2022 SCSG GI SYMPOSIUM

RMCHCS
Rehoboth McKinley Christian Health Care Services

Jointly provided by Rehoboth McKinley Christian Health Care Services and Southern California Society of Gastroenterology.

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SOUTHERN CALIFORNIA SOCIETY OF GASTROENTEROLOGY

ERCP Biliary Stenting
Which Stent for Specific Indications?

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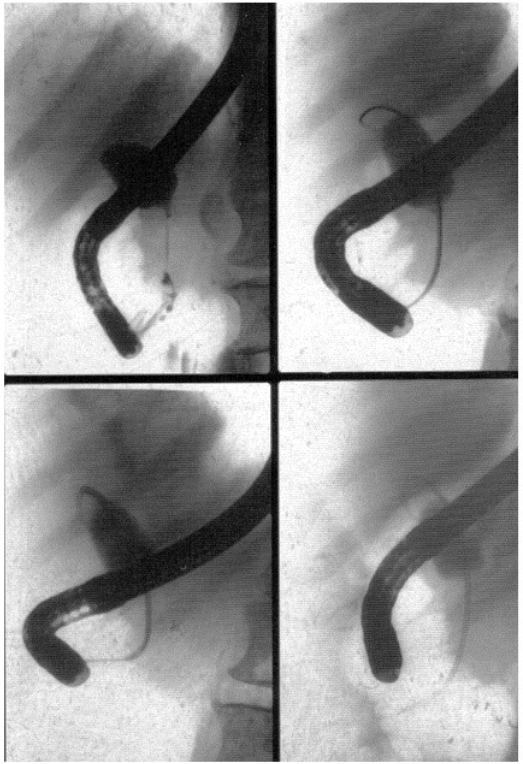
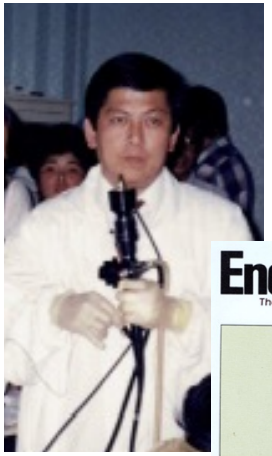
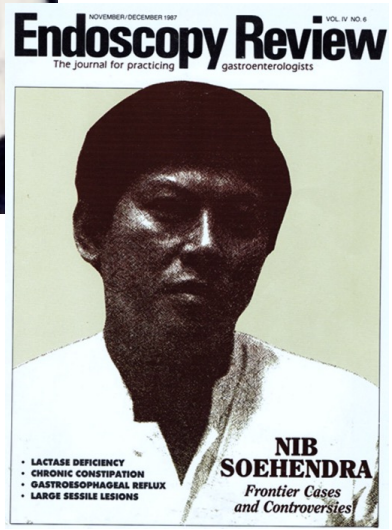
The First Biliary stent







Soehendra. Dtsch Med Wschr 1979

First 10 Fr plastic stent and SEMS

Neuhaus. Endoscopy 1989; Huibregtse. Endoscopy 1989

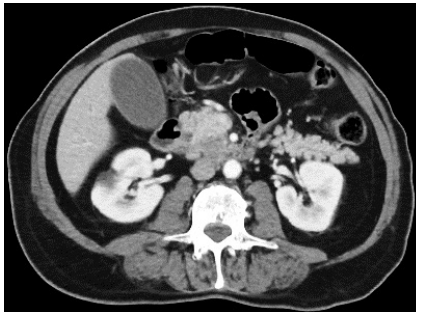
Distal biliary stricture

Malignant distal CBD stricture, most commonly caused by pancreatic cancer

Plastic stenting has been the main drain, partly because of the lack of tissue confirmation, and partly to have possible immediate resection

Nowadays:

- Tissue diagnosis is readily obtained at EUS
- Often preferrable not to resect up front (for neoadjuvant Rx)
- Survival is typically > 3 months



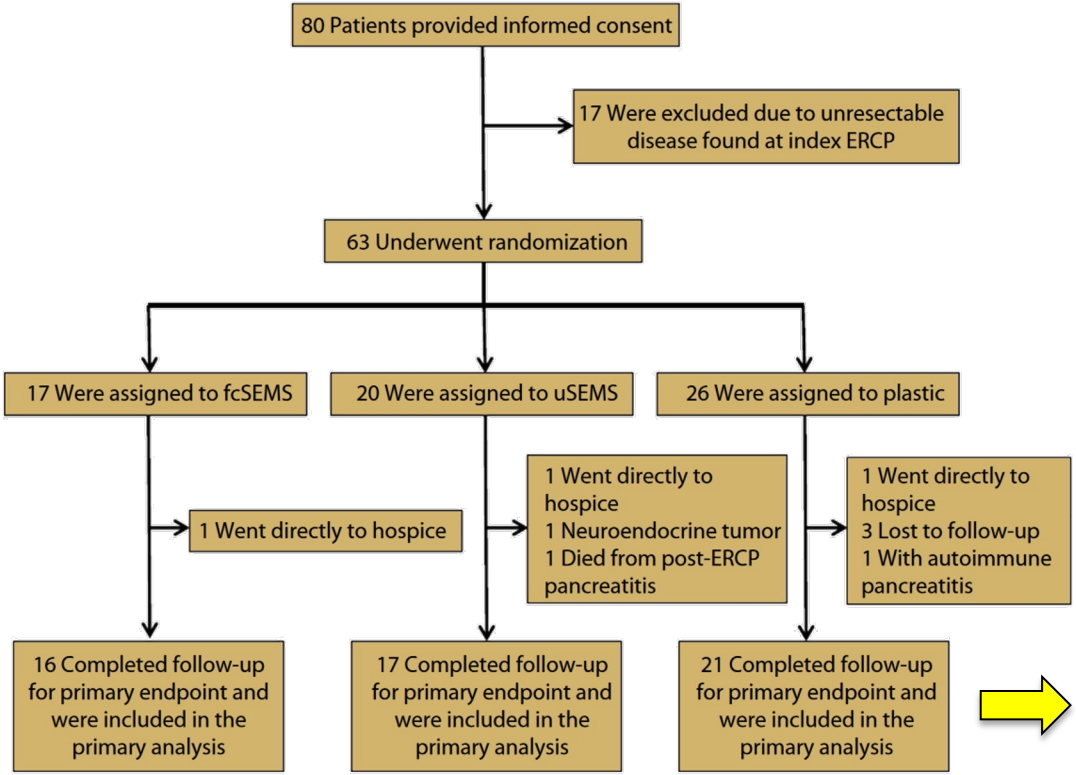
Malignant distal CBDS are best treated with SEMS

