



Annual

**Advances and Innovations in Endoscopic Oncology
and Multidisciplinary Gastrointestinal Cancer Care**

Endoscopic Interventions to Optimize Pancreaticobiliary Surgical Outcomes

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DISCLOSURES

- Consultant for Boston Scientific.
- Grant/Research Support from Taewoong Medical USA.
- This presentation and/or comments will be free of any bias toward or promotion of the above referenced companies or their product(s) and/or other business interests.

This presentation and/or comments will provide a balanced, non-promotional, and evidence-based approach to all diagnostic, therapeutic and/or research related content.

This presentation has been peer-reviewed and no conflicts were noted.

OBJECTIVES



Endoscopic Interventions to Optimize Pancreaticobiliary Surgical Outcomes From Diagnosis to Rescue

1

Before surgery:
diagnosis, staging, and
tissue acquisition

Get the diagnosis and
staging right **without
creating downstream
surgical problems.**

2

Preoperative
biliary drainage:
who, when, and how?

When drainage is
needed, choose a
strategy that **aligns
with the intended
treatment pathway.**

3

Endoscopy during
neoadjuvant therapy:
keeping patients on track

Continued optimization
and management of
adverse events to **keep
individuals on schedule
for neoadjuvant therapy
and surgery.**

4

Postoperative
problems:
endoscopy as surgical
rescue

Endoscopic management
of postoperative
complications provides
a **minimally invasive
approach leading to
faster recovery.**

Diagnosis & Staging

Preoperative Optimization

Neoadjuvant Therapy

Surgery

Postoperative Recovery
and Management

01

Before surgery

Diagnosis, staging, and tissue acquisition

Get the diagnosis and staging right without creating downstream surgical problems.

PATIENT PATHWAY

**Diagnosis &
Staging**

Preoperative
Optimization

Neoadjuvant
Therapy

Surgery

Postoperative Recovery
& Management

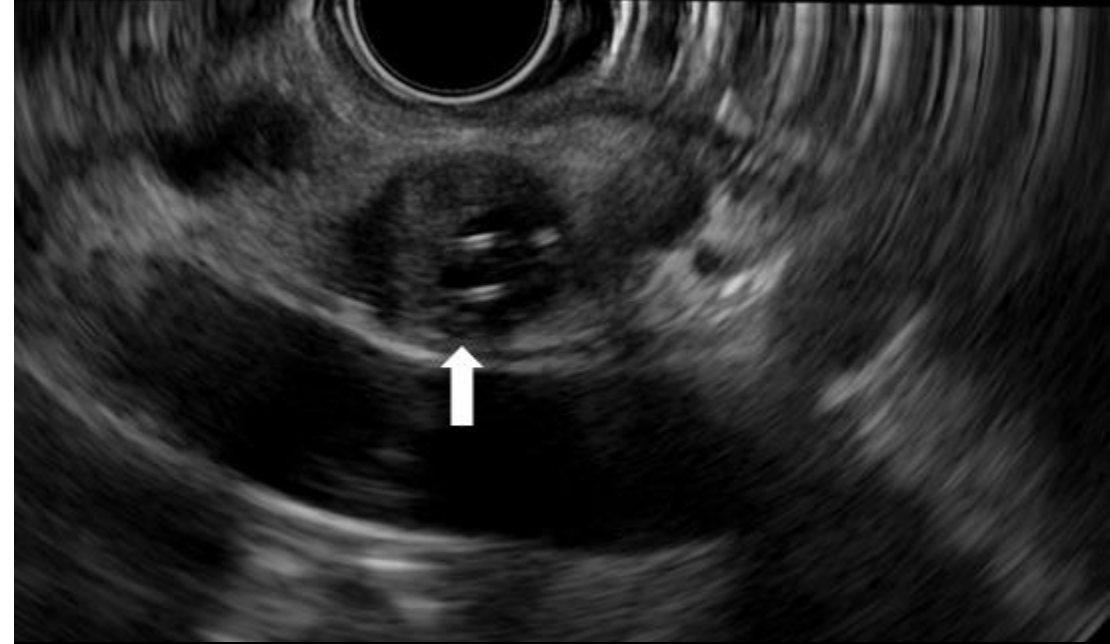
EUS-TA FOR PANCREAS MASS LESIONS

- Overall, EUS has ~91% diagnostic sensitivity and >96% specificity for solid pancreatic tumors with AE rate <1%
- Factors associated with reduced sensitivity

<u>Tumor-related</u>	<u>Procedure-related</u>	<u>Technical factors</u>
Small lesions (<2 cm)	Prior biliary stenting	Suboptimal needle selection
Background chronic pancreatitis	Fewer needle passes	Inadequate sampling technique
Head/Uncinate location	Transduodenal sampling	Inadequate specimen processing
Tumor necrosis		

EUS FOR PERIHILAR BILIARY TUMORS

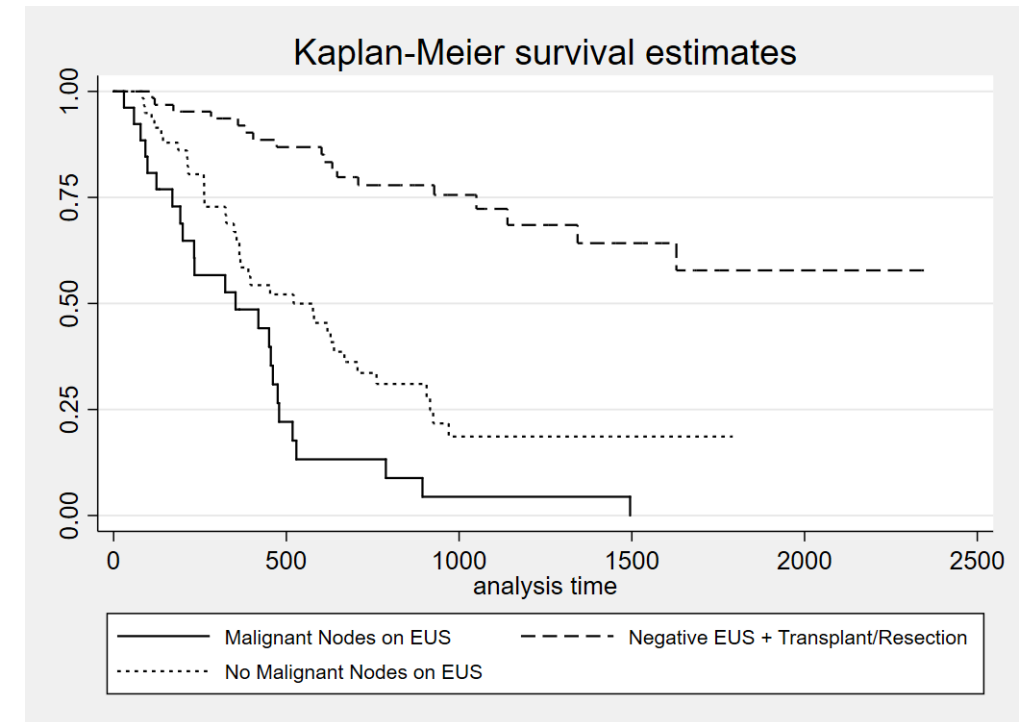
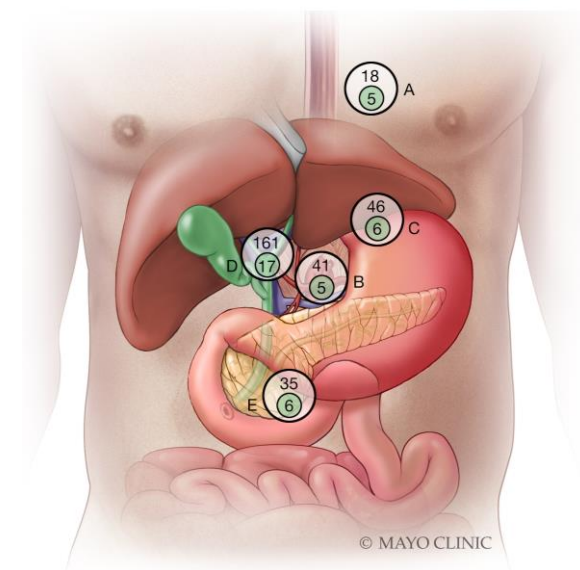
- Direct biopsy of perihilar masses has the highest sensitivity, but contraindicated in patients who may be curative surgical candidates (resection or transplant) due to concern for needle-tract seeding
- Direct tumor sampling may be performed in select patients
 - Those not considered candidates for operative cure
 - Distal CCA (curative resection involves the duodenum)



