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Anna Tavakkoli, MD

All attendees will be muted and will remain in "Listen Only Mode"

Type your questions here so that the moderator can see them.
Not all questions will be answered but we will get to as many as possible.

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5

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Moderator: Colleen Webb, MS, RD
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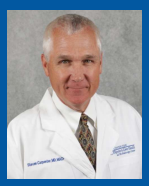

Week 37 – Thursday, September, 14, 2023
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Faculty: Steven L. Carpenter
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Disclosures

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Jennifer L. Maranki, MD, MSc

Dr. Maranki is a consultant for Boston Scientific Corp on pancreaticobiliary devices and other devises used in advanced endoscopy.

Anna Tavakkoli, MD

Dr. Tavakkoli has no relevant financial relationships with ineligible companies.

OFF LABEL USE: Dr. Maranki will discuss the use of fully covered self-expanding metal stents for treatment of benign biliary strictures and post-transplant strictures. SEMS are indicated only for use in the setting of malignancy. She may also discuss the role of EUS-guided biliary drainage and the use of metal stents for that indication, which would also be off-label.

**All of the relevant financial relationships listed for these individuals have been mitigated*

9

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ACG Guidelines on the Diagnosis and Management of Biliary Strictures

Jennifer Maranki, MD, MSc
Professor of Medicine
Penn State Health
Hershey, PA
August 31, 2023

10

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CME

ACG Clinical Guideline: Diagnosis and Management of Biliary Strictures

B. Joseph Elmunzer, MD, MSc[1], Jennifer L. Maranki, MD, MSc[2], Victoria Gómez, MD[3], Anna Tavakkoli, MD, MSc[4,5], Bryan G. Sauer, MD, MSc, FACG[6], Berkeley N. Limketkai, MD, PhD, FACG[7], Emily A. Brennan, MLIS[8], Elaine M. Attridge, MLS[9], Tara J. Brigham, MLIS, AHIP[10] and Andrew Y. Wang, MD[6]

A biliary stricture is an abnormal narrowing in the ductal drainage system of the liver that can result in clinically and physiologically relevant obstruction to the flow of bile. The most common and ominous etiology is malignancy, underscoring the importance of a high index of suspicion in the evaluation of this condition. The goals of care in patients with a biliary stricture are confirming or excluding malignancy (diagnosis) and reestablishing flow of bile to the duodenum (drainage); the approach to diagnosis and drainage varies according to anatomic location (extrahepatic vs perihilar). For extrahepatic strictures, endoscopic ultrasound-guided tissue acquisition is highly accurate and has become the diagnostic mainstay. In contrast, the diagnosis of perihilar strictures remains a challenge. Similarly, the drainage of extrahepatic strictures tends to be more straightforward and safer and less controversial than that of perihilar strictures. Recent evidence has provided some clarity in multiple important areas pertaining to biliary strictures, whereas several remaining controversies require additional research. The goal of this guideline is to provide practicing clinicians with the most evidence-based guidance on the approach to patients with extrahepatic and perihilar strictures, focusing on diagnosis and drainage.

KEYWORDS: biliary strictures; obstructive jaundice; extrahepatic strictures; perihiliar strictures; endoscopic ultrasound; guideline

Am J Gastroenterol 2023;118:405–426. https://doi.org/10.14309/ajg.0000000000002190; published online January 17, 2023

11

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Objectives of the Guidelines

- To provide clinicians with the most evidence-based guidance on the care of patients with extrahepatic and perihilar strictures, with a focus on diagnosis and drainage.

- **Develop recommendations**
  - Use of PICO (population, intervention, comparator, and outcomes) statements for key aspects of biliary stricture management
  - Systematic literature search with a team of health science librarians
  - Application of GRADE framework

- **Formulate key concepts**
  - Statements to which GRADE methodology cannot be applied

12

Grading of Recommendations, Assessment, Development, and Evaluation (GRADE)

Strength of recommendation	Criteria
Strong	Strong recommendations are offered when the desirable effects of an intervention clearly outweigh the undesirable effects.
Conditional	Conditional recommendations are offered when trade-offs are less certain—either because of low-quality evidence or because evidence suggests that desirable and undesirable effects are closely balanced.
Quality of Evidence	**Criteria**
High	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very low	We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

13

Key Concepts of Biliary Strictures

- Biliary strictures in adults are **more likely to be malignant** than benign except in well-defined scenarios.
- In asymptomatic or minimally symptomatic patients with an extrahepatic biliary stricture due to an apparent or suspected pancreatic mass, **we favor single-session EUS and ERCP for concurrent diagnosis and drainage over ERCP alone**.
- In patients with a **suspected malignant perihilar stricture due to CCA, EUS/FNA-B of the mass should be avoided**. Ok to sample LAD.

