



2023 NCSCG
20TH ANNUAL
3 GI SYMPOSIUM

A scenic view of a coastline with a large tree in the foreground, overlaid with a teal gradient. The background shows a rocky shore, a sandy beach, and the ocean under a clear sky. The tree's branches and leaves are visible in the upper and right portions of the frame.

Advanced Endoscopy Updates

Chris Hamerski MD

Regional Lead, Interventional Endoscopy

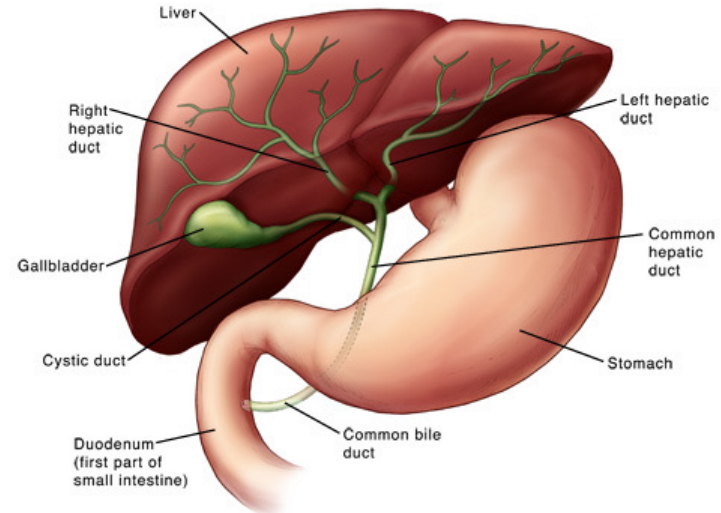
Kaiser Permanente Northern California

Overview

- Management of Gastric Outlet Obstruction (GOO)
 - EUS-gastrojejunostomy/gastroenterostomy “EUS-GJ or EUS-GE”
- Management of cholecystitis
 - EUS-cholecystoduodenostomy
- Altered anatomy ERCP

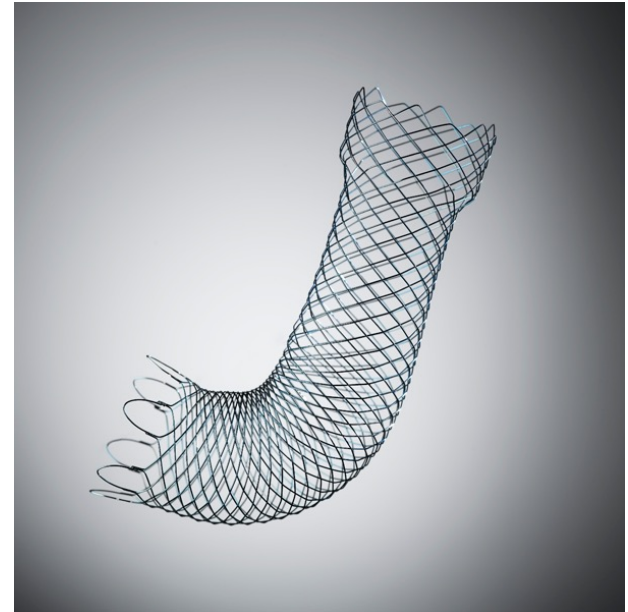
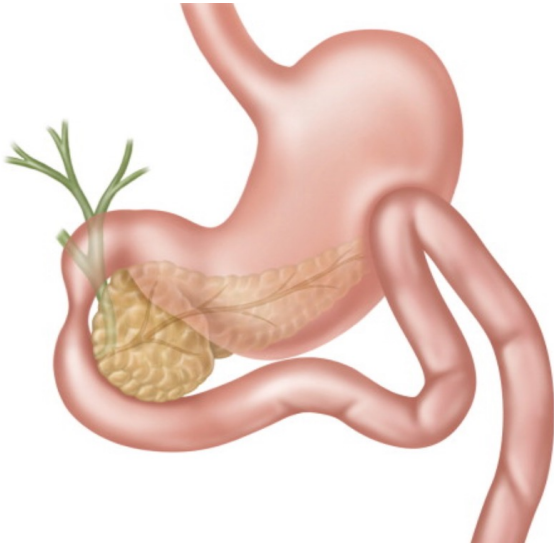
Endoscopic Management of Gastric Outlet Obstruction (GOO)

- Definition:
 - Clinical and pathophysiologic consequence of any disease process that produces a mechanical impediment to gastric emptying
 - Benign
 - Peptic ulcer disease
 - Extrinsic compression
 - Benign tumors
 - Malignant
 - Gastric cancer
 - Duodenal cancer
 - Pancreatic cancer



Endoscopic Management of Gastric Outlet Obstruction (GOO)