First author, year	Studies included	Population	Intervention	Outcomes
Almadi, 2017 [12]	20 RCTs	1713 patients with malignant biliary obstruction (proximal and distal)	Endoscopic or percutaneous palliative biliary drainage with plastic stent vs. SEMS	Stent patency, WMD 4.45 months (95%CI 0.31 – 8.59), favoring SEMS Overall survival, WMD 0.67 (95%CI −0.66 to 1.99), no difference
Moole, 2017 [13]	11 (7 RCTs, 3 retrospective, 1 prospective)	947 patients with malignant biliary obstruction (only distal)	Endoscopic palliative biliary drainage with plastic stent vs. SEMS	Stent occlusion, OR 0.48 (95%CI 0.34 – 0.67), favoring SEMS Overall survival/time to death: ▪ SEMS, 157.3 days (95%CI 148.9 – 165.6) ▪ Plastic 120.6 days (95%CI 114.3 – 126.9) ▪ $P = 0.0024$
Zorrón Pu, 2015 [14]	13 RCTs	1133 patients with malignant biliary obstruction (proximal and distal)	Endoscopic palliative biliary drainage with plastic stent vs. SEMS	Stent dysfunction, RD −0.26 (95%CI −0.32 to −0.20), favoring SEMS Survival longer in the SEMS group (187 vs. 162 days, $P < 0.0001$)
Sawas, 2015 [15]	19 (13 RCTs, 5 retrospective, 1 prospective)	1989 patients with malignant biliary obstruction (proximal and distal)	Endoscopic or percutaneous palliative biliary drainage with plastic stent vs. SEMS	Stent occlusion, HR 0.42 (95%CI 0.27 – 0.64), favoring SEMS 30-day survival, HR 0.82 (95%CI 0.45 – 1.48), no difference
Hong, 2013 [16]	10 RCTs	785 patients with malignant biliary obstruction (proximal and distal)	Endoscopic palliative biliary drainage with plastic stent vs. SEMS	Stent patency, HR 0.37 (95%CI 0.28 – 0.48), favoring SEMS Survival, HR 0.81 (95%CI 0.68 – 0.96), favoring SEMS

Overall costs are not different between plastic stents and SEMS, but QOL is better with SEMS

Dumonceau. Endoscopy 2018

Malignant distal CBDS from PDAC for neoadjuvant Rx



Primary end point -Stent occlusion
-Surgical resection
-Death

Gardner GIE 2016

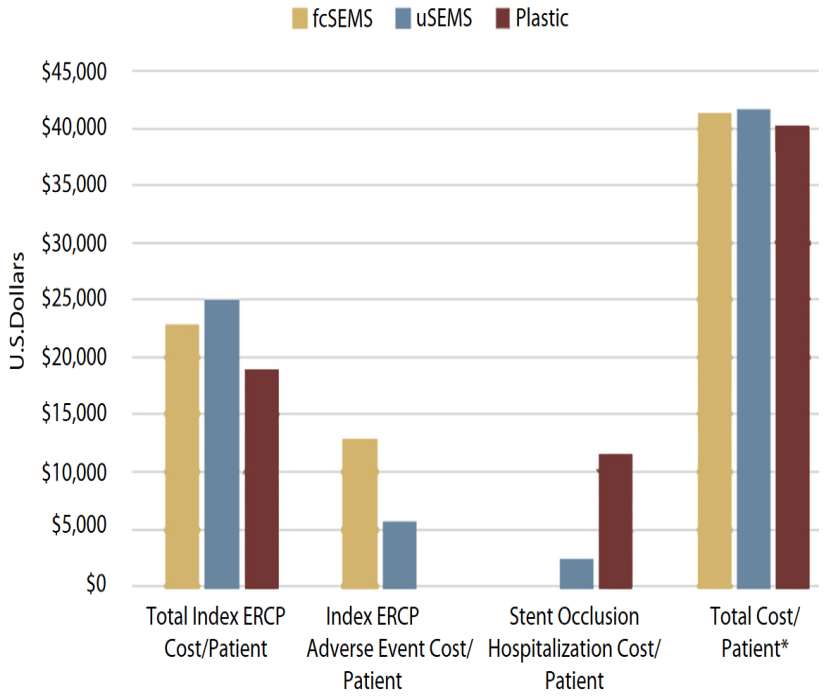
Clinical End Points after Stenting

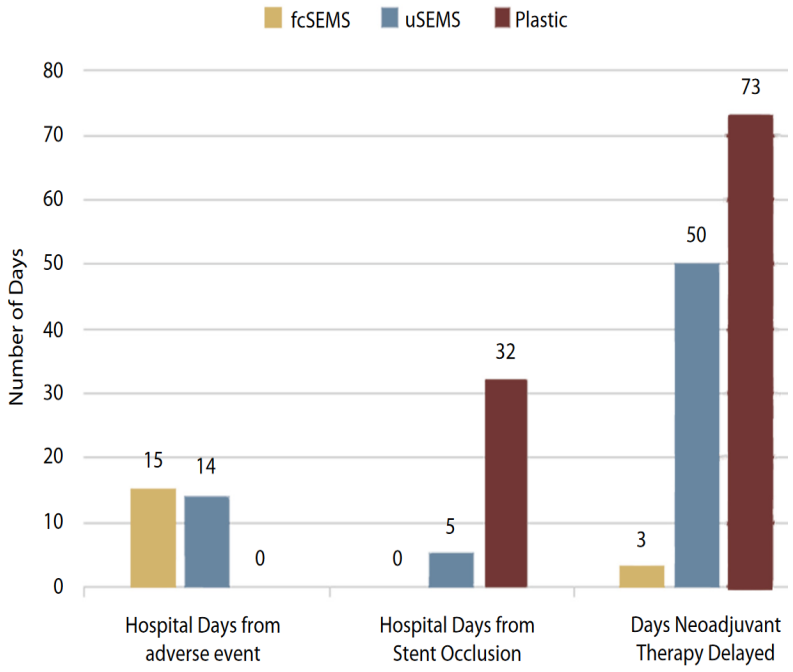
TABLE 2. Primary clinical outcomes

Characteristic	fcSEMS (n = 16)	uSEMS (n = 17)	Plastic stent (n = 21)	*P* value
Stent occlusion				
n (%)	4 (25)	6 (35)	11 (52)	.22
Time to end point, mean (range), d	220 (21-341)	74 (45-90)	76 (7-161)	<.01
Attempted surgical resection				
n (%)	8 (50)	6 (35)	4 (19)	.14
Time to end point, mean (range), d	165 (127-193)	165 (133-193)	151 (101-184)	.63
Death				
n (%)	4 (25)	5 (29)	6 (29)	.96
Time to end point, mean (range), d	71 (7-196)	242 (122-453)	187 (96-312)	.11