14

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Extrahepatic Strictures: Diagnosis

- In patients with an extrahepatic biliary stricture due to an apparent or suspected pancreatic mass:
  - We *recommend* **EUS with fine-needle sampling (aspiration or biopsy) over ERCP** as the preferred method of evaluating for malignancy. *Moderate quality; Strong level*
  - We *suggest* **EUS with FNB or EUS with FNA plus ROSE over FNA without ROSE** as the preferred method of evaluating for malignancy. *Very low quality; Conditional strength*

15

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Several prospective studies and two meta-analyses support the superiority of EUS-guided sampling over ERCP, particularly in cases of pancreatic masses.

Method(s)	Sensitivity (%)	Specificity (%)	Positive likelihood ratio	Negative likelihood ratio	Area under the curve- sROC
EUS + ERCP	86 (81–90)	98 (91–100)	12.50 (4.23–36.88)	0.17 (0.11–0.28)	0.9656
EUS	76 (72–80)	100 (94–100)	10.95 (3.73–32.13)	0.27 (0.18–0.43)	0.9458
ERCP	58 (53–62)	98 (92–100)	7.51 (2.75–20.51)	0.47 (0.40–0.56)	0.7819
EUS-FNA in pancreatic lesions	75 (65–81)	100 (87–100)	10.59 (2.29–48.91)	0.27 (0.16–0.47)	0.9422
ERCP in pancreatic lesions	47 (40–53)	100 (87–100)	4.90 (1.02–23.59)	0.66 (0.43–1.01)	0.7930
EUS-FNA in biliary lesions	71 (62–79)	100 (86–100)	5.77 (1.56–21.28)	0.38 (0.19–0.75)	0.8832
ERCP in biliary lesions	74 (65–82)	100 (86–100)	7.03 (1.93–25.65)	0.29 (0.21–0.41)	0.8097

ERCP, endoscopic retrograde cholangiopancreatography; EUS-FNA, endoscopic ultrasound-guided fine needle aspiration; sROC, summary receiver operating characteristic.

de Moura DTH, et al. Clin Endosc. 2020 Jul;53(4):417-428. Epub 2019 Nov 5. PMID: 31684700

16

Several studies comparing FNB to FNA have shown superiority of FNB, but there have been no direct comparisons of FNB to FNA when ROSE is available.

Outcome	FNB		FNA		NxP Interaction[1]	Effect of needle type	
	n/N	% (95%CI)	n/N	% (95%CI)	*P* value	OR (95%CI)[2]	*P* value
Diagnosis of malignancy							
▪ Accuracy	91/108	84 (76 to 91)	81/108	75 (66 to 83)	0.26	3.41 (1.12 to 10.4)	0.03
▪ Sensitivity	75/92	82 (72 to 89)	65/92	71 (60 to 80)	0.25	3.23 (1.12 to 9.38)	0.03
▪ Specificity	16/16	100 (79 to 100)	16/16	100 (79 to 100)	–	–	–
▪ Positive predictive value	75/75	100 (94 to 100)	65/65	100 (94 to 100)	–	–	–
▪ Negative predictive value	16/33	48 (31 to 66)	16/43	37 (22 to 53)	0.78	1.62 (0.64 to 4.10)	0.31
Specific diagnosis							
▪ Accuracy	85/108	79 (70 to 86)	69/108	64 (54 to 73)	0.13	4.79 (1.67 to 13.7)	0.004
▪ Accuracy[3]	10/16	63 (35 to 85)	4/16	25 (7 to 52)	–	–	–

FNB, fine-needle biopsy; FNA, fine-needle aspiration; NxP, needle by period; CI, confidence interval; OR, odds ratio.
[1] Analysis to examine whether the differences between needles varied depending on whether they were used first or second.
[2] OR calculated as odds for FNB relative to odds for FNA.
[3] Analysis based on patients with a benign final diagnosis only.

Oppong KW, et al. Endoscopy. 2020 Jun;52(6):454-461. Epub 2020 Mar 11. PMID: 32162287.