Endoscopic Ultrasound/Fine Needle Aspiration Is Effective for Lymph Node Staging in Patients With Cholangiocarcinoma

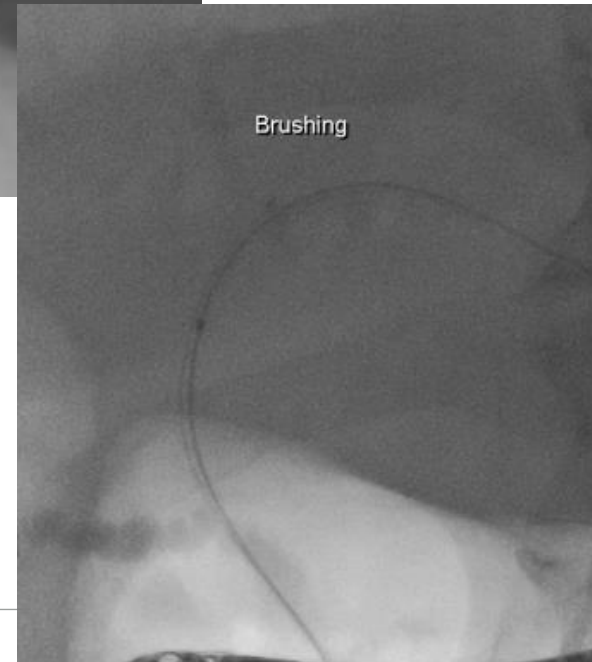
Thomas Malikowski,¹ Michael J. Levy,² Ferga C. Gleeson,² Andrew C. Storm,² Eric J. Vargas,² Mark D. Topazian,² Barham K. Abu Dayyeh,² Prasad G. Iyer,² Elizabeth Rajan,² Gregory J. Gores,² Lewis R. Roberts,² and Vinay Chandrasekhara²

- 157 patients (124 pCCA)
- EUS detected regional lymph nodes in 86% vs 47% with cross-sectional imaging; $P < 0.001$
- EUS detected LN metastases in 87.1% of those ultimately diagnosed with metastatic disease



ERCP SAMPLING

- Sensitivity 8-43%
- Specificity >90%
- Sensitivity is higher when suspicious cytology is included
- Challenges: sampling desired target, obtaining viable cells, interobserver variability for interpretation
 - Tumor cells may be rare or not highly abnormal
 - Reactive cells in PSC may resemble neoplastic cells
- FISH improves sensitivity to 65%



TRIPLE MODALITY TESTING

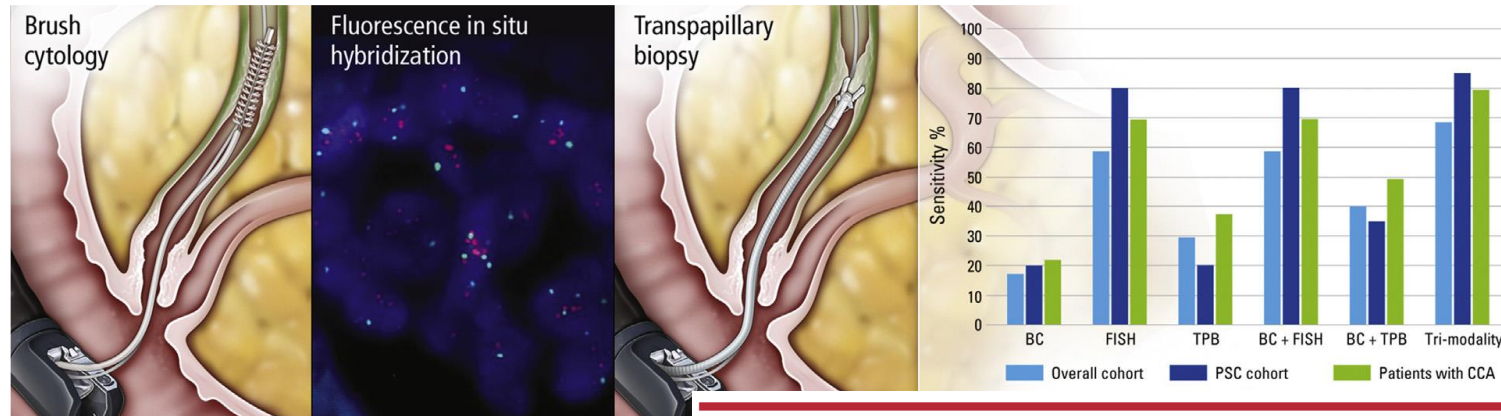


TABLE 3. Performance characteristics of tissue sampling techniques for malignancy detection

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Overall cohort, n = 204				
BC	17.3 (10.6-26)	100 (96.4-100)	100 (81.5-100)	53.8 (46-61.1)
TPB	29.8 (21.2-39.6)	100 (96.4-100)	100 (88.8-100)	57.8 (50.1-65.3)
FISH	58.7 (48.6-68.2)	92.0 (84.8-96.5)	88.4 (78.4-94.9)	68.1 (59.6-75.9)
BC+FISH	58.7 (48.6-68.2)	92.0 (84.8-96.5)	88.4 (78.4-94.9)	68.1 (59.6-75.9)
BC+TPB	40.4 (30.9-50.5)	100 (96.4-100)	100 (91.6-100)	61.7 (53.8-69.2)
BC+FISH+TPB	68.3 (58.4-77.1)	92.0 (84.8-96.5)	89.9 (81.0-95.5)	73.6 (65.0-81.1)
Patients with primary sclerosing cholangitis, n = 57				
BC	20.0 (5.7-43.7)	100 (90.5-100)	100 (39.8-100)	69.8 (55.7-81.7)
TPB	20.0 (5.7-43.7)	100 (90.5-100)	100 (39.8-100)	69.8 (55.7-81.7)
FISH	80.0 (56.3-94.3)	86.5 (71.2-95.5)	76.2 (52.8-91.8)	88.9 (73.9-96.9)
BC+FISH	80.0 (56.3-94.3)	86.5 (71.2-95.5)	76.2 (52.8-91.8)	88.9 (73.9-96.9)
BC+TPB	35.0 (15.4-59.2)	100 (90.5-100)	100 (59.0-100)	74.0 (59.7-85.4)
BC+FISH+TPB	85.0 (62.1-96.8)	86.5 (71.2-95.5)	77.3 (54.6-92.2)	91.4 (76.9-98.2)

DNA/RNA-BASED NGS

DNA/RNA-Based Next-Generation Sequencing (NGS) Improves the Early Diagnosis and Management of Neoplastic Bile Duct Strictures: A Six-Year, Prospective, Multi-Institutional, Real-Time Study