Gardner GIE 2016

Total care costs “same”; FCSEMS least delay of care





Gardner GIE 2016

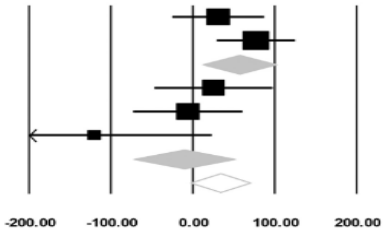
Malignant hilar stricture

Mean Patient survival

Study name	Subgroup within study	Difference in means	Lower limit	Upper limit	*P* Value
Mukai 2013	RCT	31	-25	87	.2789
Sangchan 2012	RCT	77	29	125	.0016
		56	12	101	.0136
Raju 2011	Retro	25	-47	97	.4984
Gao 2017	Retro	-6	-73	61	.8604
Ivasaki 2018	Retro	-121	-264	23	.1009
		-11	-73	51	.7274
		33	-3	69	.0731

Statistics for each study

Difference in means and 95% CI



A

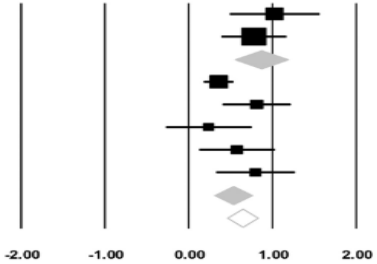
Plastic SEMS

Mean improved patency

Study name	Subgroup within study	Std diff in means	Lower limit	Upper limit	*P* Value
Mukai 2013	RCT	1.03	0.49	1.56	.0002
Sangchan 2012	RCT	0.78	0.39	1.17	.0001
		0.86	0.55	1.18	.0000
Liberato 2012	Retro	0.36	0.18	0.54	.0001
Raju 2011	Retro	0.81	0.40	1.22	.0001
Gao 2017	Retro	0.24	-0.27	0.75	.3608
Ivasaki 2018	Retro	0.58	0.12	1.03	.0127
Choi 2019	Retro	0.80	0.32	1.27	.0010
		0.53	0.30	0.75	.0000
		0.64	0.46	0.82	.0000

Statistics for each study

Std diff in means and 95% CI

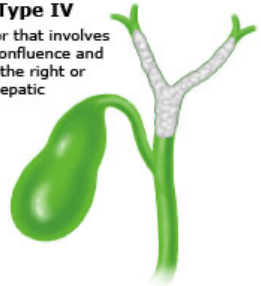


B

Plastic SEMS

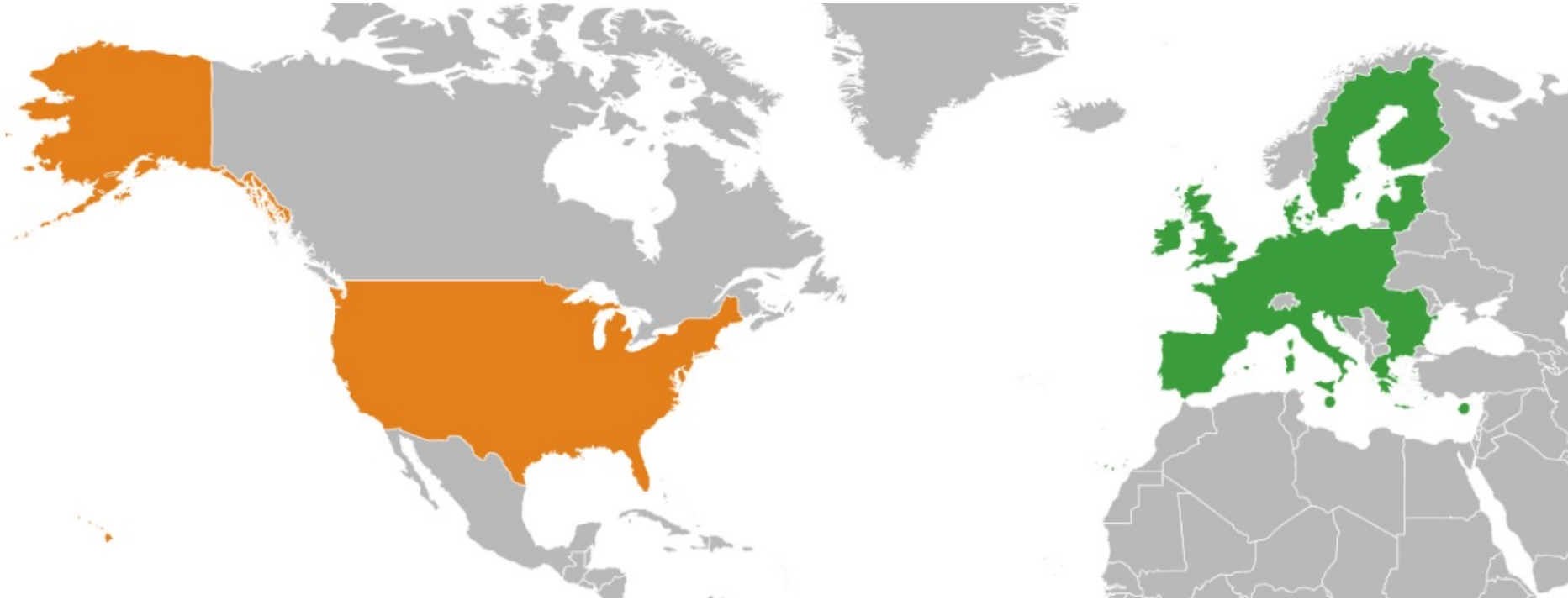
Type IV

Tumor that involves the confluence and both the right or left hepatic duct



Qumseya. GIE 2021

Metal or Plastic Stents for hilar strictures?