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17

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Perihilar Strictures: Diagnosis

- In patients with a suspected malignant perihilar stricture, we recommend **multimodality sampling over brush cytology alone at the time of the index ERCP** *(strong recommendation, low-quality evidence)*
  - 2013 meta-analysis with over 1500 patients (pancreatic cancer and CCA) showed a composite sensitivity of only 41%
  - Other studies have demonstrated brush cytology sensitivity clustering around 50-60%

Burnett AS, et al. J Surg Res. 2013 Sep;184(1):304-11. Epub 2013 Jul 5. PMID: 23866788.
Kuzu UB, et al. Gastroenterol Res Pract. 2015;2015:580254. Epub 2015 Mar 26. PMID: 25883643.
Pereira P, et al. Acta Cytol. 2020;64(4):344-351. Epub 2019 Sep 24. PMID: 31550713.

18

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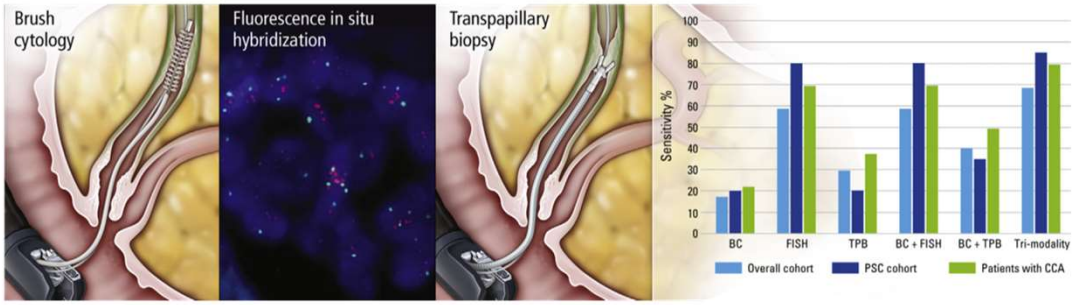
Impact of trimodality sampling on detection of malignant biliary strictures compared with patients with primary sclerosing cholangitis (CME)

Serge Baroud, MD,[1,*] Alexander J. Sahakian, MD,[1,*] Tarek Sawas, MD, MPH,[2] Andrew C. Storm, MD,[1] John A. Martin, MD,[1] Barham K. Abu Dayyeh, MD, MPH,[1] Mark D. Topazian, MD,[1] Michael J. Levy, MD,[1] Lewis R. Roberts, MBChB, PhD,[1] Gregory J. Gores, MD,[1] Bret T. Petersen, MD,[1] Vinay Chandrasekhara, MD[1]

Rochester, Minnesota; Dallas, Texas, USA



Gastrointest Endosc 2022;95:884-92. PMID 34871554

19

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Single Operator Cholangioscopy (SOC)-directed biopsies

- 2015 SRMA
- 10 studies, 456 patients
- One study directly compared the yield of SOC biopsies with standard brushings and biopsies. SOC biopsies had a sensitivity of 76.5% compared with brushings (5.8%) and biopsies (29.4%).
- The pooled sensitivity and specificity to detect CCA was 66.2% and 97.0%), respectively.

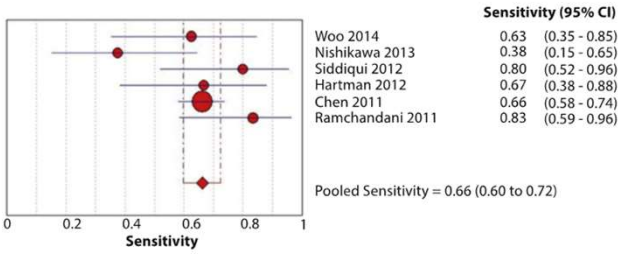


Figure 5. Forest plot of studies reporting the diagnostic role of cholangioscopy-guided biopsies. The pooled sensitivity for the diagnosis of cholangiocarcinoma was 66.2% (95% CI, 59.7%-72.3%). *CI,* confidence interval.

Navaneethan U, et al. Gastrointest Endosc. 2015 Oct;82(4):608-14.e2. Epub 2015 Jun 10. PMID: 26071061

20

Indeterminate biliary stricture

- If the etiology of a biliary stricture remains uncertain despite ERCP with multimodality intraductal sampling, additional diagnostic options exist and can be selectively deployed according to clinical context, stricture characteristics, and resource availability. (KC)
  - Probe-based confocal laser endomicroscopy (pCLE)
  - Next generation sequencing (NGS)
  - Multidisciplinary tumor board and/or surgical consultation when clinical suspicion persists despite two negative samplings

21

Benign Extrahepatic Strictures: Drainage

- We recommend fully covered self-expanding metallic stent (fcSEMS) placement over multiple plastic stents (MPSs) in parallel to reduce the number of procedures required for long-term treatment *(conditional recommendation, low-quality evidence)*
- Overall stricture resolution using MPSs and Rome protocol ranges from 80% - 90%.
- 7 RCTs comparing fcSEMS to MPSs and 2 SRMAs have shown that stricture resolution is comparable, but is associated with a faster time to resolution and fewer ERCPs.