- Malignant GOO
 - Surgery vs Enteral stenting

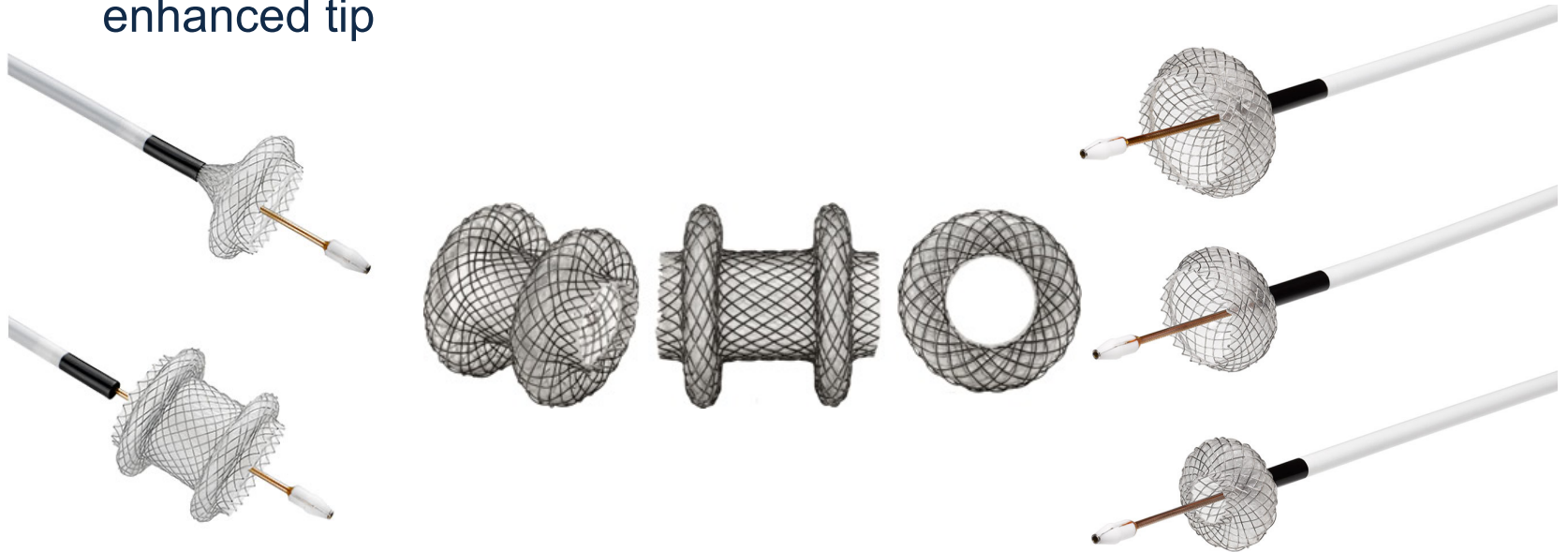


Enteral Stenting for GOO

- 15-40% of enteral stent patients require reintervention
- Duodenal stent increases risk of biliary stent dysfunction (HR 2.0)
 - Mean biliary stent patency 64 days with duodenal stent vs 170 days w/o duodenal stent
- **Take home:** Enteral stenting faster than surgery at relieving obstruction with shorter hospitalization, but worse long term outcomes
- When life expectancy is
 - >6 months, surgical GJ is superior
 - <6 months, enteral stent is superior

EUS-Gastrojejunostomy

- Axios biflanged Lumen Apposing Metal Stent (LAMS)
 - EUS-guided stent deployment system with electrocautery enhanced tip



Endoscopic ultrasound-guided gastroenterostomy using novel tools designed for transluminal therapy: a porcine study

Endoscopy 2012

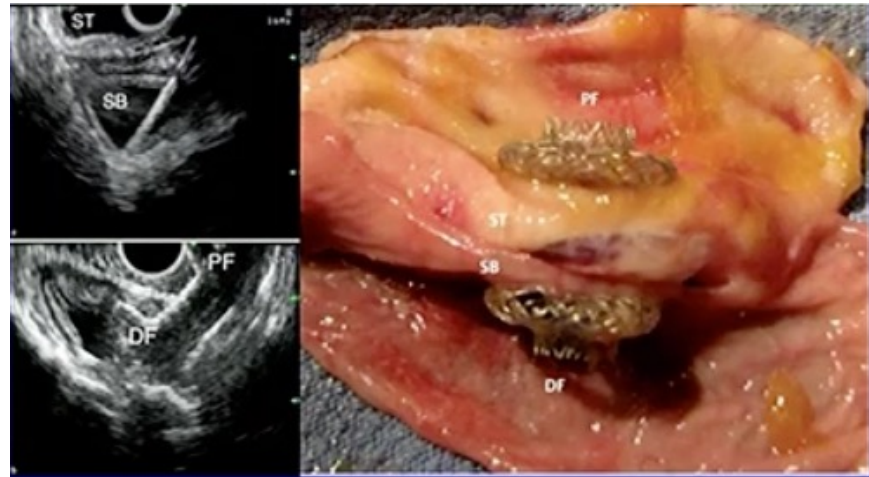
Authors

K. F. Binmoeller, J. N. Shah

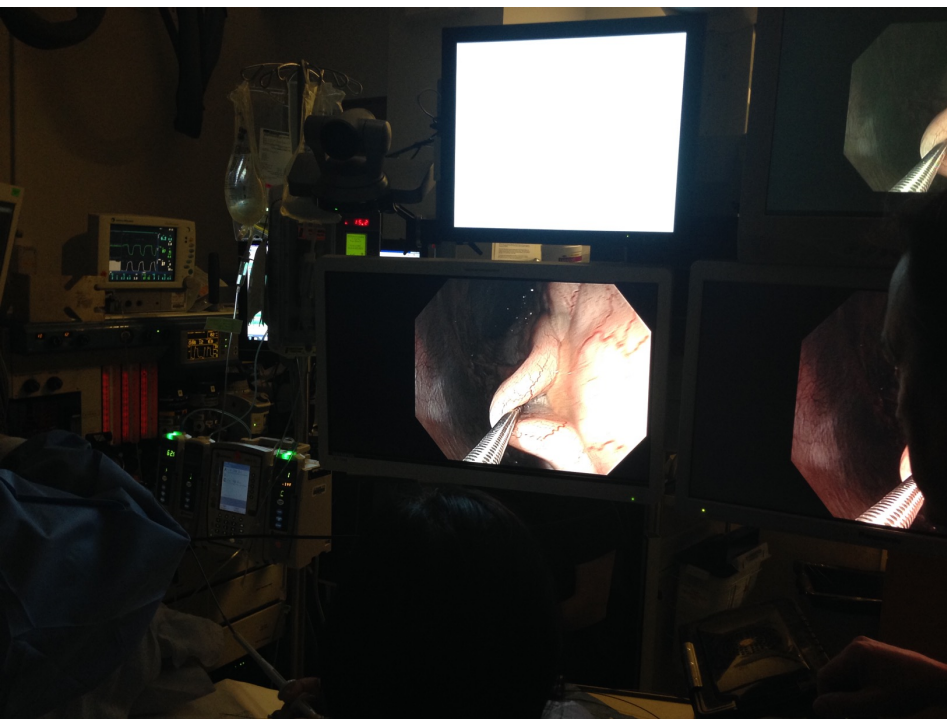
Institution

Interventional Endoscopy Services, California Pacific Medical Center, San Francisco, California, USA