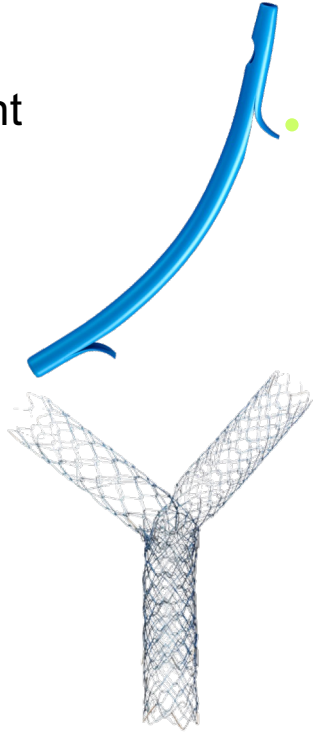


Metal or Plastic Stents for hilar strictures?

ASGE. GIE 2021

The panel suggests placement of bilateral stents compared with a unilateral stent in the absence of liver atrophy

The panel suggests placing SEMSs or PSs. However, in patients who have a short life expectancy and who place high value on avoiding repeated interventions, the panel suggests using SEMSs compared with PSs



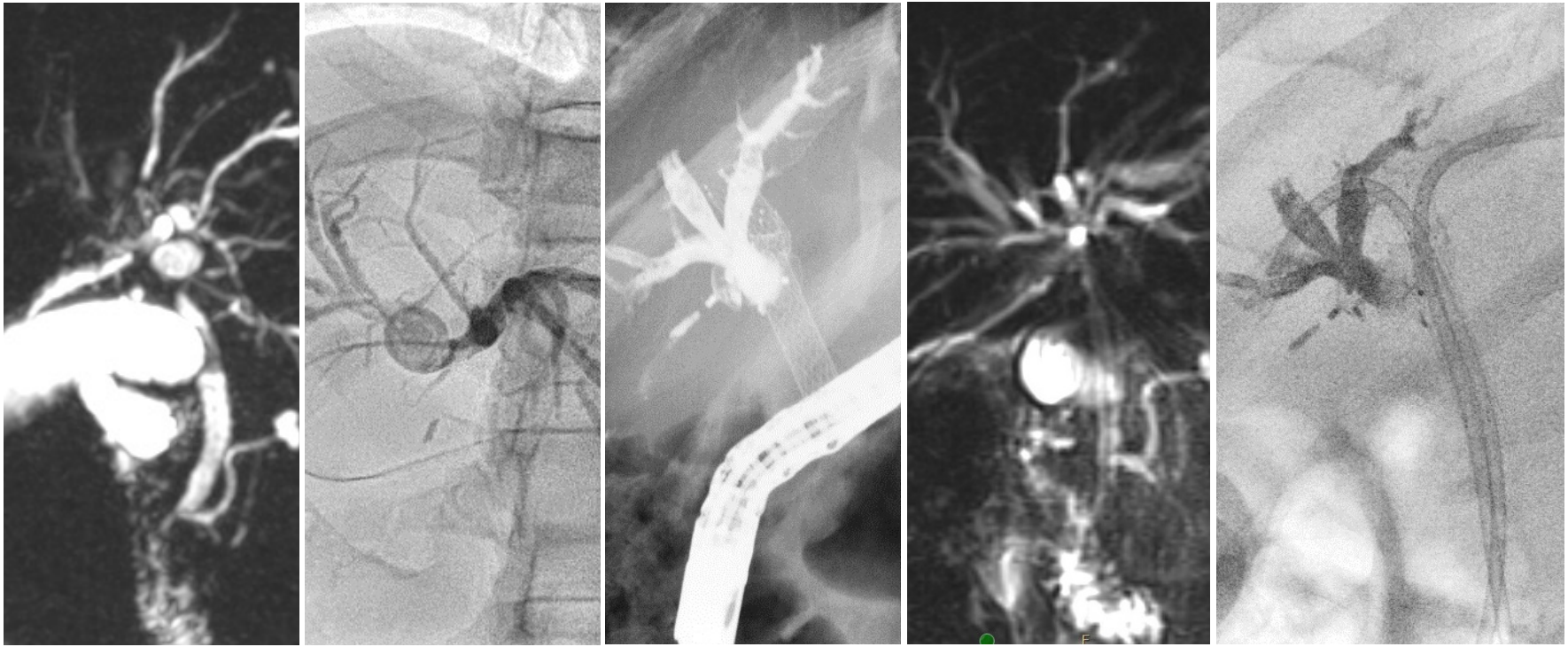
ESGE. Endoscopy 2018

ESGE recommends uncovered SEMSs for palliative drainage of malignant hilar obstruction

Personal comments:

- Randomized trials were biased: used single of double, mostly 7 Fr stents
- Plastic stents were “non-scheduled”

Stent-in-stent hilar SEMS drainage



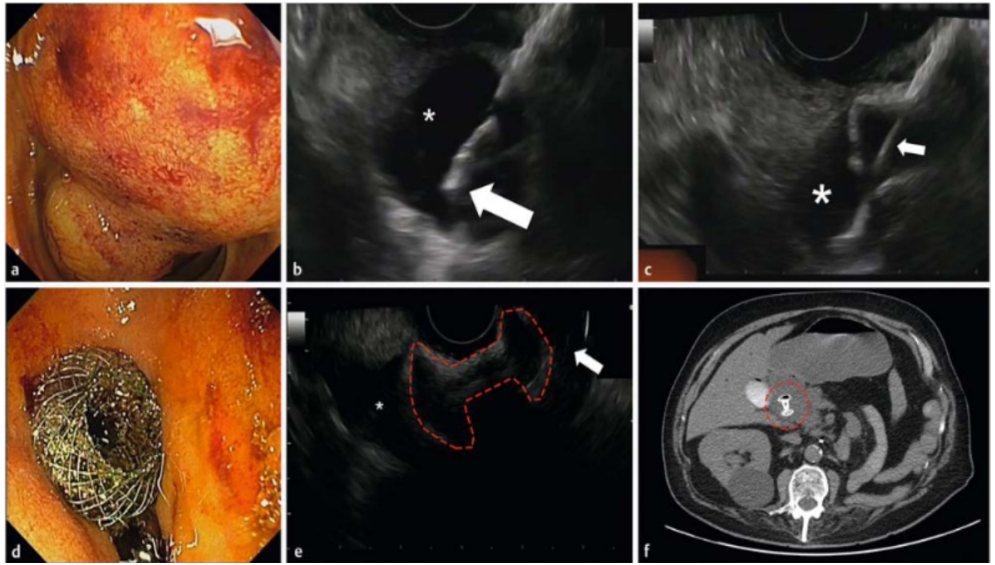
What can be done to palliate malignant CBDS when ERCP failed?

