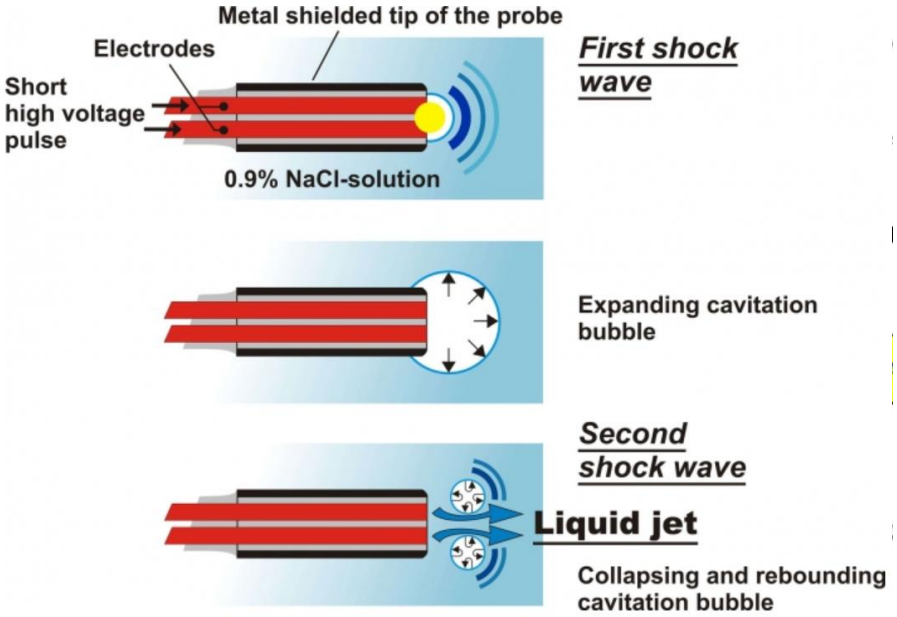


stones > 10 mm
greater clearance by cholangioscopy than conventional (basket) treatment

Buxbaum J et al. GIE 2018

Cholangioscopy-assisted Lithotrypsy

Electro-hydraulic (EHL) probe– technique



Laser method- types-sonde

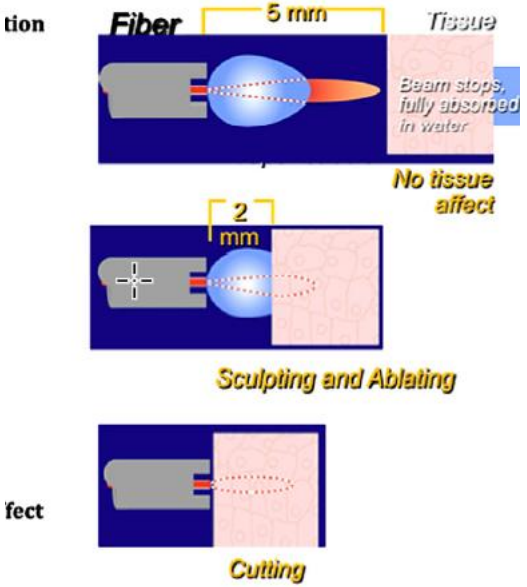
Pulsed laser causes instantanous fluid evaporation

This induces formation of Cavitation bubble

Collapse of bubble leads To shock wave

Photomechanical effect

Bigger the bubble stronger the mechanical effect



Handling difficult stones
Cholangioscopic - Lithotrypsy

Majority > 15 mm, multiple > 3 stones
40% impacted stones

407 cases in 22 centres utilizing Spy-DS-device

	EHL	Laser	P-value
Technical success (complete stone clearance)	**96.7%**	**99%**	n.s.
Single session achieved	**74.5%**	**86.1%**	n.s.