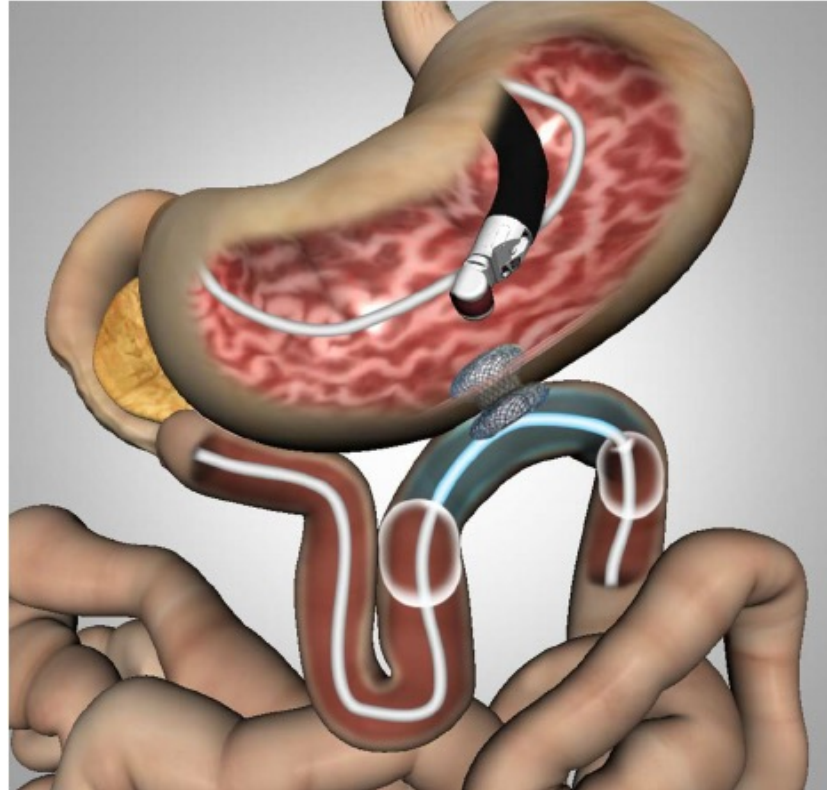
- Feasibility study in 5 pigs
- 100% technical success



First NOTES Gastrojejunostomy March 2014



EUS-Gastrojejunostomy



EUS-GJ Outcomes

- Initial data limited to case series (generally 10-30 patients)
 - 90% technical success, 90% clinical success
 - AEs: 10-15%; most managed endoscopically; 1 conversion to surgical GJ


Name of author	Number of patients	Clinical success %	Technical success %	Adverse event %
Khashab <i>et al.</i> (10)	10	90	90	0
Itoi (11)	20	90	90	2
Tyberg <i>et al.</i> (3)	26	85	92	11.5
Chen <i>et al.</i> (12)	30	83.3	86.7	10
Khashab <i>et al.</i> (1)	30	87	87	16

EUS-GJ Outcomes

- 2019 retrospective study of EUS-GJ (n=22) vs enteral stenting (n=78)
 - 100% technical success in both groups
 - Similar hospital stays
 - Higher stent failure requiring re-intervention in enteral stent group (32% vs 8%)
 - Higher adverse events in ES group (40% vs 21%)

Endoscopic ultrasound-guided gastroenterostomy versus open surgical gastrojejunostomy: clinical outcomes and cost effectiveness analysis

Surg Endo 2021

Abdul Kouanda¹ · Kenneth Binmoeller² · Christopher Hamerski² · Andrew Nett² · Jona Bernabe² · Rabindra Watson^{2,3} 

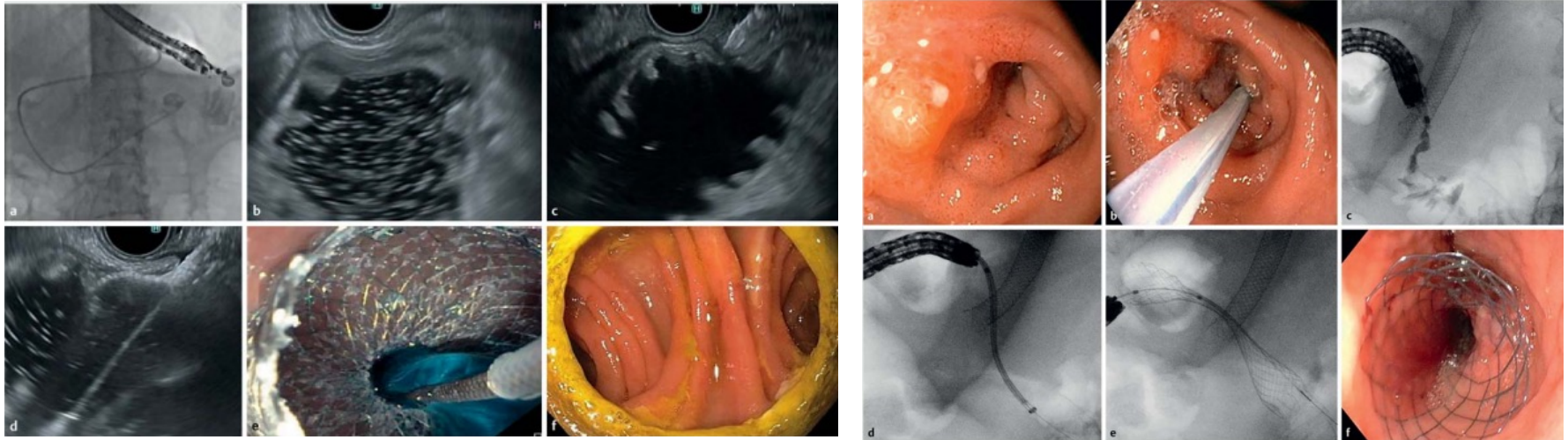
- 66 patients: 40 EUS-GE, 26 Surgical GJ
 - Similar technical success: 93% vs 100%
- EUS-GE resulted in:
 - Faster resumption of oral intake (1.3 vs 4.7 days, $p < 0.001$)
 - Shorter length of stay (5 vs 14.5 days, $p < 0.001$)
 - Faster initiation/resumption of chemotherapy (17.7 vs 31.3 days, $p = 0.033$)
 - Lower cost (\$49,387 vs \$124,192)
 - No difference in symptom recurrence, re-intervention, 30 day mortality