- Try again another time
- Refer to an expert endoscopist
- Ask IR interventionalist for help
- Try a transluminal drainage approach if you are highly skilled

Jacques. GIE 2020

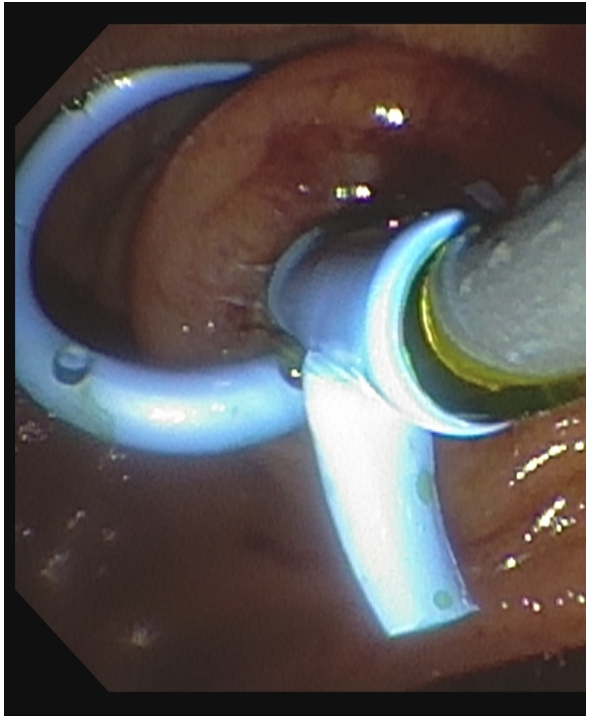
Choledochoduodenostomy for malignant CBDS with LAMS after failed ERCP

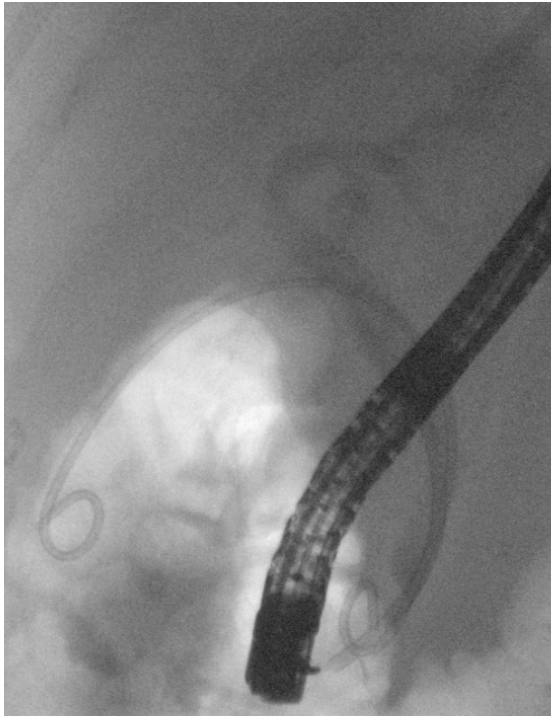
Technical success, n. (%)	21 (100)
Clinical success, n. (%)	21 (100)
LAMS size (diameter × length)	
▪ 6 mm × 8 mm, n. (%)	1 (4.76)
▪ 8 mm × 8 mm, n. (%)	16 (76.1)
▪ 10 mm × 10 mm, n. (%)	3 (14.28)
▪ 15 mm × 10 mm, n. (%)	1 (4.76)
Pretreatment bilirubin level, mean	13.9 mg/dl
Bilirubin level after 2 weeks, mean	2.3 mg/dl
Pretreatment CBD size: mean (range), mm	16 (12–20)
Adverse events, n. (%)	1 (4.76)
Reinterventions, n. (%)	1 (4.76)
Jaundice recurrence, n. (%)	3 (17)
Follow-up: mean (range), days	188 (8–554)
Survival time: mean (range), days	161 (8–419)



Tarantino. EIO 2021

Unfit patient experience with acute cholecystitis





Endoscopic Rx of cholecystitis: GB stenting

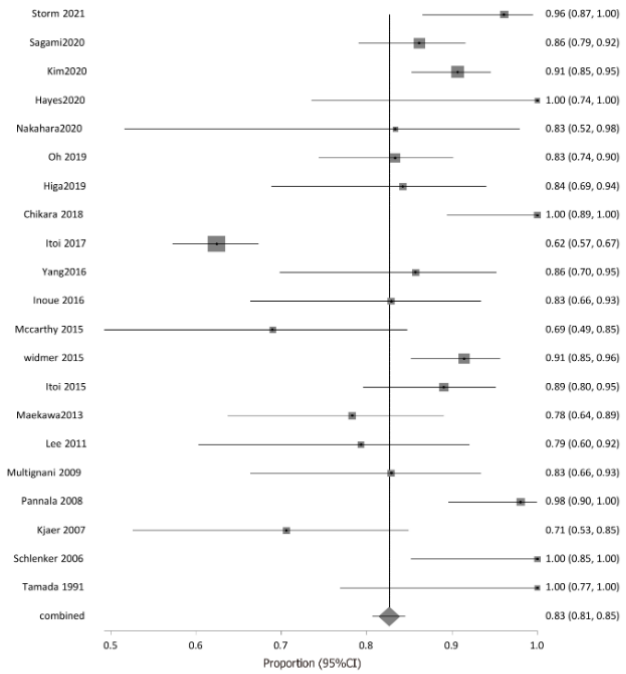


Figure 2 Forest plot showing the individual study proportions of endoscopic transpapillary gallbladder drainage technical success in relation to the pooled rate[7,9,22,24-40].