EHL and Laser-Lithotrypsy equally effective use by preference, availability, expertise

Brewer-Gutierrez O. CGH 2018

Handling difficult stones
Cholangioscopic - Lithotrypsy

Majority > 15 mm, multiple > 3 stones
40% impacted stones

- **85% fragments removed by extraction balloon**
- **Stent placement: each group 30% (> 85% plastic)**
- **Failure-rate: overall only 11 (2.7%)**

- **Adverse events: 15 (3.7%)**

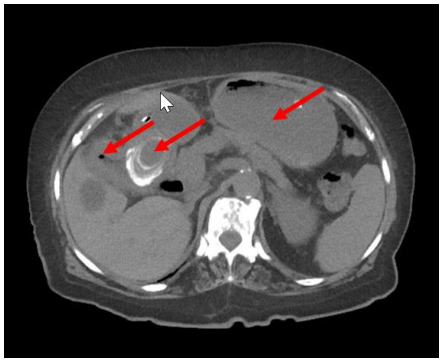
mainly cholangitis, 1 CBD perforation (SEMS-treated)
all conservative, no mortality (90 day FU)

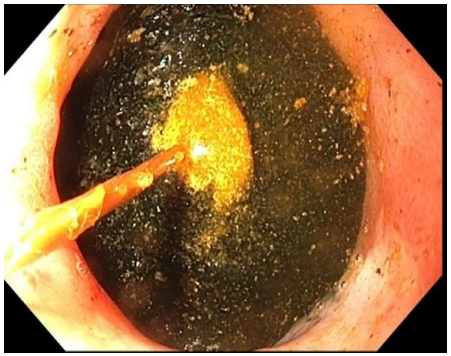
Brewer-Gutierrez O. CGH 2018

Cholangioscopic - Lithotrypsy

What if the stone does not break ?

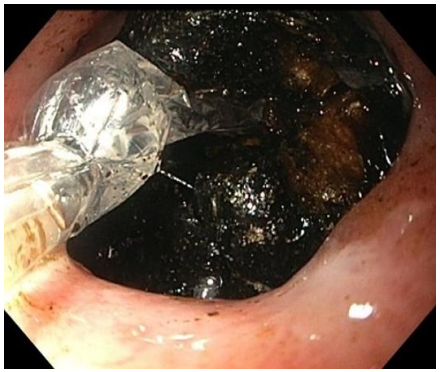
Bouveret-Syndrome and «Drill and Blast»-Methode



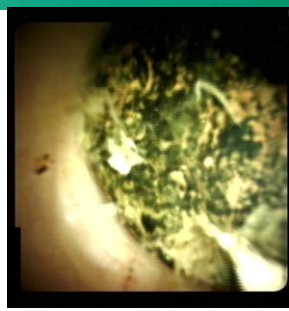


«Rigler-Triad»
ectopic gallstone
Aerobilia,
gastric retention

Kukiolka et al. Z.Gastro 2020



Cholangioscopy-assisted lithotrypsy



Clear add-on value =

low threshold if available due to

- **enabling visualized targeted lithotrypsy (EHL or laser)**
- **end control for stone clearance**