22

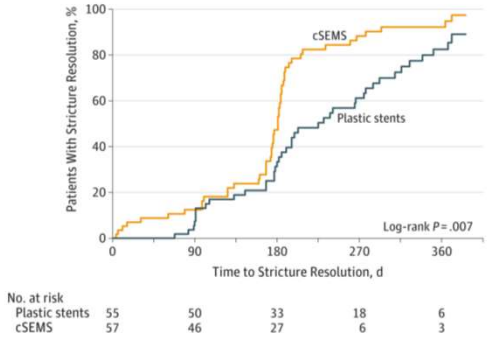
Published in final edited form as:
JAMA. 2016 March 22; 315(12): 1250–1257. doi:10.1001/jama.2016.2619.

Effect of Covered Metallic Stents Compared With Plastic Stents on Benign Biliary Stricture Resolution:

A Randomized Clinical Trial

Gregory A. Coté, MD, MS, Adam Slivka, MD, PhD, Paul Tarnasky, MD, Daniel K. Mullady, MD, B. Joseph Elmunzer, MD, MSc, Grace Elta, MD, Evan Fogel, MD, Glen Lehman, MD, Lee McHenry, MD, Joseph Romagnuolo, MD, MSc, Shyam Menon, MBBS, Uzma D. Siddiqui, MD, James Watkins, MD, Sheryl Lynch, BSN, Cheryl Denski, BG, Huiping Xu, PhD, and Stuart Sherman, MD

- Multicenter (8), open-label, parallel, RCT
- Tx-naïve benign biliary stricture (N=112)
- MPSs or Single fcSEMS
  - Assessed Q 3 mos (MPS) or Q6 mos (fcSEMS)
- Followed for 12 months after stricture resolution
- MPS resolution 85.4%; fcSEMS 92.6%
- Mean # ERCP 3.24 MPS, 2.14 fcSEMS



Benign Extrahepatic Strictures: Key concepts related to drainage

- An extrahepatic biliary stricture due to a benign condition should be **treated for 12 months when using MPSs and for at least 6 months when using fcSEMS**, although some evidence suggests that 12 months of fcSEMS therapy is advantageous.
  - When aiming for 12-month fcSEMS dwell time, stent exchange at the 6-month mark should be considered to reduce the risk of imbedment.

- In patients with a **BBS and gallbladder *in situ*, endoscopists should consider treatment with MPSs instead of fcSEMS if the cystic duct orifice cannot be avoided** by the metallic prosthesis because of a possible increased risk of acute cholecystitis.

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Malignant Extrahepatic Strictures: Drainage

- In patients with an extrahepatic stricture due to resectable pancreatic cancer or cholangiocarcinoma, we suggest **against** routine preoperative drainage *(conditional recommendation, low quality evidence.)*
  - In patients with acute cholangitis, severe pruritus, very high serum bilirubin levels, and those undergoing neoadjuvant therapy or experiencing another anticipated delay to surgery, preoperative biliary drainage is warranted.

25

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Preoperative Biliary Drainage for Cancer of the Head of the Pancreas

Niels A. van der Gaag, M.D., Erik A.J. Rauws, M.D., Ph.D., Casper H.J. van Eijck, M.D., Ph.D., Marco J. Bruno, M.D., Ph.D., Erwin van der Harst, M.D., Ph.D., Frank J.G.M. Kubben, M.D., Ph.D., Josephus J.G.M. Gerritsen, M.D., Ph.D., Jan Willem Greve, M.D., Ph.D., Michael F. Gerhards, M.D., Ph.D., Ignace H.J.T. de Hingh, M.D., Ph.D., Jean H. Klinkenbijl, M.D., Ph.D., Chung Y. Nio, M.D., Steve M.M. de Castro, M.D., Ph.D., Olivier R.C. Busch, M.D., Ph.D., Thomas M. van Gulik, M.D., Ph.D., Patrick M.M. Bossuyt, Ph.D., and Dirk J. Gouma, M.D., Ph.D.*

- Multicenter RCT, 202 patients
- Preop biliary drainage x 4-6 weeks fb surgery vs surgery alone within 1 week
- Primary outcome was rate of complications 120 days after randomization
  - Rate was 39% in surgery group vs 74% in pre-op drainage group