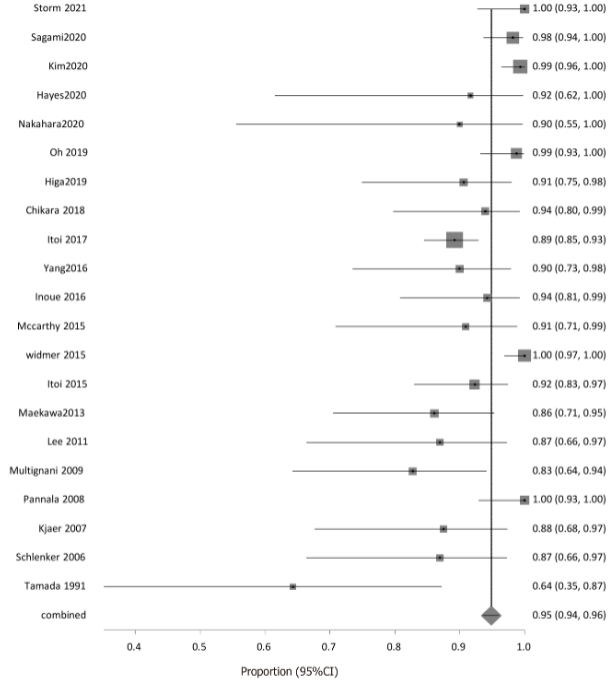
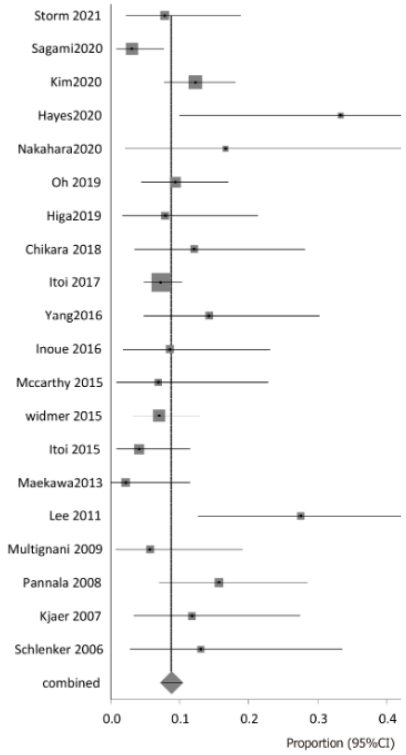


Figure 3 Forest plot showing the individual study proportions of endoscopic transpapillary gallbladder drainage clinical success in relation to the pooled rate[7,9,22,24-40].

Jandura. World JGE 2021

Transpapillary gallbladder stenting



Pooled rates of post procedure adverse events

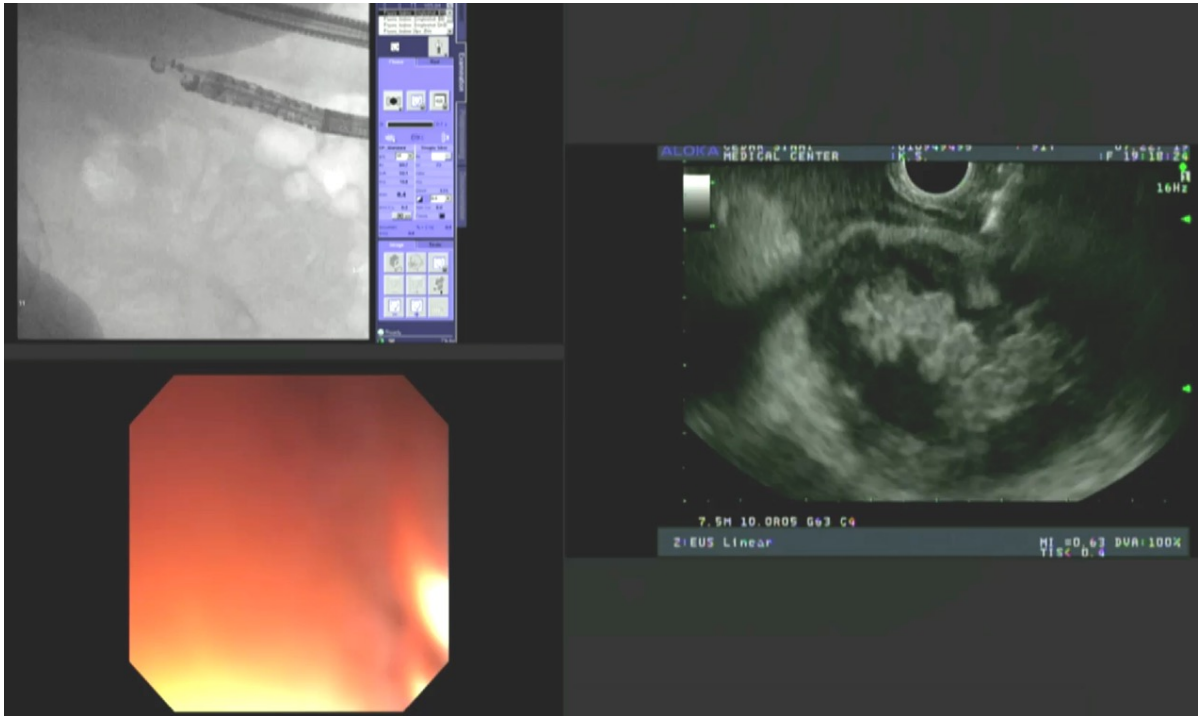
- bleeding 1.03%
- perforation 0.78%
- peritonitis/bile leak 0.45%
- pancreatitis 1.98%

Stent occlusion and migration were 0.39% and 1.3%, respectively

Pooled rate of cholecystitis recurrence following ETGBD was 1.48%

Jandura. World JGE 2021

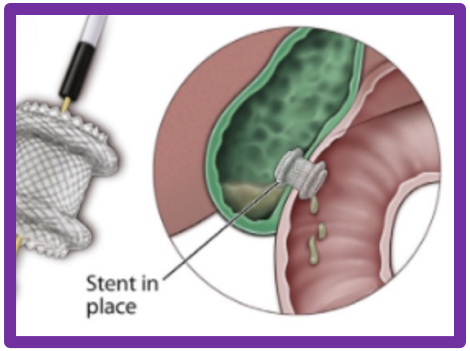
LAMS cholecystostomy - Acute cholecystitis