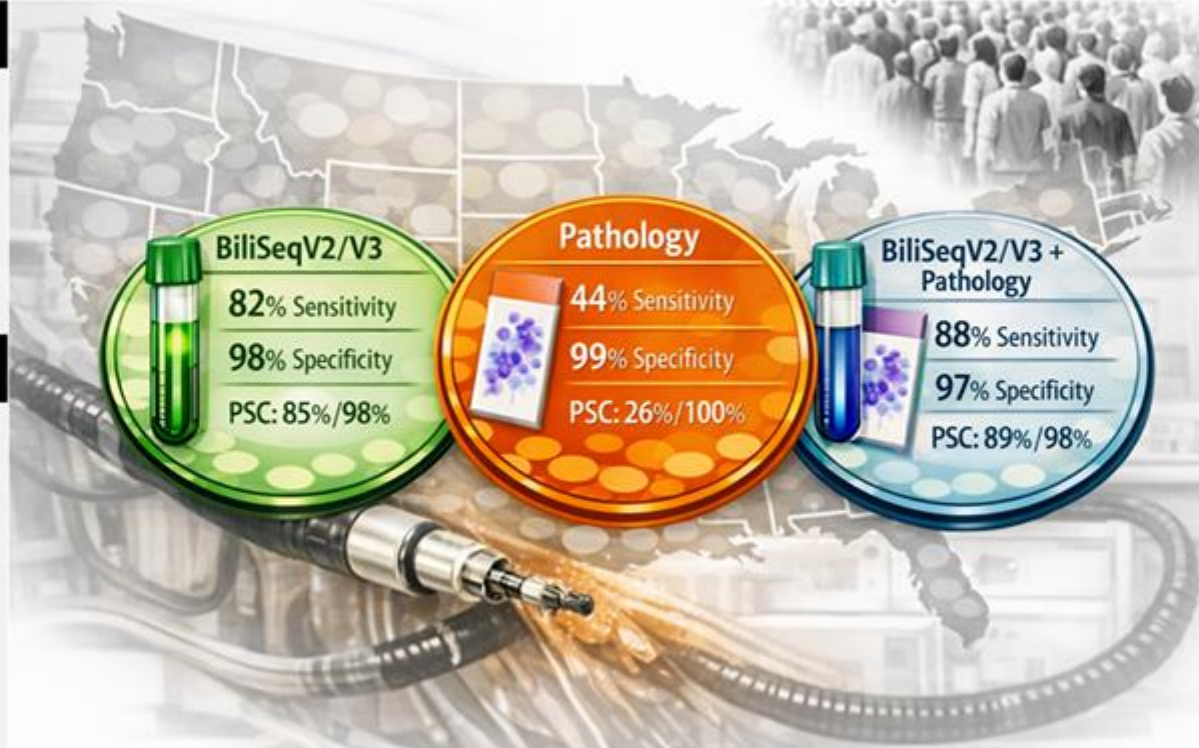
Population

- 2,116 patients from 28 institutions
- 2,908 biliary specimens (1,936 brushings, 848 biopsies & 124 bile samples)
- 95% patient follow-up



Study design

- Real-time study w/ 7-to-10-day turnaround testing time
- BiliSeq version 2 (V2) for 217 patients
- BiliSeq version 3 (V3) for 1,863 patients
- Specimens collected in a unique stabilization buffer



Findings

- Indeterminate strictures: 77% sensitivity and 98% specificity
- Actionable alterations in 23% of malignancies
- Management change in 30% of patients



Summary

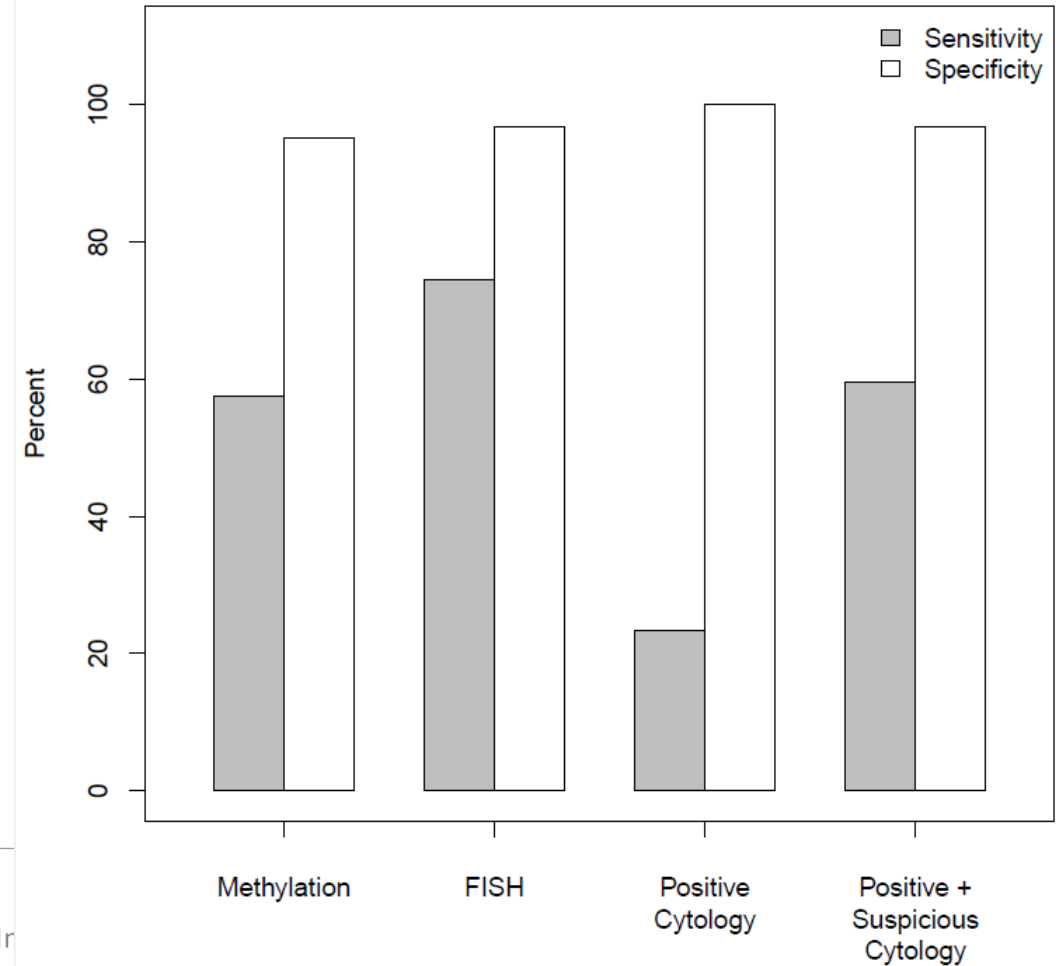
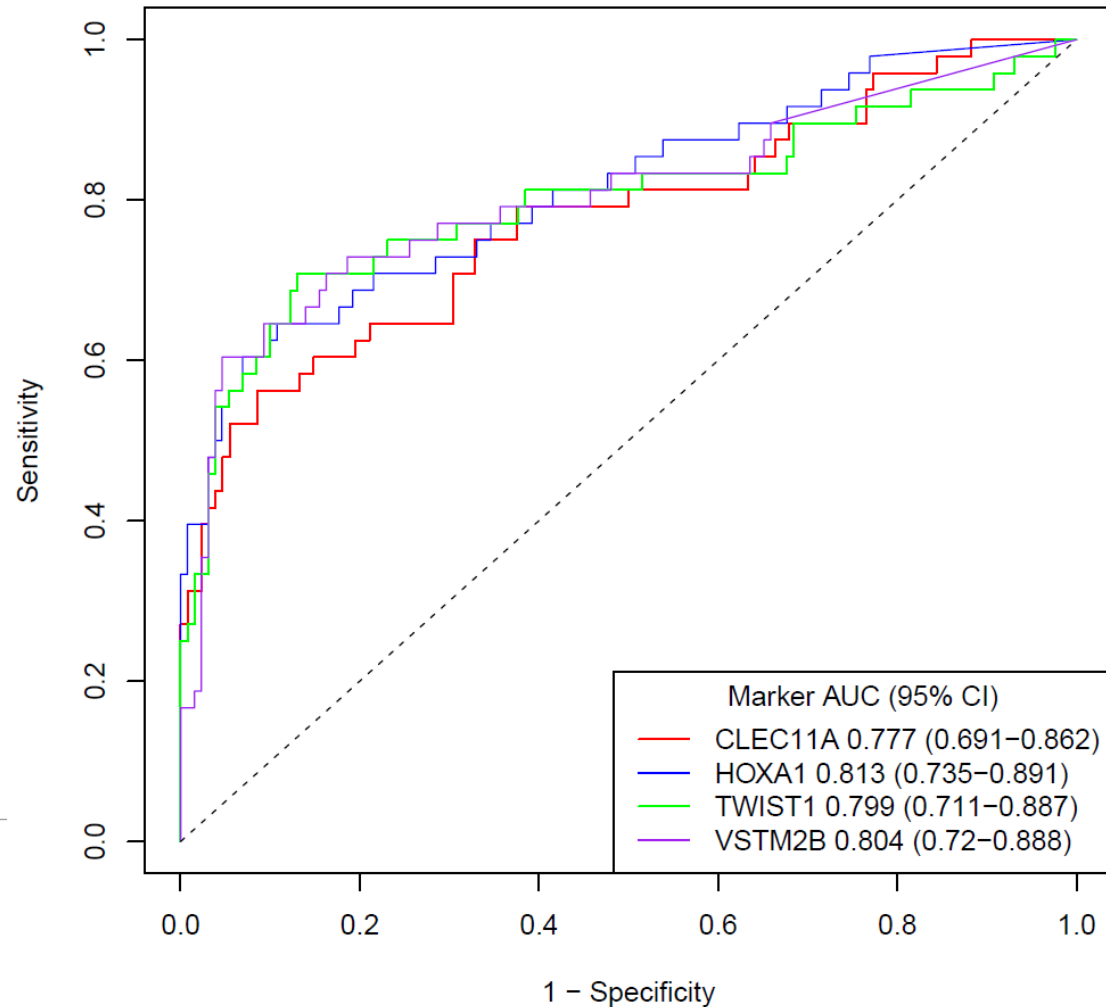
- BiliSeq nearly doubles the sensitivity of pathology
- Superior performance in high-risk populations (PSC)
- Identification of targetable alterations at diagnosis