Endoscopic ultrasound-guided gastroenterostomy versus duodenal stenting for malignant gastric outlet obstruction: an international, multicenter, propensity score-matched comparison

Endoscopy 2022

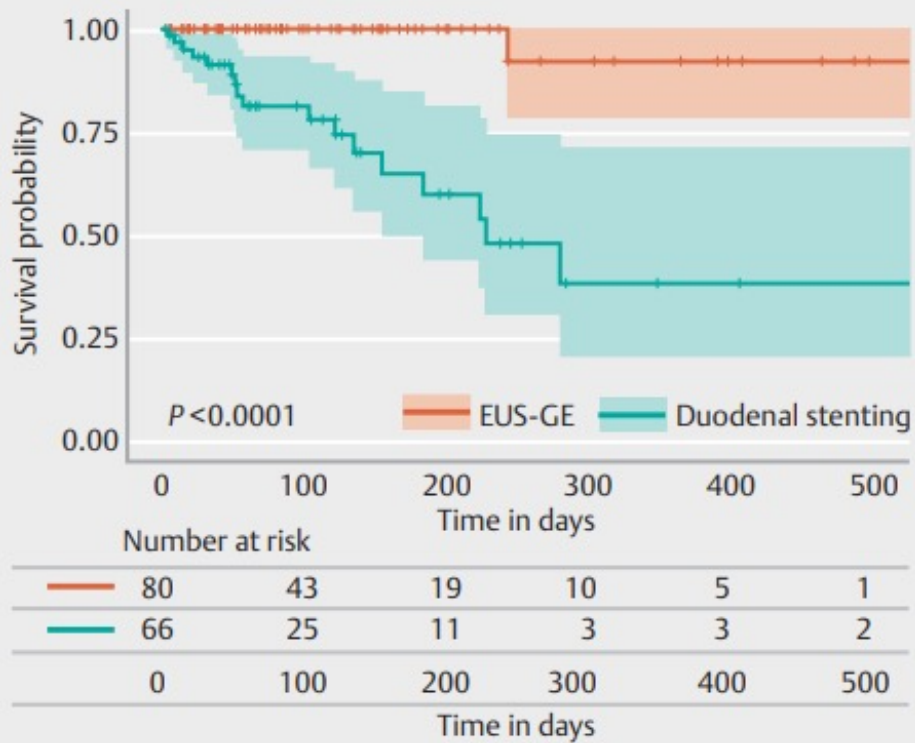
Authors

Roy L. J. van Wanrooij¹, Giuseppe Vanella², Michiel Bronswijk^{3,4}, Peter de Gooyer⁵, Wim Laleman³, Hannah van Malenstein³, Francesco Vito Mandarino², Giuseppe Dell'Anna², Paul Fockens^{1,5}, Paolo G. Arcidiacono², Schalk W. van der Merwe³, Rogier P. Voermans⁵



Endoscopic Stent vs EUS-GJ

- Multicenter retrospective study of ES (n=107) vs EUS-GJ (n=107) from 2015-2021
 - Clinical success: 75% (ES) vs 91% (EUS-GJ)
 - Stent dysfunction: 26% vs 1%
 - 1 stent migration in EUS-GJ group after 243 days
 - Median time to stent dysfunction in ES group: 57 days
 - Adverse events: 21% vs 10%
 - 3% in EUS-GJ group required emergency salvage surgery



► **Fig.3** Kaplan–Meier curve with time to event (stent dysfunction) analysis (log-rank test $P < 0.001$). EUS-GE, endoscopic ultrasound-guided gastroenterostomy.

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

Endosc Int Open 2023

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

- Retrospective multicenter study of 436 patients (232 EUS-GE, 131 ES, 73 Surgical GE)

	EUS-GE (n=232)	ES (n=131)	Surgical-GE (n=73)	Overall P value	P value EUS- GE vs. ES [†]	P value EUS-GE vs. surgical-GE ¹
Technical success (N, %)	228 (98.3)	130 (99.2)	73 (100.0)	0.58	0.66	0.58
Clinical success (N, %)	228 (98.3)	120 (91.6)	66 (90.4)	0.002*	0.002*	0.005*
Length of hospital stay (days, median [IQR])	2 (1–3)	3 (1–10)	5 (2–9)	<0.0001*	<0.0001*	0.18
Rate of re-intervention (N, %)	2 (0.9)	16 (12.2)	10 (13.7)	<0.0001*	<0.0001*	<0.0001*
AEs, N (%)	20 (8.6)	51 (38.9)	20 (27.4)	<0.0001*	<0.0001*	<0.0001*