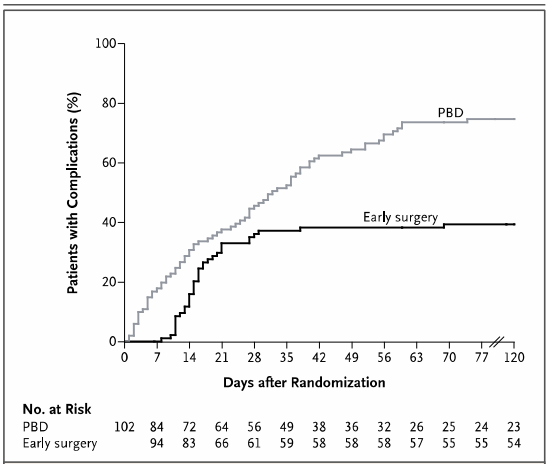

Figure 2. Proportion of Patients with Complications.
The primary outcome — the rate of serious complications within 120 days after randomization — occurred in 37 patients (39%) who underwent early surgery alone and 75 patients (74%) who underwent preoperative biliary drainage (PBD) followed by surgery (relative risk in the early-surgery group, 0.54; 95% confidence interval [CI], 0.41 to 0.71; P<0.001).

van der Gaag MD, et al. NEJM 2010; 362:129-37.

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26

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Malignant Extrahepatic Strictures: Drainage

- In patients with a malignant extrahepatic biliary stricture that is unresectable or borderline resectable, we recommend SEMS placement over PS placement *(strong recommendation, moderate quality evidence).*
  - SEMS results in fewer interventions, lower rates of hospitalizations due to stent-related complications, and fewer additional days of hospitalization
  - 2006 Cochrane review shows equivalent survival
  - More recent meta-analyses have suggested a survival advantage with SEMS

27

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Plastic vs. Self-Expandable Metal Stents for Palliation in Malignant Biliary Obstruction: A Series of Meta-Analyses

Majid A. Almadi, MBBS, MSc (Clinical Epidemiology), FRCPC[1,2], Alan Barkun, MD, CM, MSc (Clinical Epidemiology), FRCPC[1,3] and Myriam Martel, BSc[1]

- 20 RCTs comparing PS to SEMS for malignant biliary obstruction
- 1713 patients
- No differences in overall patient survival or 30-day mortality
- Higher symptom-free survival at 6 months with SEMS, and lower rates of late complications, sepsis, cholangitis, stent clogging, and need for re-intervention
- Survival advantage with uncovered SEMS, but not partially or fcSEMS

Almadi MA, et al. Am J Gastroenterol. 2017 Feb;112(2):260-273. Epub 2016 Nov 15. PMID: 27845340.

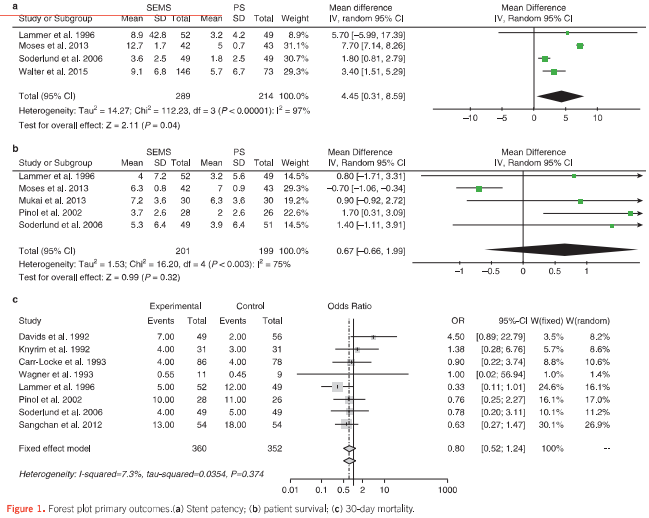

Figure 1. Forest plot primary outcomes.(a) Stent patency; (b) patient survival; (c) 30-day mortality.

28

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Malignant Extrahepatic Stricture: Key concepts related to drainage

- A diagnosis of malignant should be confirmed before placement of an uncovered SEMS across a biliary stricture.
- In patients with a malignant extrahepatic stricture who are potential candidates for pancreaticoduodenectomy and undergo uSEMS placement, we suggest placing the proximal (upstream) end of the prosthesis at least 1.5 cm below the biliary confluence.

29

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Malignant Extrahepatic Stricture: Drainage

- In patients with a malignant extrahepatic stricture that is unresectable or borderline resectable, the evidence is *insufficient* to recommend for or against uSEMS vs fcSEMS placement.