Gastroenterology

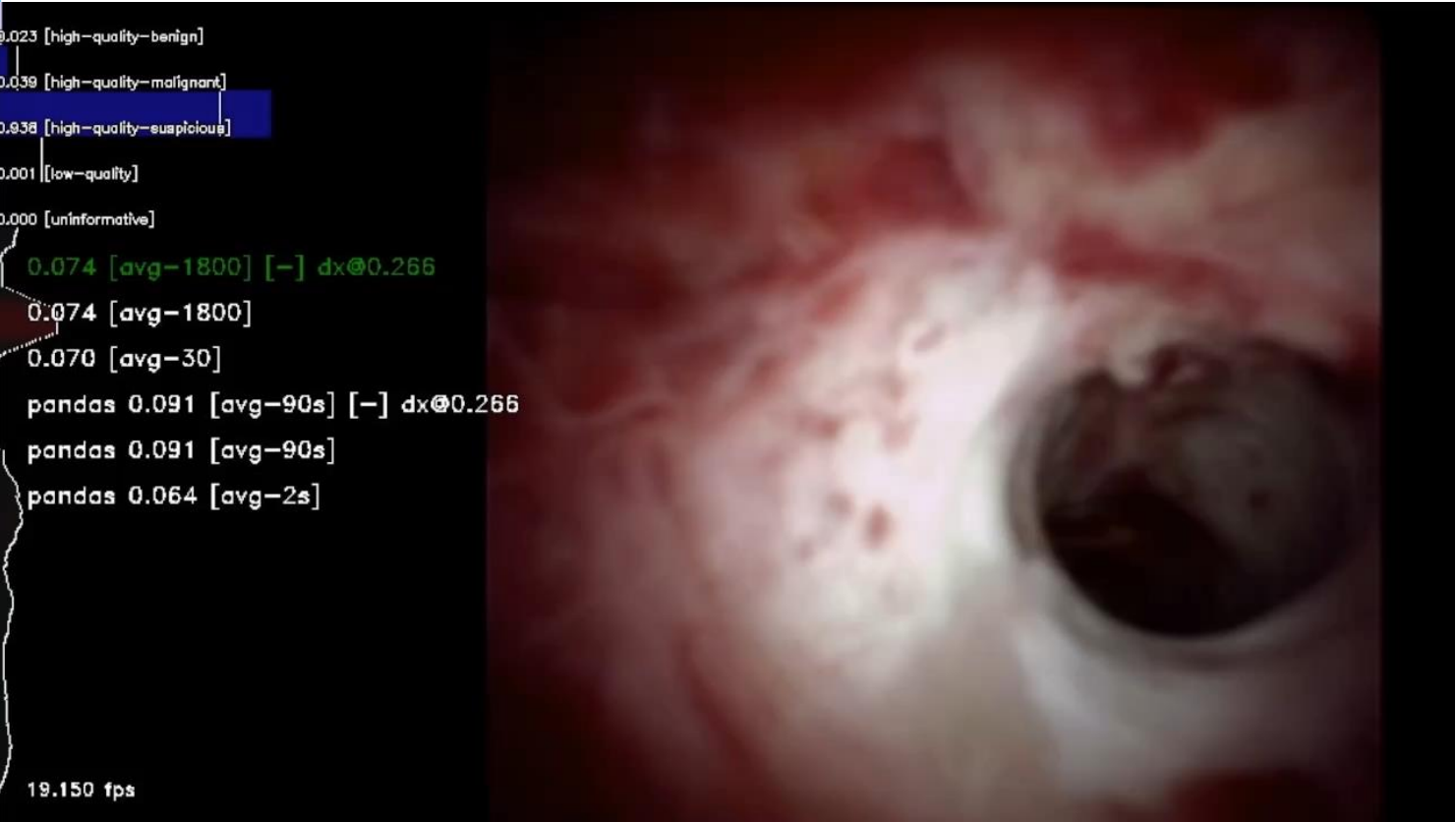
Das R. Gastroenterology 2026;171:325-41.

DNA METHYLATION

ROC for Methylation Markers



REAL TIME CHOLANGIOSCOPY AI



	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95% CI)	P-value
Brush cytology (BC)+ Transpapillary forceps biopsy (TFB)	0.438 (0.198- 0.701)	1.000 (0.735- 1.000)	0.679 (0.477- 0.841)	0.043
Cholangioscopy AI	0.875 (0.617— 0.985)	0.889 (0.653- 0.986)	0.882 (0.723- 0.967)	-----

Marya NB. Clin Gastroenterol Hepatol 2026. Epub Ahead of Print.

02

Preoperative biliary drainage

Who, when, and how?

When drainage is needed, choose a strategy that aligns with the intended treatment pathway.