EUS-Gastrojejunostomy

“EUS-GJ has similar technical success and adverse event rates to duodenal stenting, but higher clinical success and lower recurrence rates, suggesting that EUS-GJ should be preferred over duodenal stenting in centers with available expertise”

EUS-GJ at DDW

- EUS-GJ for benign GOO
 - 16 patients
 - Intrinsic: NSAID stricture, PUD, XRT stricture, anastomotic stricture
 - Extrinsic: Pancreatitis, SMA syndrome, hematoma
 - 93% clinical success, 100% oral intake same day
 - 25% had stent removed, 75% stent remained in place
 - Median stent patency 286 days (88-1444 days)
 - No stent migration
- Take home: EUS-GJ excellent option for benign GOO
 - LAMS may be left in place longer than previously thought

EUS-GJ at DDW

- RCT of EUS-GE (n=48) to Duodenal Stent (n=49)

Results			
	EUS-GE (N = 48)	DS (N = 49)	P-value
Technical success (%)	46 (95.8)	49 (100)	0.242
Clinical success (%)	48 (100)	45 (91.8)	0.117
Procedural time (min) *	35.0 (25 – 48.5)	19.5 (14 – 28.5)	<0.001
Time to resumption of oral diet (days)	1 (1 – 2)	1 (1 – 2)	0.236
Hospital stay (days) *	4 (3 – 7)	6 (3.25 – 11.75)	0.013
30-day mortality (%)	10 (20.8)	6 (12.2)	0.286
30-day AE (%)	11 (22.9)	12 (24.5)	1
6 month reintervention (%)	2 (4.2)	14 (28.6)	0.002
Stent patency (days)	174.2 (95% CI 165.6 – 182.9)	147.9 (95% CI 130.1 – 165.7)	0.013
1-month GOOS	2.41 (0.7)	1.91 (0.9)	0.008
Mean survival (days)	118.5 (95% CI 98.4 – 138.6)	114.3 (95% CI 97/2 – 131.4)	0.910

EUS-GJ at DDW

- Same-session Double EUS bypass vs Surgical GJ and Hepaticojejunostomy

EUS-guided gastroenterostomy was performed first[1] using the WEST approach[2,3] or EPASS.

Several approaches for **biliary drainage** were allowed:

- EUS-antegrade stenting [right]
- EUS-guided hepaticogastrostomy
- EUS-guided transgastric rendez-vous
- EUS choledocho-duodenostomy [left]



1. Bronswijk M, Vanella G, Van der Merwe S. *VideoGIE*. 2021.
2. Bronswijk M, et al. *VideoGIE*. 2020 Aug 3;5(9):442.
3. S. Van der Merwe, et al. Therapeutic EUS ESGE Guideline *Endoscopy* 2021.

EUS-GJ at DDW

- Same-session Double EUS bypass vs Surgical GJ and Hepaticojejunostomy

	EUS (n=53)		Surgery (n=101)		P value
Efficacy					
Technical success, n (%)	51	96.2%	101	100.0%	0.117
Clinical success*, n (%)	48/53	90.6%	83	82.2%	0.234
Per protocol clinical success, n (%)	48/51	94.1%	83	82.2%	0.049
Median time to oral intake, days (IQR)	0	(0-1)	6	(3-7)	<0.001
Full diet tolerability, n (%)	50/53	94.3%	22/27	81.5%	0.112
Median time to full diet, days (IQR)	3	(2-4)	9	(6-14)	
Gastroenterostomy dysfunction, n (%)	0	0.0%	4	4.0%	0.299
Median time to dysfunction, days (IQR)	N/A	N/A	130	(57-336)	
Biliary dysfunction, n (%)	4	7.5%	5	5.0%	0.495
Median time to dysfunction, days (IQR)	64	(43-67)	149	(39-265)	
Distal obstruction, n (%)	1	1.9%	2	2.0%	1.000
Median time to distal obstruction, days (IQR)	90	N/A	466	(246-686)	
Baseline bilirubin, median, mg/dl	3,8	(2.8-8.9)	2,2	0.7-6.2	0.064
Bilirubin decrease >25%	51	96.2%	98	97.0%	1.000
Bilirubin decrease >50%	49	92.5%	94	93.1%	1.000
Bilirubin decrease >75%	29	54.7%	31	30.7%	0.005

EUS-GJ at DDW

- Same-session Double EUS bypass vs Surgical GJ and Hepaticojejunostomy

	EUS (n=53)		Surgery (n=101)		P value
Safety					
Overall adverse events, n (%)	6	11.3%	35	34.7%	0.002
Mild, n(%)					
Pain, n (%)	2	3.8%	4	4.0%	1.000
Post-procedural cholangitis, n (%)	1	1.9%	0	0.0%	0.344
Post-procedural cholangitis, n (%)	1	1.9%	1	1.0%	1.000
Moderate, n(%)					
Sepsis, n (%)	2	3.8%	15	14.9%	0.055
Sepsis, n (%)	0	0.0%	4	4.0%	0.299
Post-interventional bleeding, n (%)	2	3.8%	3	3.0%	1.000
Post-operative collection, n (%)	0	0.0%	6	5.9%	0.094
Need for re-endoscopy, n (%)	1	1.9%	1	1.0%	1.000
Severe, n(%)	2	3.8%	20	19.8%	0.007
Hepatic pseudoaneurysm, n (%)	1	1.9%	0	0.0%	0.344
Prolonged anorexia, n (%)	0	0.0%	2	2.0%	0.546
Anastomotic bleeding, n (%)	0	0.0%	5	5.0%	0.165
Post-interventional infection, n (%)	0	0.0%	10	9.9%	0.016
Surgical (re-)intervention, n (%)	1	1.9%	2	2.0%	1.000