TABLE 2. Key outcomes

	FCSEMS, % (n)	UCSEMS, % (n)	*P* value
Effectiveness outcome			
Sustained biliary drainage (primary endpoint)	72.2 (39/54)	72.9 (43/59)	.01*
Neoadjuvant therapy not completed†	18.2 (10/55)	28.8 (15/52)	.25
Neoadjuvant therapy completed with delay	16.4 (9/55)	11.5 (6/52)	.58
With recurrent biliary obstruction requiring reintervention	3.6 (2/55)	1.9 (1/52)	.99
Patients with CIS	43.6 (24/55)	45.8 (27/59)	.85
SEMS affected surgical procedure	13.0 (3/24)	15.4 (4/27)	.99
Time to CIS (N = 50) (days), median (range)	114.0 (90.5–168.5)	106.5 (83.0–211.0)	.94
Procedure-related/stent-related serious adverse events			
Acute cholecystitis	9.3 (4/43)	4.8 (2/42)	.68
Acute pancreatitis‡	1.7 (1/59)	0 (0/60)	.50
Cholangitis	15.3 (9/59)	13.3 (8/60)	.80
GI hemorrhage	1.7 (1/59)	0 (0/60)	.50
Abdominal pain	1.7 (1/59)	3.3 (2/60)	.99
CBD obstruction or abnormal LFTs	3.4 (2/59)	1.7 (1/60)	.62
Liver abscess	0 (0/59)	1.7 (1/60)	.99
Total	23.7 (14/59)	20.0 (12/60)	.66

FCSEMS, Fully covered self-expanding metal stent; *UCSEMS*, uncovered self-expanding metal stent; *CIS*, curative intent surgery; *CBD*, common bile duct; *LFT*, liver function test.
*Noninferiority *P* value.
†None with recurrent biliary obstruction requiring reintervention.
‡Excludes reports of mild acute pancreatitis.

Seo DW, et al. Gastrointest Endosc. 2019 Oct;90(4):602-612.e4. Epub 2019 Jul 2. PMID: 31276674.

30

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Perihilar Stricture: Drainage

- In patients with obstructive jaundice due to a malignant perihilar stricture who are otherwise asymptomatic and who have declined or are not candidates for additional treatment, **palliative drainage is not mandatory** and should be decided on an individual case basis. (KC)

- In patients with a perihilar stricture due to a suspected malignancy, the evidence is *insufficient* to recommend for or against ERCP vs PTBD.

31

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Endoscopic or Percutaneous Biliary Drainage for Gallbladder Cancer: A Randomized Trial and Quality of Life Assessment

SUNDEEP SINGH SALUJA,* MANPREET GULATI,‡ PRAMOD KUMAR GARG,§ HEMRAJ PAL,‖ SUJOY PAL,* PEUSH SAHNI,* and TUSHAR K. CHATTOPADHYAY*

*Department of Gastrointestinal Surgery, ‡Department of Radiology, §Department of Gastroenterology, and ‖Department of Psychiatry, All India Institute of Medical Sciences, New Delhi, India

Table 3. Comparison Between PTBD and ES According to Intention-to-Treat Analysis

Outcome	PTBD (n = 27)	ES (n = 27)	*P* value
Technical success	26 (93)	22 (81)	.19
Successful drainage	24 (89)	11 (41)	<.001
Early complications	5 (18)	14 (52)	.04
Early cholangitis	3 (11)	13 (48)	.002
Procedure-related mortality	1 (4)	2 (8)	1.00
30-day mortality	1 (4)	2 (8)	.61
Stent occlusion	8 (32)	9 (39)	.63
Median survival, days (range)	60 (43–77)	60 (28–92)	.71

NOTE. Values in parentheses are percentages except where indicated.

Saluja SS, et al. Clin Gastroenterol Hepatol. 2008 Aug;6(8):944-950.e3. Epub 2008 Jun 30. PMID: 18585976.

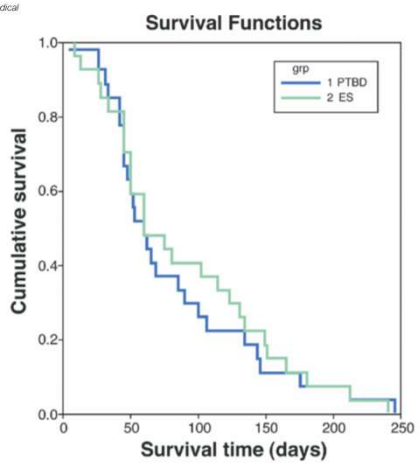

Figure 2. Kaplan-Meier survival curve of the patients with inoperable GBC by intention-to-treat analysis.