large CBD: contrast unreliable for definite clearance

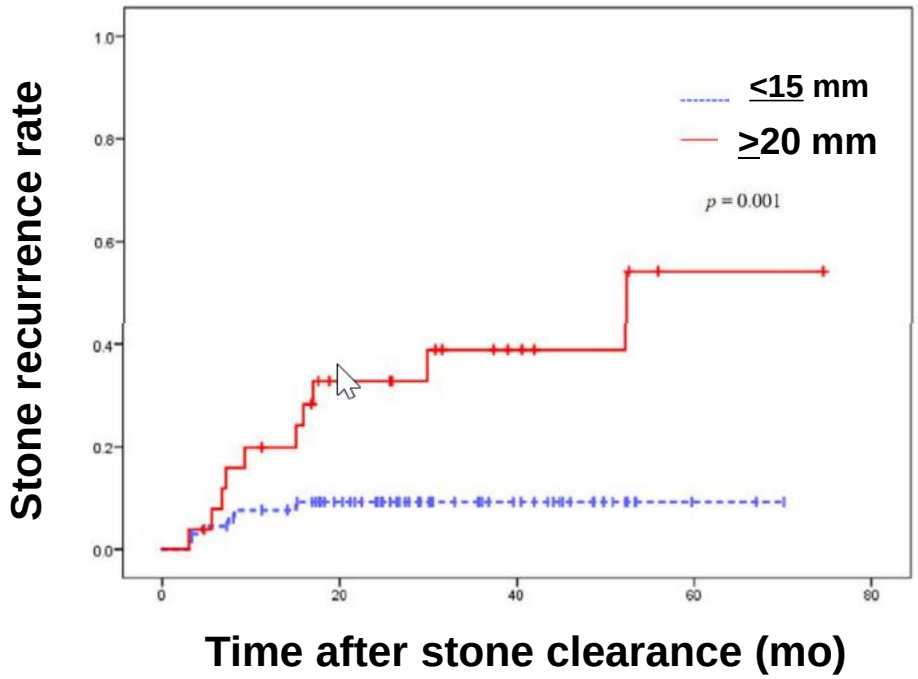
- **reduces radiation exposure**
- **eases ERC in pregnant women (without radiation)**

Cholangioscopy-guided lithotrypsy is very efficient a safe procedure – treating difficult bile stones

Tsapaki et al. PhysMed. 2019 Brewer O Endoscop Int Open 2021

Stone-Recurrence: When to call the surgeon?

Discuss biliodig. anastomosis ?