EUS-GJ at DDW

Secondary outcomes

Median procedure duration, min (IQR)	51	(32-77)	198	(139-263)	<0.001
Median hospital stay, days (IQR)	4	(3-9)	13	(9-22)	<0.001
Median weight change after 2 months, kg (IQR)	-0.6	(-2.4-3.5)	-1.9	(-2.0-0.1)	0.039
Median post-procedural survival, days (IQR)	179	(98-409)	158	(35-353)	0.101

Compared to surgery, same-procedure **Double EUS-bypass** showed:

- Similar technical and clinical success
- **Fewer overall and severe adverse events**
- Significantly shorter time to oral intake and hospital stay

Despite treating patients with:

- more comorbid conditions,
- different (perceived) anaesthesiological risk
- potentially more advanced disease

EUS-GJ at DDW

- Gastric emptying in EUS-GE (n=14) vs Enteral Stent (n=12) for malignant GOO
 - Median gastric emptying t1/2:
 - EUS-GE 86 mins vs ES 133 min (p=0.036)
 - Abnormal emptying:
 - EUS-GE: 8.3% vs ES 57%

EUS-GJ

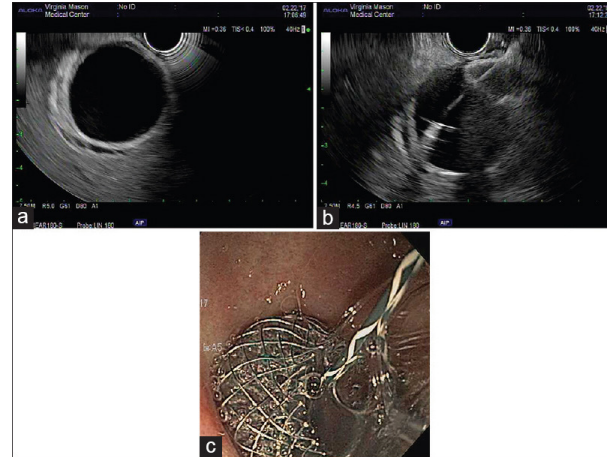
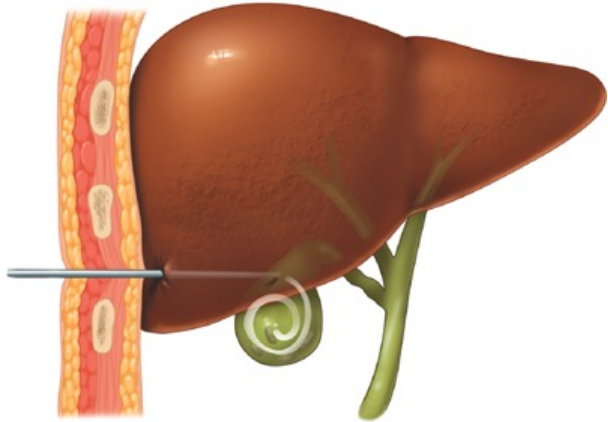
- Growing evidence supports EUS-GJ as the preferred treatment of malignant GOO, and likely benign GOO

Overview

- Management of Gastric Outlet Obstruction (GOO)
 - EUS-gastrojejunostomy/gastroenterostomy “EUS-GJ or EUS-GE”
- **Management of cholecystitis**
 - **EUS-cholecystoduodenostomy**
- Altered anatomy ERCP

Management of Acute Cholecystitis

- Typically managed surgically
- High risk patients have been managed with percutaneous cholecystotomy tube
- Retrospective studies have suggested EUS-guided gallbladder drainage (EUS-GBD) may be superior to percutaneous GB drainage (PT-GBD)



EUS-GBD vs PT-GBD

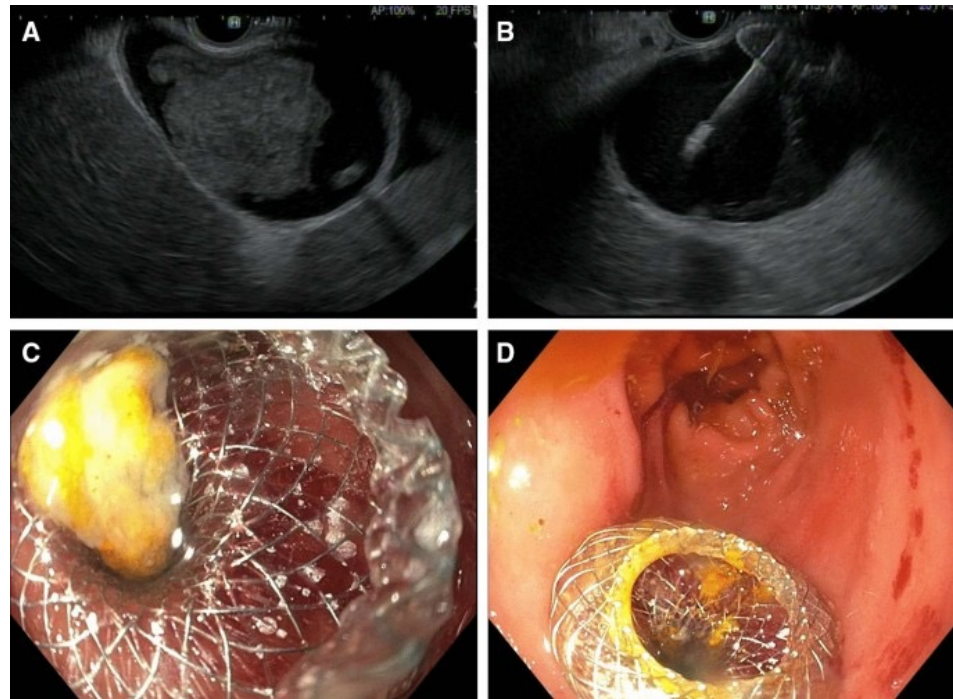
- Prospective multicenter RCT, 5 high volume centers
- Inclusion
 - >18 yo with acute cholecystitis
 - Deemed high risk for cholecystectomy or refused surgery
- Exclusion
 - Suspected gangrene or perforated GB
 - Previous GB drainage
 - Liver abscess
 - Altered anatomy of upper GI tract
 - Decompensated cirrhosis, portal HTN, varices
 - Coagulopathy
 - Pregnancy