32

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Prediction of drainage effectiveness during endoscopic stenting of malignant hilar strictures: the role of liver volume assessment

Ariane Vienne, MD, Ehlam Hobeika, MD, Hervé Gouya, MD, Nathanael Lapidus, MD, Jacques Fritsch, MD, André Daniel Choury, MD, Ariane Chryssostalis, MD, Marianne Gaudric, MD, Gilles Pelletier, MD, PhD, Catherine Buffet, MD, PhD, Stanislas Chaussade, MD, PhD, Frédéric Prat, MD, PhD

Paris, Le Kremlin-Bicêtre, France

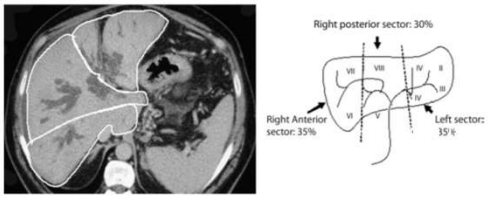

Figure 1. Liver biliary and volume distribution.

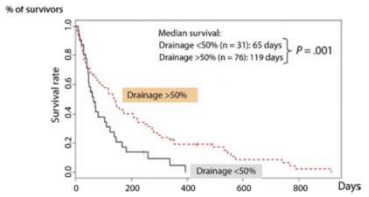

Figure 3. Cumulative survival depending on liver volume drained (n = 107), estimated by Kaplan-Meier curves with survival in groups compared by using the log-rank test.

TABLE 3. Outcomes comparing drainage <50% versus drainage >50%

Drainage results	Drainage <50%	Drainage >50%	*P* value
No. of patients	31	76	
Bismuth stage II/III/IV, n (%)	5 (16%)/17 (55%)/9 (29%)	27 (36%)/43 (57%)/6 (8%)	.99
Mean bilirubin level before treatment, μmol/L (SD)	293 (144)	283.8 (197)	.45
Drainage effectiveness, n (%)	15 (48%)	62 (82%)	.001
Cholangitis, n (%)	17 (55%)	23 (30%)	.03
Median survival, days (min-max)	59 (9-394)	119 (3-917)	.01

SD, Standard deviation.

Vienne A, et al. Gastrointest Endosc. 2010 Oct;72(4):728-35. PMID: 20883850.

33

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Malignant Perihilar Stricture: Drainage

- In patients with a malignant perihilar stricture, the evidence is *insufficient* to recommend for or against PS vs uSEMS placement.
- If SEMS is chosen for drainage of a malignant perihilar stricture, and effective drainage strategy using PS should be proven first.(KC)
- In patients with a malignant perihilar stricture due to CCA who are not candidates for resection or transplantation, **we suggest the use of adjuvant endobiliary ablation (photodynamic therapy or radiofrequency ablation) plus PS placement** over PS placement alone. *Conditional recommendation, low-quality evidence.*

34

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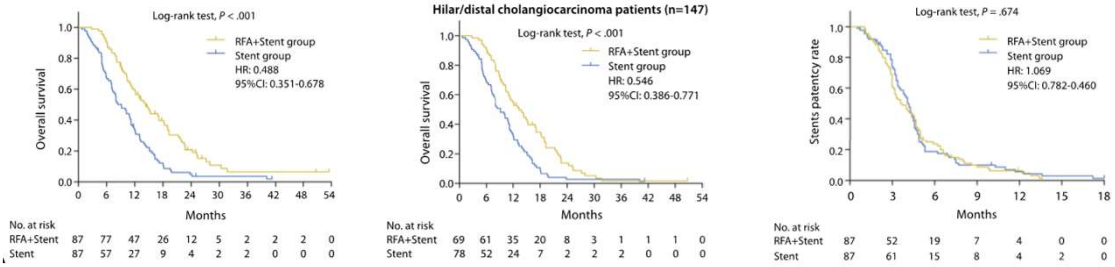
Endoscopic radiofrequency ablation plus plastic stent placement versus stent placement alone for unresectable extrahepatic biliary cancer: a multicenter randomized controlled trial CME

Dao-Jian Gao, MD, PhD,[1,*] Jian-Feng Yang, MD, PhD,[2,*] Shu-Ren Ma, MD,[3,*] Jun Wu, MD,[4] Tian-Tian Wang, MD,[1] Hang-Bin Jin, MD,[2] Ming-Xing Xia, MD,[1] Ying-Chun Zhang, MD,[3] Hong-Zhang Shen, MD,[2] Xin Ye, MD,[1] Xiao-Feng Zhang, MD,[2,†] Bing Hu, MD, PhD[1,4,†]