PATIENT PATHWAY

Diagnosis &
Staging

**Preoperative
Optimization**

Neoadjuvant
Therapy

Surgery

Postoperative Recovery
& Management

GOALS OF BILIARY DRAINAGE

- Relieve symptoms due to cholestasis (e.g., pruritus)
- Urgent management of ascending cholangitis, if present
- Optimize medical status prior to chemotherapy
- Provide durable drainage throughout the treatment course

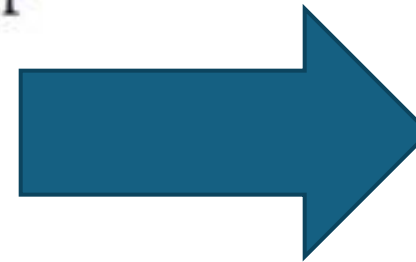
PRE-OPERATIVE BILIARY DRAINAGE

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Preoperative Biliary Drainage for Cancer of the Pancreas

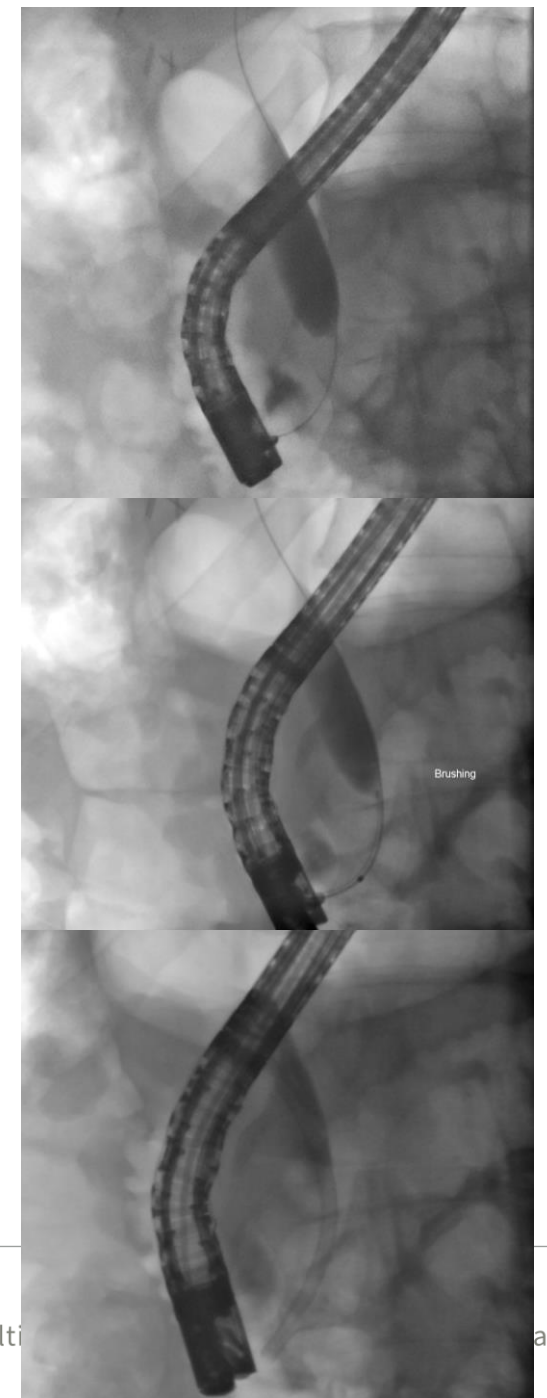
Niels A. van der Horst-Corvellec, M.D., Ph.D.,
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Erwin van der Harst, M.D., Ph.D., Frank J.G.M. van Leeuwen, M.D., Ph.D.,
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and Dirk J. Gouma, M.D., Ph.D.*



**NEOADJUVANT
THERAPY**

ERCP FOR BILIARY DRAINAGE

- Transpapillary biliary stenting is feasible in >90% with experienced operators
- >80% clinical success
- Options include plastic stent placement (PS) or self-expandable metal stents (SEMS)



ASGE GUIDELINE RECOMMENDATIONS

For patients with dMBO, ASGE suggests SEMS over PS

Conditional recommendation/low quality of evidence

- 15 RCTs with 1253 patients
- SEMS were associated with:
 - Longer stent patency (8 RCTs; MD, 3.4 months; 95% CI, 1.83-5.02; I2 Z 97%)
 - Reduced risk of stent failure (12 RCTs; OR, .45; 95% CI, .36-.55; I2 Z 0%)
 - Lower rates of acute cholangitis (11 RCTs; OR, .53; 95% CI, .33-.87; I2 Z 44%)
 - Lower rates of endoscopic reinterventions (4 RCTs; OR, .58; 95% CI, .40-.85; I2 Z 28%)
 - No differences between SEMS & PS with mean survival, 30-day mortality, post-ERCP pancreatitis, acute cholecystitis, surgical resectability, and postoperative adverse events

American Society for Gastrointestinal Endoscopy guideline on the role of endoscopy in the diagnosis and management of solid pancreatic masses: summary and recommendations

Prepared by: THE ASGE STANDARDS OF PRACTICE COMMITTEE

Jorge D. Machicado, MD, MPH,^{1,*} Sunil G. Sheth, MD, FASGE,^{2,*} Jean M. Chalhoub, MD,³ Nauzer Forbes, MD, MSc, FASGE,⁴ Madhav Desai, MD, MPH,⁵ Saowanee Ngamruengphong, MD, FASGE,⁶ Georgios I. Papachristou, MD, PhD,⁷ Vaibhav Sahai, MBBS, MS,⁸ Ibrahim Nassour, MD, MSCS,⁹ Wasif Abidi, MD, PhD,¹⁰ Omeed Alipour, MD,¹¹ Stuart K. Amateau, MD, PhD, FASGE,¹² Nayantara Coelho-Prabhu, MD, FASGE,¹³ Natalie Cosgrove, MD,¹⁴ Sherif E. Elhanafi, MD,¹⁵ Larissa L. Fujii-Lau, MD,¹⁶ Divyanshoo R. Kohli, MD,¹⁷ Neil B. Marya, MD,¹⁸ Swati Pawa, MD, FASGE,¹⁹ Wenly Ruan, MD,²⁰ Nikhil R. Thiruvengadam, MD,²¹ Nirav C. Thosani, MD,⁵ Bashir J. Qumseya, MD, MPH, FASGE,²² ASGE Standards of Practice Committee Chair