Endosonography-guided gallbladder drainage versus percutaneous cholecystostomy in very high-risk surgical patients with acute cholecystitis: an international randomised multicentre controlled superiority trial (DRAC 1)

Anthony Y B Teoh ¹, Masayuki Kitano ², Takao Itoi,³ Manuel Pérez-Miranda,⁴ Takeshi Ogura,⁵ Shannon Melissa Chan,¹ Carlos Serna-Higuera,⁴ Shunsuke Omoto,⁶ Raul Torres-Yuste,⁴ Takayoshi Tsuchiya,³ Ka Tak Wong,⁷ Chi-Ho Leung ¹, Philip Wai Yan Chiu ¹, Enders Kwok Wai Ng,¹ James Yun Wong Lau¹

Methods

- EUS-GBD
 - EUS puncture from stomach or duodenum (duodenum preferred)
 - Could use conventional method (19G needle -> guidewire -> LAMS or direct method with cautery enhanced system)
 - 10 x 10 mm stent if stones <10 mm, otherwise 15 x 10 mm
 - GB stones removed when able
- PT-GBD
 - Experienced interventional radiologist
 - 8.5F pigtail drainage catheter, transhepatic preferred



Follow Up

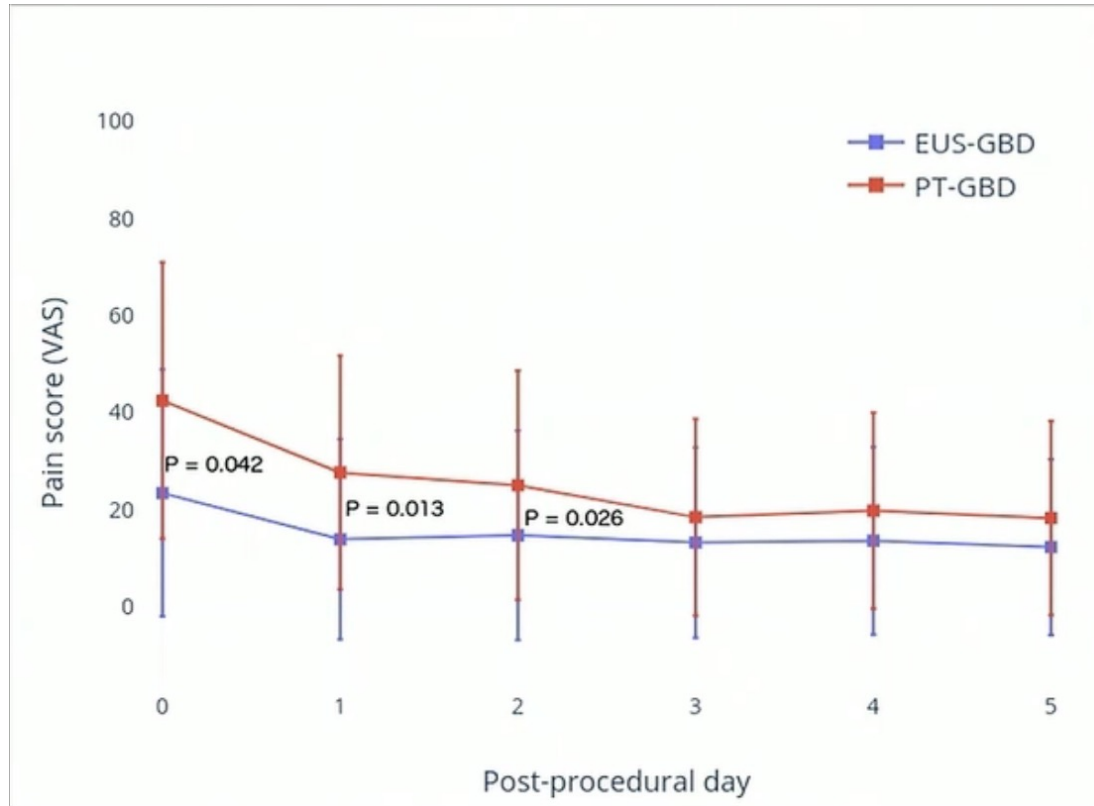
- EUS-GBD
 - 1 month F/U cholecystoscopy
 - If stones cleared -> remove LAMS -> place 7F double pigtail stent
- PT-GBD
 - 1 month F/U cholecytogram
 - If patent cystic duct -> drain removed
 - If obstructed cystic duct -> long term PT-GBD



Clinical Outcomes

	EUS-GBD N = 39	PT-GBD N = 40	P-value
1-year adverse events (%)	10 (25.6)	31 (77.5)	< 0.001
Grading 1/2/3/4/5	0/1/2/0/2	0/1/2/0/2	
Recurrent acute cholecystitis (%)	1 (2.6)	8 (20)	0.029
Reinterventions after 30-days (%)	1 (2.6)	12 (30)	0.001
Reinsertion of PT-GBD	0	12	
Clearing blocked stent	1	0	
Unplanned admissions (%)	6 (15.4)	20 (50)	0.002
30-day adverse events (%)	5 (12.8)	19 (47.5)	0.001
Grading 1/2/3/4/5	0/1/2/0/2	6/4/5/0/4	
30-day mortality (%)	3 (7.7)	4 (10)	1
Technical success (%)	38 (97.4)	40 (100)	0.494
Clinical success (%)	36 (92.3)	37 (92.5)	1
Procedure time (minutes)	22.7 (13.0)	27.4 (12.0)	0.108
Hospital stay (days) *	8 (4 – 13)	9 (7 – 14)	0.181