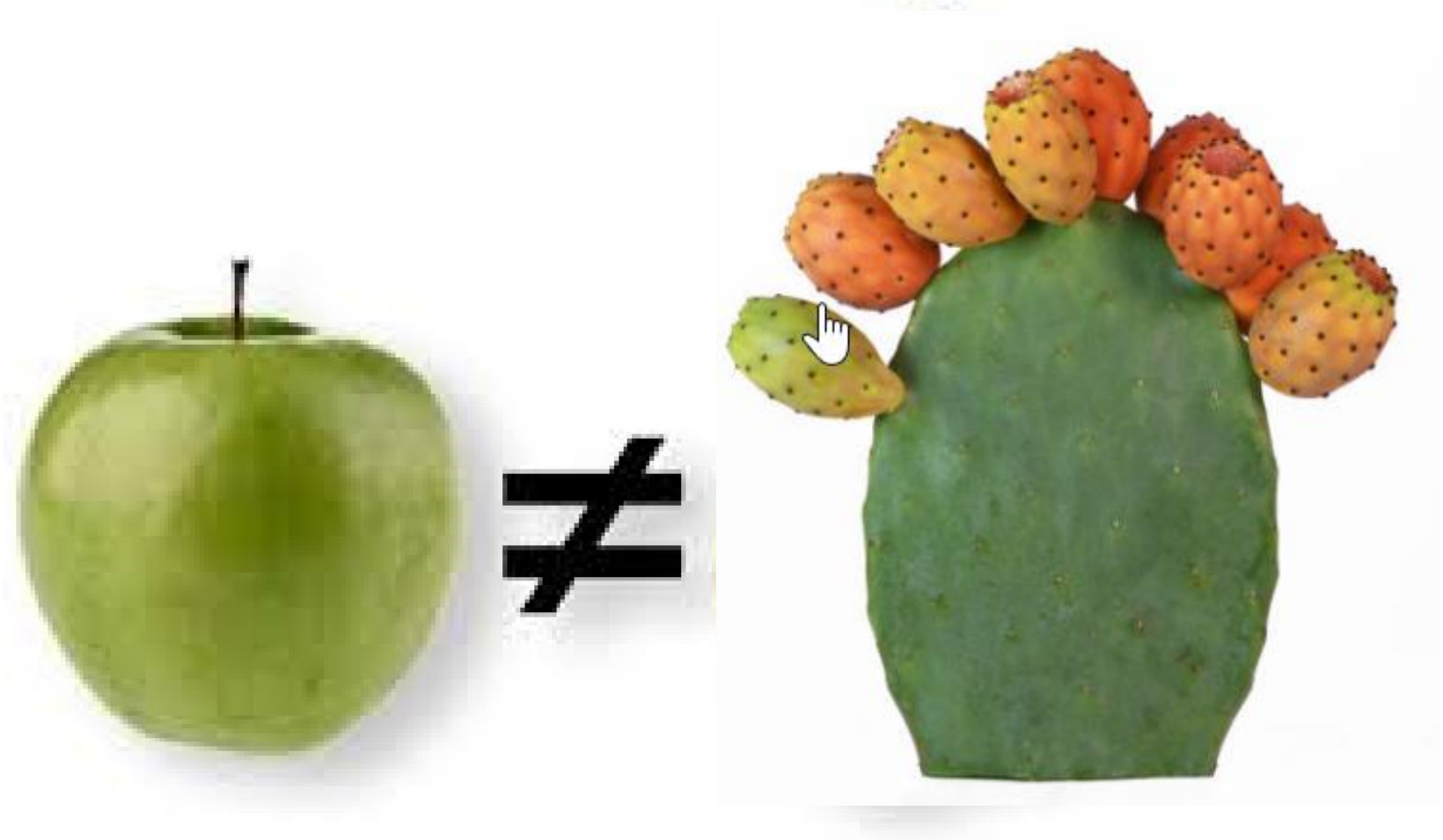
Murabayashi Intern Med 2019

Risk factor for recurrence:
CBD diameter > 20 mm

Restoration of CBD-diameter=
Shrinkage within 2 weeks by at least 3 mm
71% diagnostic accuracy
Lack of recurrent stones

Irreversible CBD-dilation
>20mm
with repeated recurrent stones (e.g. within 1 year)

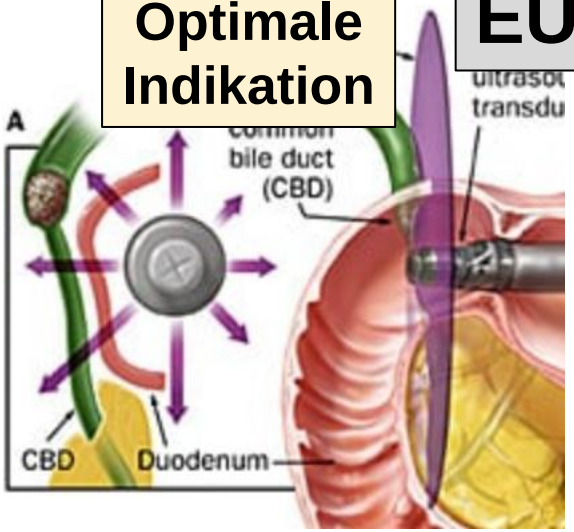
Choledocho- Hepaticolithiasis



Zusammenfassung – Take-Home-Messages – www.erc

Optimale Indikation

EUS



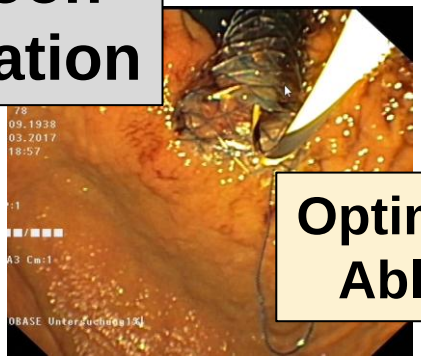
Expertise/ Training-Fallzahl

i10T2

Optimales/Instrumentarium

SAFETY
KOMFORT
SERVICE

Balloon-Dilatation



Optimaler Ablauf

Cholangio-Skopie/EHL

Optimale Performance


TEAM WORK !