UCSEMS VS FCSEMS

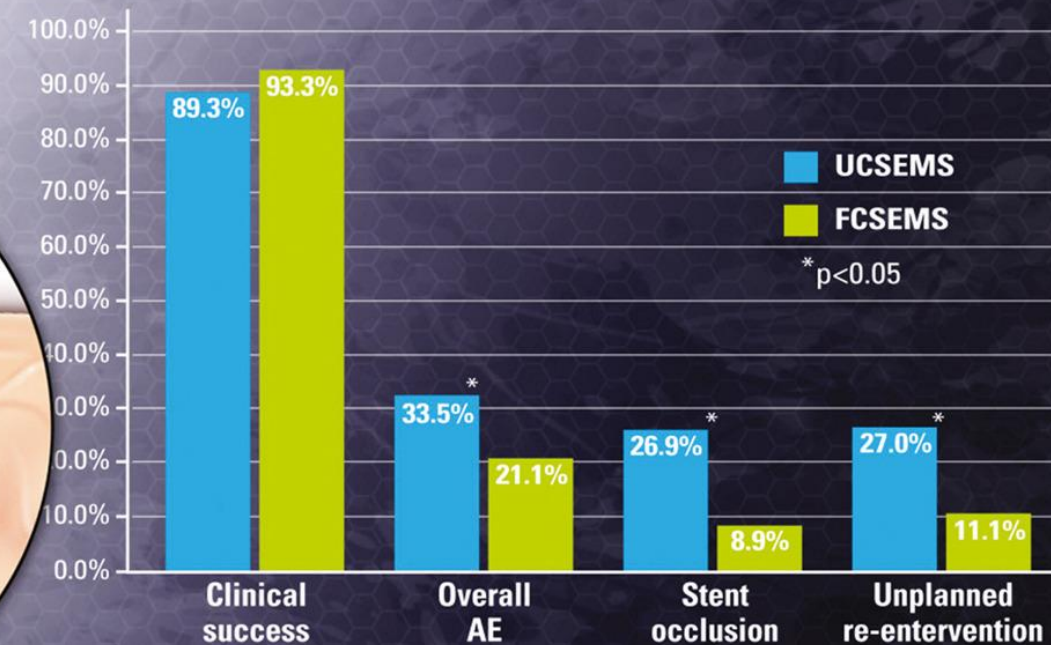
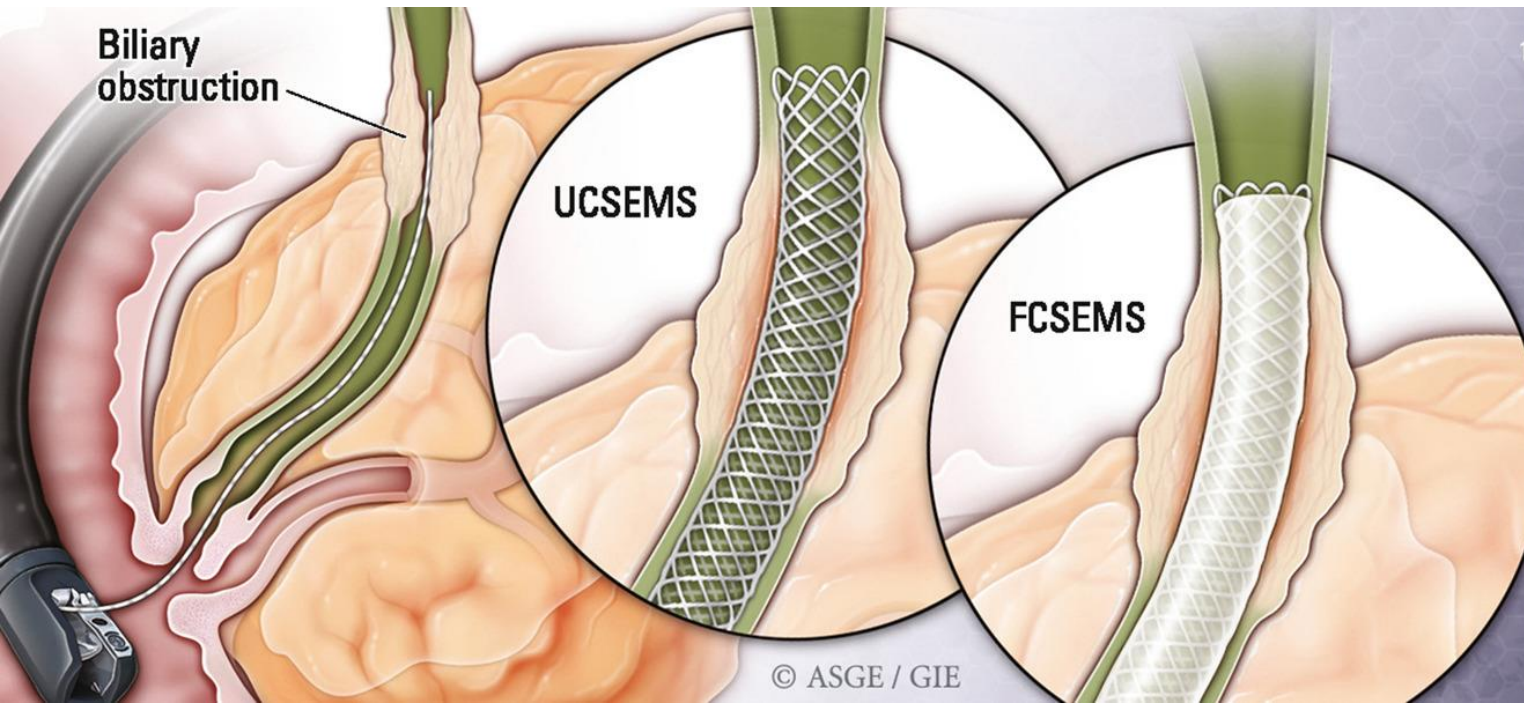
- Retrospective cohort study of 454 patient
 - 364 UCSEMS
 - 90 FCSEMS
- Median f/u 9.6 mo

Uncovered versus fully covered self-expandable metal stents for the management of distal malignant biliary obstruction

Rabih Ghazi, MD,* Jad P. AbiMansour, MD,* Tala Mahmoud, MD, John A. Martin, MD, Ryan J. Law, DO, Michael J. Levy, MD, Barham K. Abu Dayyeh, MD, MPH, Andrew C. Storm, MD, Bret T. Petersen, MD, Vinay Chandrasekhara, MD

Rochester, Minnesota, USA

GIE 2023.



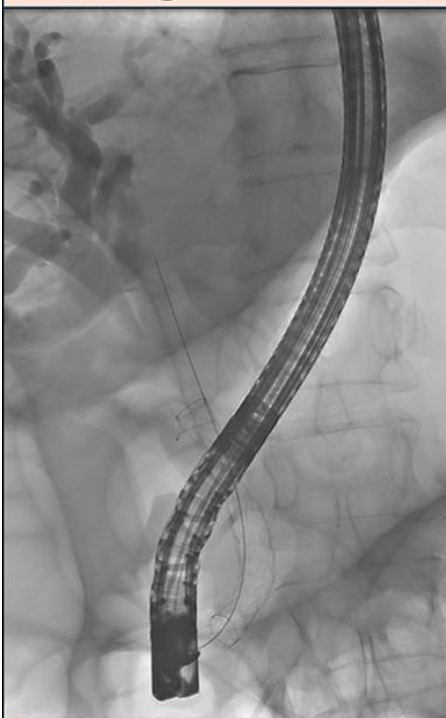
ASGE GUIDELINE RECOMMENDATIONS

General concepts

- Use 10 mm FC or PC SEMS
- Select stent that will bridge stenosis for >10 mm and be 2 cm below the hepatic hilum
- When feasible, proximal end should terminate below cystic duct take-off in those with an intact GB
- If cystic duct will be traversed, consider uSEMS or PS GB stenting alongside FCSEMS

ANTI-MIGRATION FINS

Comparison of Fully Covered Self-Expandable Metal Stents With and Without Anti-Migration Fins for the Management of Distal Malignant Biliary Obstruction

			Traditional FCSEMS (n=142)			Outcome event	Hazard ratio without fins versus with fins (95% CI)	p-value
			FCSEMS-AF (n=73)				Re-intervention	1.03 (0.54-1.97)
					Any Adverse Event		1.10 (0.59-2.08)	0.762
					Stent Occlusion		0.68 (0.31-1.51)	0.342
					Stent Migration		12.23 (1.90-78.66)	0.008

Conclusion: FCSEMS and FCSEMS-AF have similar overall performance in dMBO, but traditional FCSEMS were more likely to migrate. Both groups had similar occlusion risk after stent length adjustment.

Abbreviations: FCSEMS, Fully covered self-expandable metal stents; FCSEMS-AF, Fully covered self-expandable metal stents with anti-migration fins; dMBO, distal malignant biliary obstruction

META-ANALYSIS OF RCTs

Endoscopy

Types of Self-Expandable Metal Stents for Palliative Drainage of Unresectable Extrahepatic Malignant Biliary Obstruction: A Network Meta-Analysis of Randomized Controlled Trials

Daniel M Simadibrata, Chinmay Guralwar, Manik Aggarwal, Leslie C Hassett, Giuseppe Vanella, Vinay Chandrasekhara.