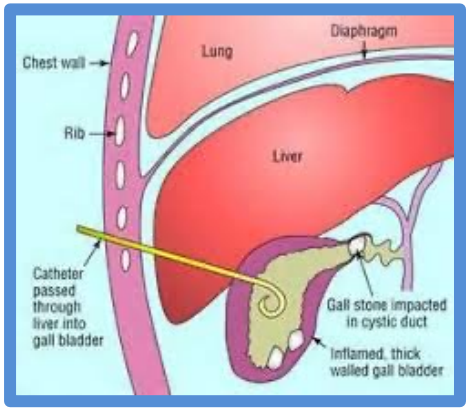


Endoscopic (EUS) vs Perc. Cholecystostomy

Five comparative studies (206 patients in the **EUS-GBD group** vs. 289 patients in the **PT-GBD group**):

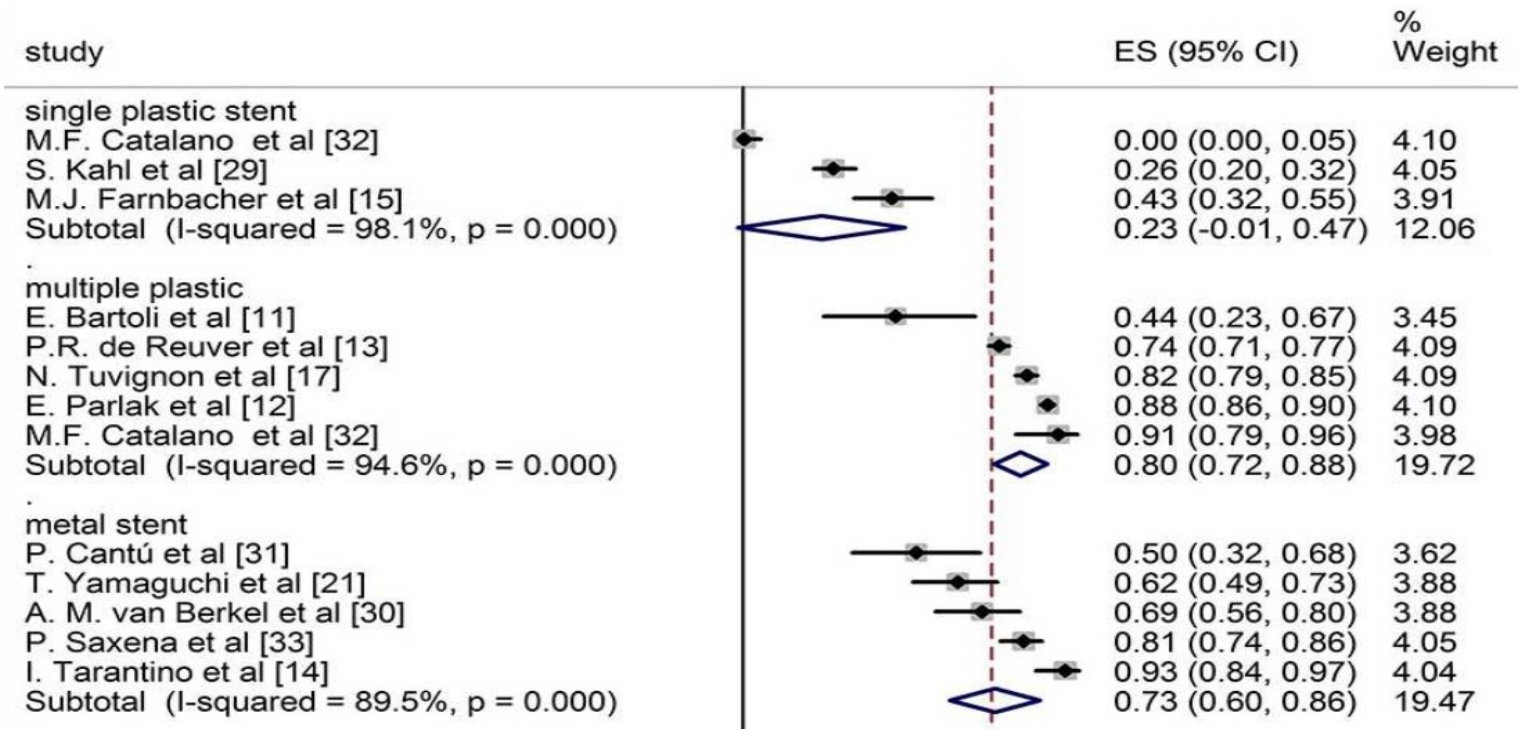
- No statistically significant differences in technical success and clinical success
- EUS-GBD had **fewer adverse events**
- EUS-GBD patients had **shorter hospital stays**
- EUS-GBD patients required significantly **fewer reinterventions**
- EUS-GBD had significantly **fewer unplanned readmissions**





Luk & Teoh. Endoscopy 2019

Benign Biliary Strictures of All Causes



Forest plot comparing long term stricture resolution in different subgroups

Huszár. PLOS ONE 2017

Post-transplantation biliary stricture

- Four randomized clinical trials totaling 205 patients
- Plastic stents typically x 1 year, FCSEMS x 6 months
- No difference was observed between the stricture resolution rate, stricture recurrence and adverse events between the plastic and metallic stent groups
- The metallic stent group demonstrated benefits in relation to the number of ERCPs performed, duration of treatment, number of stents used, and cost

de Carvalho Visconti. Endoscopy 2018

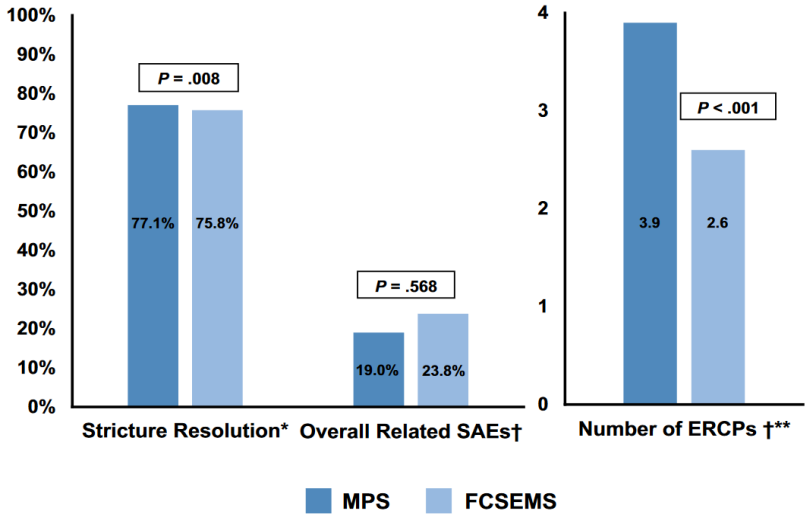
Chronic pancreatitis CBD stricture (CPBS)