Shanghai, Hangzhou, Shenyang, China



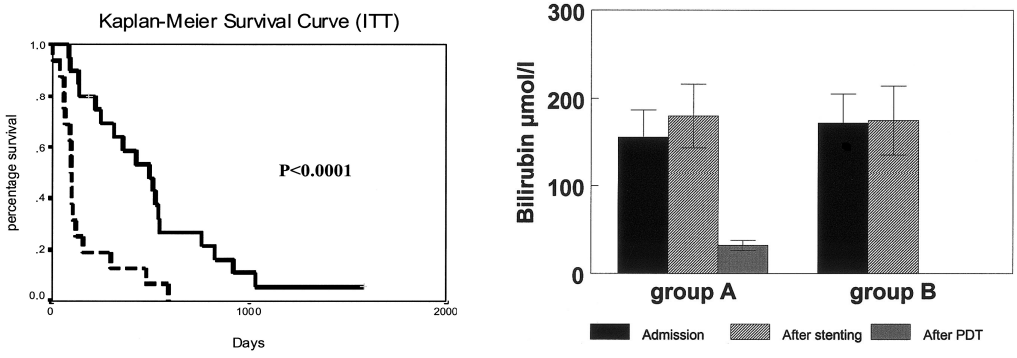
- RCT, 3 tertiary centers, RFA+PS vs PS alone, 174 participants
- RFA may improve overall survival and QOL

Gao DJ, et al. Gastrointest Endosc. 2021 Jul;94(1):91-100.e2. Epub 2020 Dec 24. PMID: 33359435.

35

Successful photodynamic therapy for nonresectable cholangiocarcinoma: a randomized prospective study

Marianne E.J Ortner, Karel Caca, Frieder Berr, Jochen Liebetruth, Ulrich Mansmann, Dominik Huster, Winfried Voderholzer, Guido Schachschal, Joachim Mössner, Herbert Lochs



- Prospective, open-label, randomized, multicenter study with a group sequential design compared PDT + stenting (group A) with stenting alone (group B) in patients with nonresectable CCA.
- PDT resulted in prolongation of survival (group A: n = 20, median 493 days; group B: n = 19, median 98 days; *P* < 0.0001). It also improved biliary drainage and quality of life.

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Ortner ME, et al. Gastroenterology. 2003 Nov;125(5):1355-63. PMID: 14598251.

36

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Biliary Stricture: Drainage if ERCP unsuccessful or not possible

- In patients with a biliary stricture, in whom ERCP is indicated but unsuccessful or impossible, **we suggest EUS-guided biliary access/drainage over PTBD**, based on fewer adverse events, when performed by an endoscopist with substantial experience in these interventional EUS procedures *(conditional recommendation, very-low-quality evidence).*
  - Meta-analyses (500-1500 cases) suggest technical success in 90% and adverse event rate of 15-20%
    - Lowest AE rate with rendezvous; highest with hepaticogastrostomy

37

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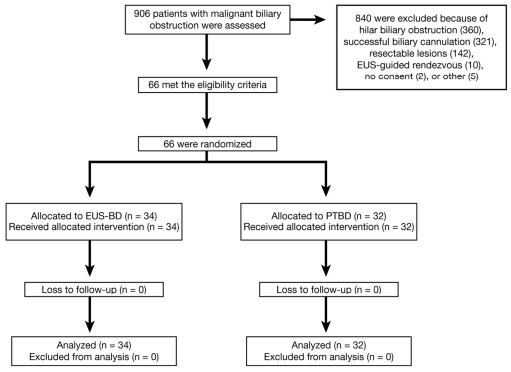
Similar Efficacies of Endoscopic Ultrasound–guided Transmural and Percutaneous Drainage for Malignant Distal Biliary Obstruction

Tae Hoon Lee, Jun-Ho Choi, Do Hyun Park, Tae Jun Song, Dong Uk Kim, Woo Hyun Paik, Young Hwangbo, Sang Soo Lee, Dong Wan Seo, Sung Koo Lee, Myung-Hwan Kim



	EUS-BD	PTBD
Technical success	94.1%	96.9%*
Fxnal success	87.5%	87.1%
AEs	8.8%	31.2%*
Freq of unscheduled intervention	0.34	0.93*

*p<0.05

Lee TH, et al. Clin Gastroenterol Hepatol. 2016 Jul;14(7):1011-1019.e3. Epub 2015 Dec 31. PMID: 26748220.

38

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Thanks for your attention!

- Questions and Answers

39

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Questions?

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Jennifer L. Maranki, MD, MSc

Anna Tavakkoli, MD

**All of the relevant financial relationships listed for these individuals have been mitigated*

40


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41