- 10 RCTs with 1,659 individuals
- No significant differences in time to recurrent biliary obstruction, incidence of RBO, or overall survival
- UCSEMS had lowest rates of stent migration, but highest rates of tissue ingrowth
- FCSEMS had highest rates of acute cholecystitis

MALIGNANT HILAR BILIARY OBSTRUCTION

- Not all individuals with MHBO require drainage
- Avoid atrophic liver lobes
 - Does not improve biochemical results
 - Increased risk of cholangitis
- Drain >50% of the viable liver
 - Associated with longer median survival (119 vs 59 days; $P=0.005$)

ORIGINAL ARTICLE: Clinical Endoscopy

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 Chrysostalis, MD, Marianne Gaudric, MD, Gilles Pelletier, MD, PhD, Catherine Buffet, MD, PhD, Stanislas Chaussade, MD, PhD, Frédéric Prat, MD, PhD

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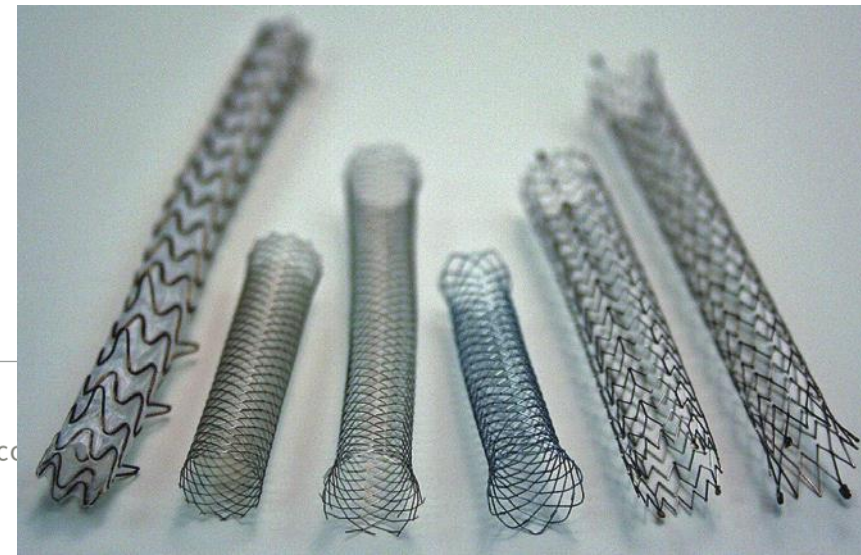
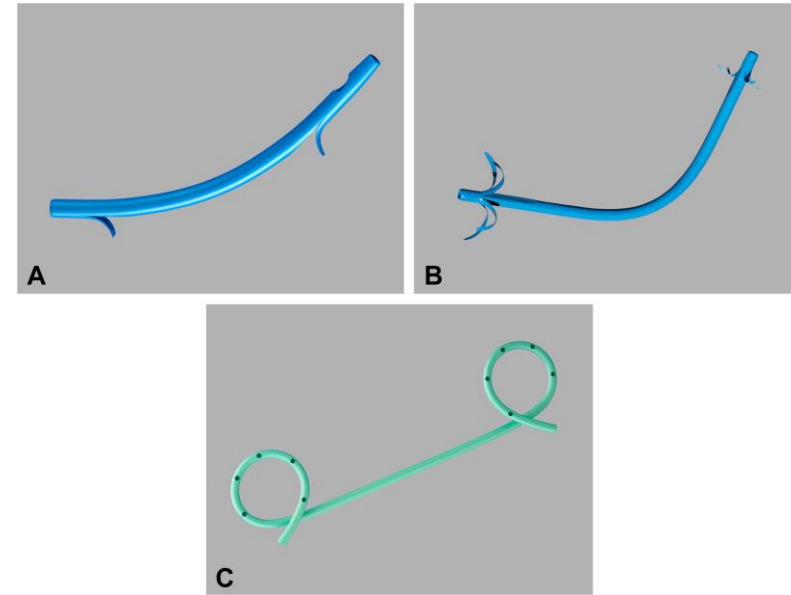
STENT SELECTION

Plastic stents (PS)

- Preferred when diagnosis has not been established or optimal drainage strategy is not clear
- If patient requires reintervention, easier to change PS than address occluded SEMS

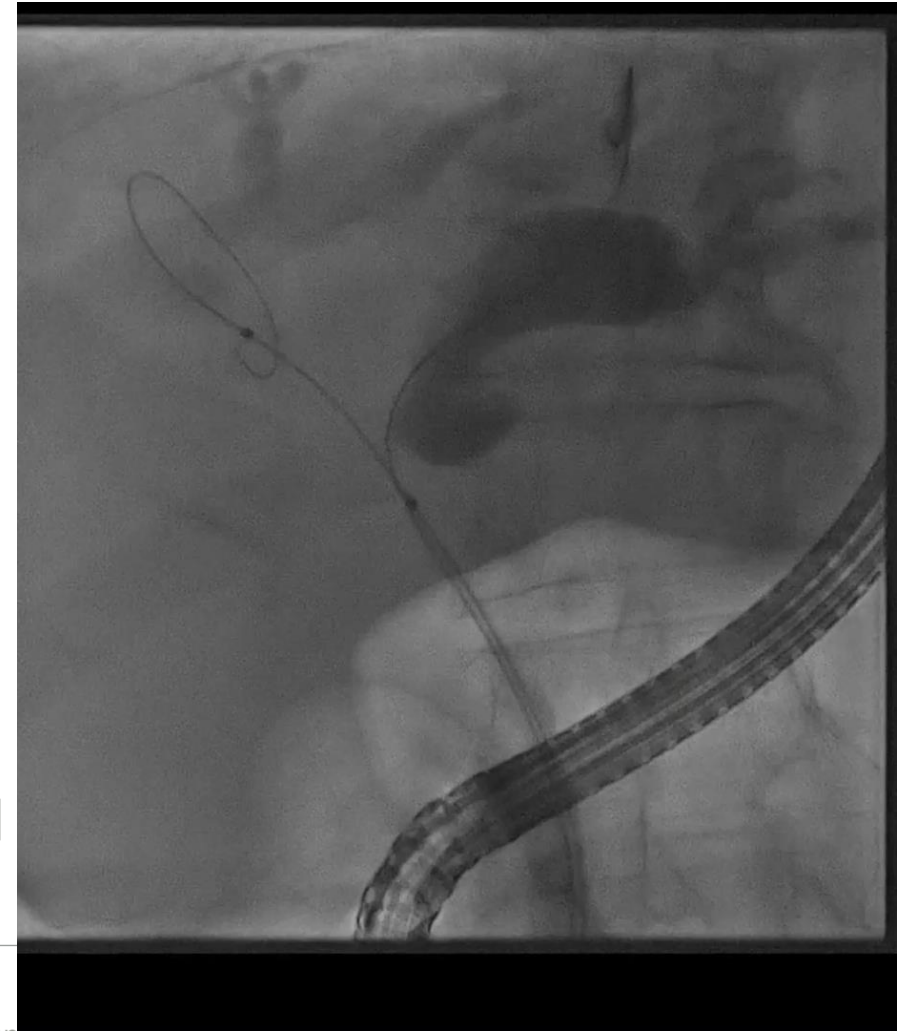
Self Expandable Metal Stents (SEMS)

- High technical success
- High clinical success
- Fewer reinterventions when compared to PS that were placed without scheduled stent exchange



STENT GUIDELINE RECOMMENDATIONS

- In patients undergoing treatment, either PS or SEMS can be used based on individual factors and local expertise
- Asia-Pacific Consensus recommends PS with scheduled stent exchange in those with Bismuth II-IV strictures who may respond well to chemotherapy
- Many patients are living longer
- Our practice is to use multiple long plastic wedge stents
- Convert to metal stenting due to patient preference or end of life



03

Endoscopy during neoadjuvant therapy

Keeping patients on track

Continued optimization and management of adverse events to keep individuals on schedule for neoadjuvant therapy and surgery.