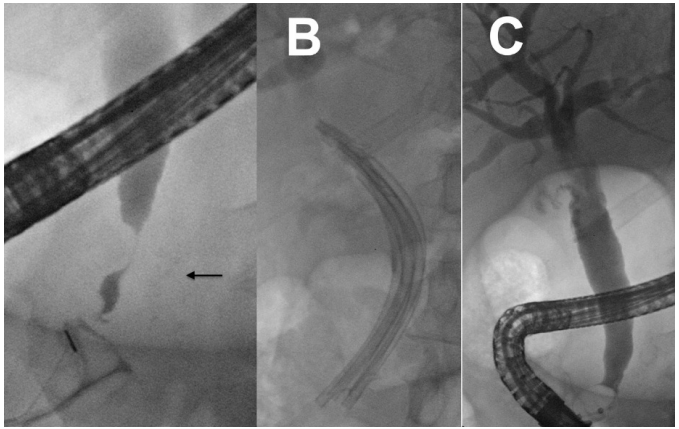
- Multicenter, randomized study of 60 patients
- Randomized to either a single cSEMS or three plastic stents
- After 3 months, the position of the cSEMS was checked or another three plastic stents were added
- At 6 months, all stents were removed
- Median follow-up was 40 months (range 1–66 months). The 2-year stricture-free success rate was 90% in the plastic stent group and 92% in the cSEMS group
- There was one late recurrence in the plastic stent group 50 months after stent removal
- Conclusion: A 6-month treatment with **either six 10-Fr plastic stents or with one 10-mm cSEMS** produced good long-term relief of biliary stricture caused by chronic pancreatitis.

Haapamäki. Endoscopy 2015

Multiple plastic stents = FCSEMS in CPBS but needs more ERCP

RCT of 84 patients, multi-center, international study





Procedure characteristic	ITT		
	MPS	FCSEMS	*P* value
Mean number of ERCPs[b]	3.9 ± 1.3 (82)	2.6 ± 1.3 (79)	<.001
Mean number of stents placed	6.7 ± 4.4 (81)	2.3 ± 3.3 (79)	<.001
Median procedure duration, *min*	28.0 (302) (5.0,144.0)	26.0 (192) (3.0,182.0)	.519
Median total stenting time, *mo*	11.8 (80) (0.1,25.4)	11.8 (79) (0.1,25.3)	.975

Ramchandani. Gastroenterology 2021

Post-cholecystectomy Bile Leak: stent or cut?

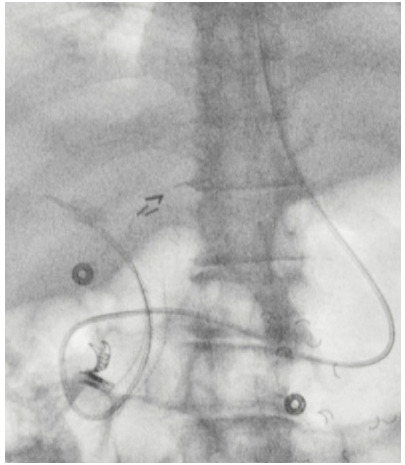
Study/year of publication	Sphincterotomy alone success, % (*n*/*N*)	Sphincterotomy alone adverse events, % (*n*/*N*)	Stent alone success, % (*n*/*N*)	Stent alone adverse events, % (*n*/*N*)	Stent and sphincterotomy, success, % (*n*/*N*)	Stent and sphincterotomy, adverse events, % (*n*/*N*)	Death, % (*n*/*N*)
Abbas et al. [18]	89 (203/228)	13 (29/228)	96 (215/224)	9 (20/224)	97 (465/480)	9 (43/480)	0
Chandra et al. [20]	91 (32/35)	0	NA	NA	94 (16/17)	0	0
Dolay et al. [8]	85 (11/13)	0	NA	NA	100 (14/14)	0	0
Kaffes et al. [19]	78 (14/18)	NA	100 (40/40)	NA	100 (31/31)	NA	0
Sachdev et al. [11]	100 (5/5)	NA	100 (6/6)	NA	100 (52/52)	NA	0

Stenting +/- sphincterotomy is superior to sphincterotomy alone.
What stent?

Nagra. Dig Dis 2020

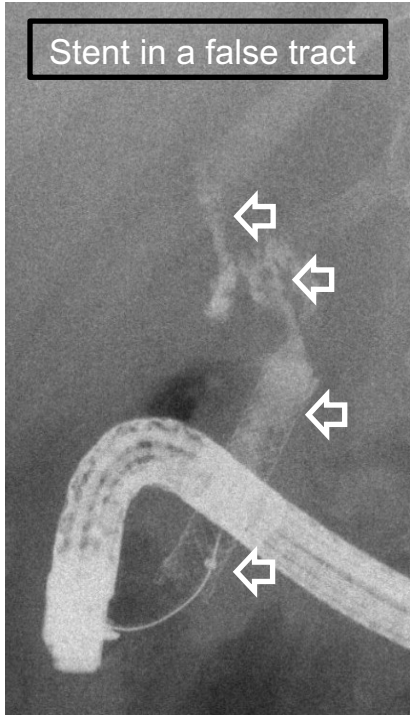
Miscellaneous Conditions that involve stenting

- Cholangitis
- Stones (extrahepatic, intrahepatic)
- Hepatic abscess
- IPMN with bile duct obstruction
- Hemobilia with ductal obstruction
- PSC



Reminders

- Uncovered metal stents should not be used for biliary strictures that has no tissue confirmation
- Transluminal stenting is not a substitution for poor basic biliary training and failed access
- Be careful if a linear tract is a real ductal stricture or a false tract along the bile duct tissue. Don’t stent if you are not certain!!



Conclusions

- Stenting has evolved significantly since 1979
- While metal stents are primarily straight stents, plastic stents come in straight, curved, single or double pigtails and even a nasobiliary design. Proper use of each type is crucial to clinical success
- Usages of transluminal (LAMS) stents are still evolving, with fundamental requirement of high-level skills and cautious application

Thank You