PATIENT PATHWAY

Diagnosis &
Staging

Preoperative
Optimization

**Neoadjuvant
Therapy**

Surgery

Postoperative Recovery
& Management

MALIGNANT GASTRIC OUTLET OBSTRUCTION

- 436 patients (232 EUS-GE, 131 stenting, 73 surgical GE)
- Clinical success: ability to tolerate full liquids <2 weeks

Original article

Thieme

Endoscopic ultrasound-guided gastroenterostomy for the management of gastric outlet obstruction: A large comparative study with long-term follow-up

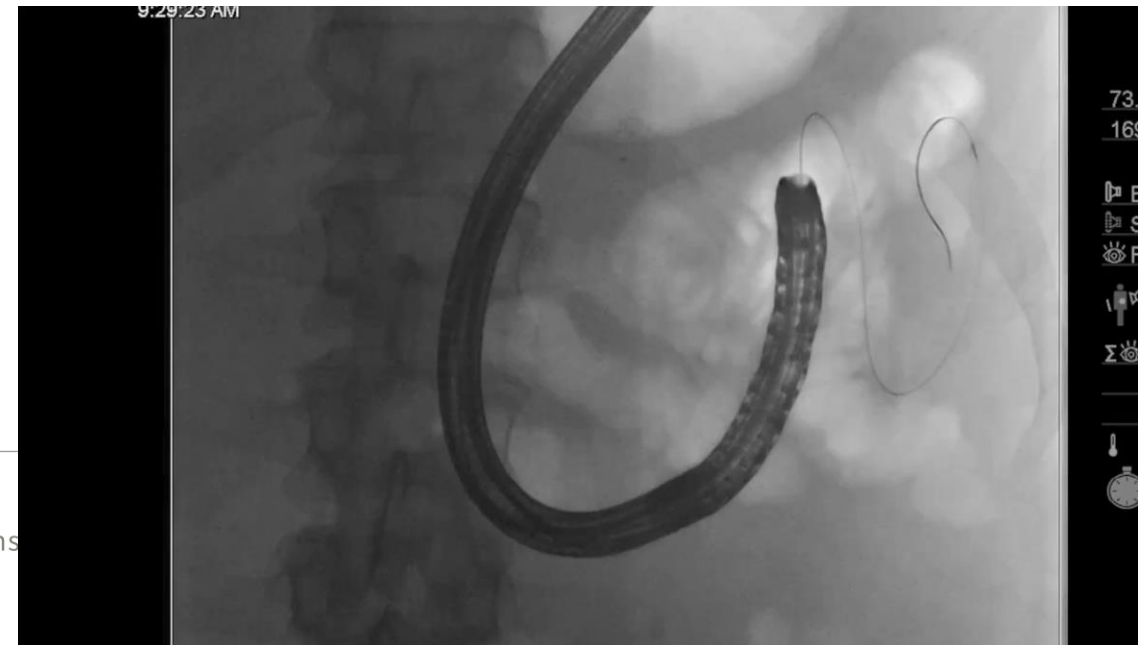
OPEN
ACCESS



Authors

Veeravich Jaruvongvanich¹, Tala Mahmoud¹, Barham K. Abu Dayyeh¹, Vinay Chandrasekhara¹, Ryan Law¹, Andrew C. Storm¹, Michael J. Levy¹, Eric J. Vargas¹, Neil B. Marya², Donna M. Abboud¹, Rabih Ghazi¹, Reem Matar¹, Babusai Rapaka¹, Navtej Buttar¹, Mark J. Truty³, Maridi Aerts⁴, Nouredin Messaoudi⁵, Rastislav Kunda⁶

	EUS-GE	ES	Surgical GE	P value
Clinical success	98.3%	91.6%	90.4%	<0.0001
LOS, median (IQR)	2 days (1-3)	3 days (1-10)	5 days (2-9)	<0.0001
Adverse Events	8.6%	38.9%	27.4%	<0.001



2026 Annual Advances and Innovations

Jaruvongvanich V et al. Endoscopy Int Open 2023;11:E60-6.

EUS-GE: RCTs

TRIAL / COMPARATOR	SAMPLE	PRIMARY ENDPOINT	OTHER CLINICALLY RELEVANT RESULTS
DRA-GOO · Teoh et al. Lancet GH 2025 (corrected)	EUS-GE 48 Duodenal SEMS 49	6-mo stent-related reintervention 4% vs 29% RR 0.15 (95% CI 0.04–0.61) p = 0.002	1-mo GOOS: 2.41 vs 1.91 (p = 0.012) 30-day AEs: 23% vs 24% Stent patency: no significant difference
ENDURO · van de Pavert et al. Lancet GH 2025	EUS-GE 48 Surgical GJ 50	Time to solid food: 1 vs 3 days HR 2.21 (95% CI 1.43–3.42); p = 0.0003 GOO-related reintervention: 10% vs 12% (noninferior)	Clinical success: 96% vs 80% Median hospital stay: 1 vs 4 days Overall AEs: 58% vs 64%
Varadarajulu et al. Gut 2026	EUS-GE 38 Surgical GJ 36	Composite unfavorable outcome* (≤6 mo) 7.9% vs 38.9% Risk difference –31.0%; p = 0.002	Solid diet: 2 vs 5 days Median hospital stay: 3 vs 9 days Lower costs; better physical/social HRQoL

04

Postoperative problems

Endoscopy as surgical rescue

Endoscopic management of postoperative complications provides a minimally invasive approach leading to faster recovery.

PATIENT PATHWAY

Diagnosis &
Staging

Preoperative
Optimization

Neoadjuvant
Therapy

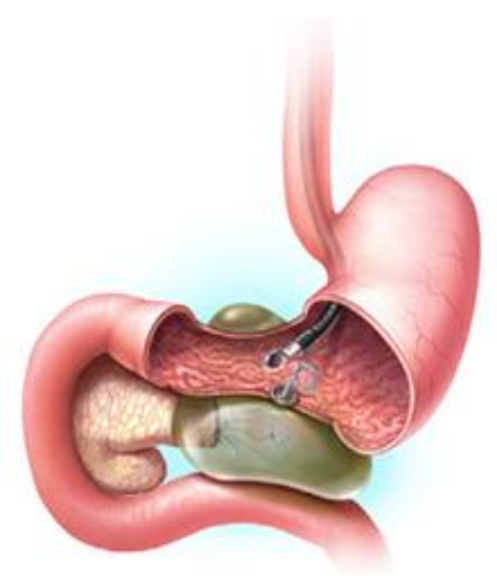
Surgery

**Postoperative Recovery
& Management**

POST-OPERATIVE ENDOSCOPIC MANAGEMENT

<u>Postoperative complication</u>	<u>Principal endoscopic intervention</u>
Post-operative pancreatic fluid collection	EUS-guided transmural drainage
Pancreatic fistula	ERCP pancreatic duct stenting in selected cases EUS-guided collection drainage
Bile leak	ERCP with biliary stenting
Hepaticojejunostomy stricture	Long-limb ERCP or EUS-guided biliary intervention
Pancreaticojejunostomy stricture	Long-limb ERCP or EUS-guided pancreatic duct drainage
Gastrojejunal anastomotic stricture	Endoscopic balloon dilation
Afferent limb syndrome	Enteral stenting or EUS-guided enteroenterostomy
Gastrointestinal anastomotic leak	Endoscopic closure, internal drainage, or vacuum therapy
Intraluminal postoperative bleeding	Endoscopic hemostasis

POSTOPERATIVE PANCREATIC FLUID COLLECTIONS



- Retrospective study of 75 patients with POPFCs
 - 42 early: ≤ 30 days; 20 acute: ≤ 14 days
 - Technical success 100%; Clinical success 93% after mean of 2.2 procedures
 - Early & acute drainage had similar rates of clinical success and AEs compared to delayed drainage
- Retrospective study of 217 individuals with POPFCs after distal pancreatectomy
 - 106 EUS drainage vs 111 Percutaneous drainage
 - PTD was performed earlier (10 vs 27 days; $p < 0.001$)
 - EUS had higher clinical success (92.5% vs 76.6%), fewer median number of interventions (2 vs 4) and lower rate of recurrence (7.6 vs 20.7%) – all statistically significant
 - Similar rates of AEs

TAKE HOME POINTS

- Endoscopy can be used throughout a patient's cancer journey, from diagnosis to medical optimization to rescue after post-operative complications
- As devices and techniques evolve, these will be incorporated into the cancer treatment paradigm

Thank you!



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