Post Procedural Pain Score



Conclusions

- EUS-GBD reduced 30-day and 1-year adverse events, post-procedure pain, recurrent acute cholecystitis, re-interventions and unplanned admissions
- EUS-GBD should be the procedure of choice in high risk surgical patients, provided expertise is available

Technical considerations

- Cholecystectomy after EUS-GBD?
- Any degree of GB perforation/leak -> IR cholecystostomy
- EUS-GBD can be performed after IR perc cholecystostomy
 - Earlier is better!
 - Long term decompression makes GB distention more difficult

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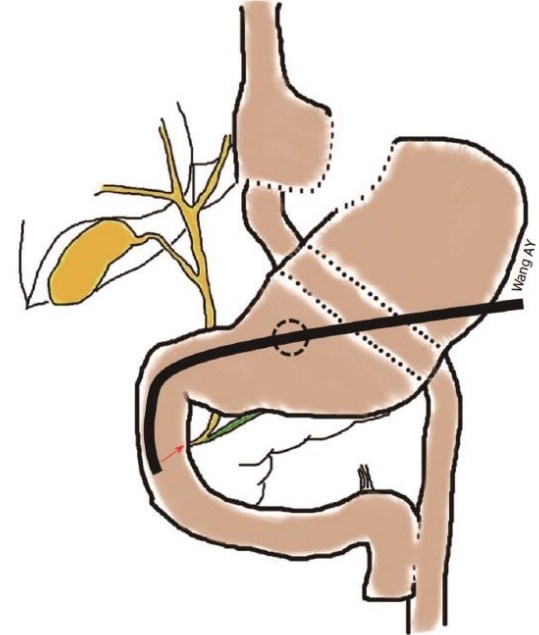
Altered Anatomy ERCP

- Roux en Y gastric bypass
 - Roux limb: 100-150 cm
 - Biliopancreatic limb: 50-100 cm



Altered Anatomy ERCP

- Laparoscopic-Assisted ERCP
 - Timing issues
 - Sterility
 - Surgical complications/difficulties
 - Adhesions, co-morbidities
 - Requires large trocar (>15 mm)
 - 10% risk of lap-associated Aes
 - Difficult positioning

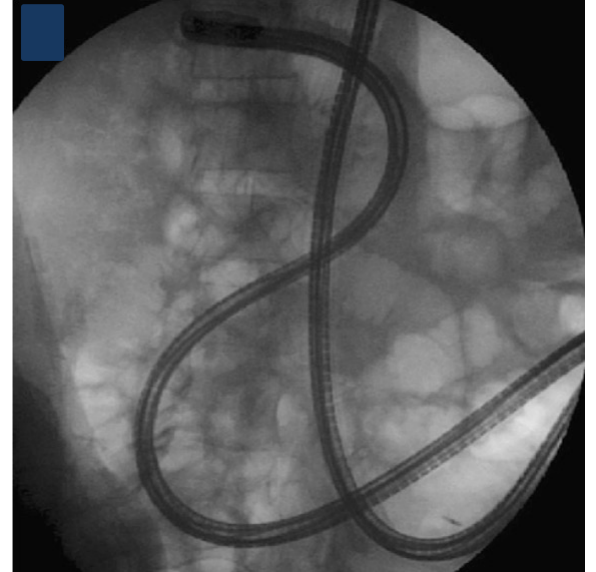


Abbas et al. GIE 2018

Wang et al World J Surg Proc 2014

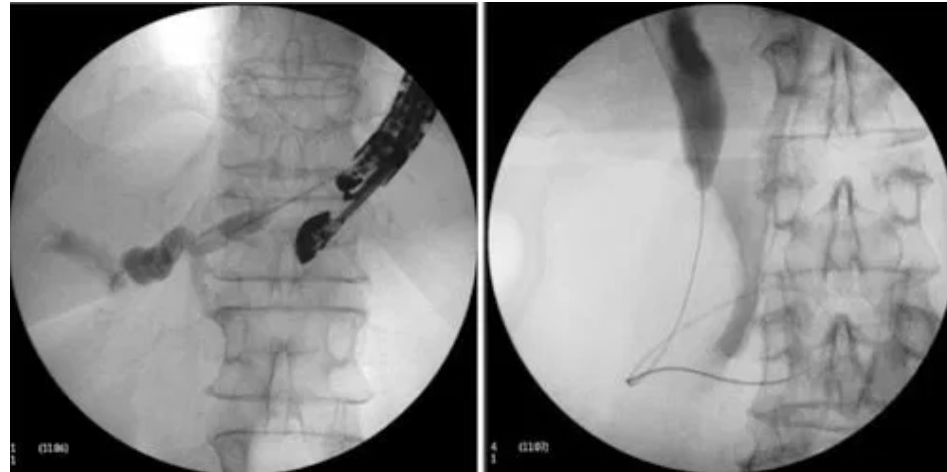
Altered Anatomy ERCP

- Deep enteroscopy
 - Time
 - Access (80-93% success accessing papilla)
 - Limited accessories
 - Cannulation rates 68-95%



EUS to the Rescue!

- “EAC”: EUS-guided anterograde cholangiography / EUS-guided ERCP
- Technique:
 - 19G transgastric-transhepatic puncture of left intrahepatic duct
 - Cholangiogram
 - Anterograde guidewire passage
 - Dilation of needle tract
 - Anterograde intervention
 - Balloon sphincteroplasty
 - Anterograde stone extraction
 - Anterograde stent placement
 - Long limb rendezvous if necessary



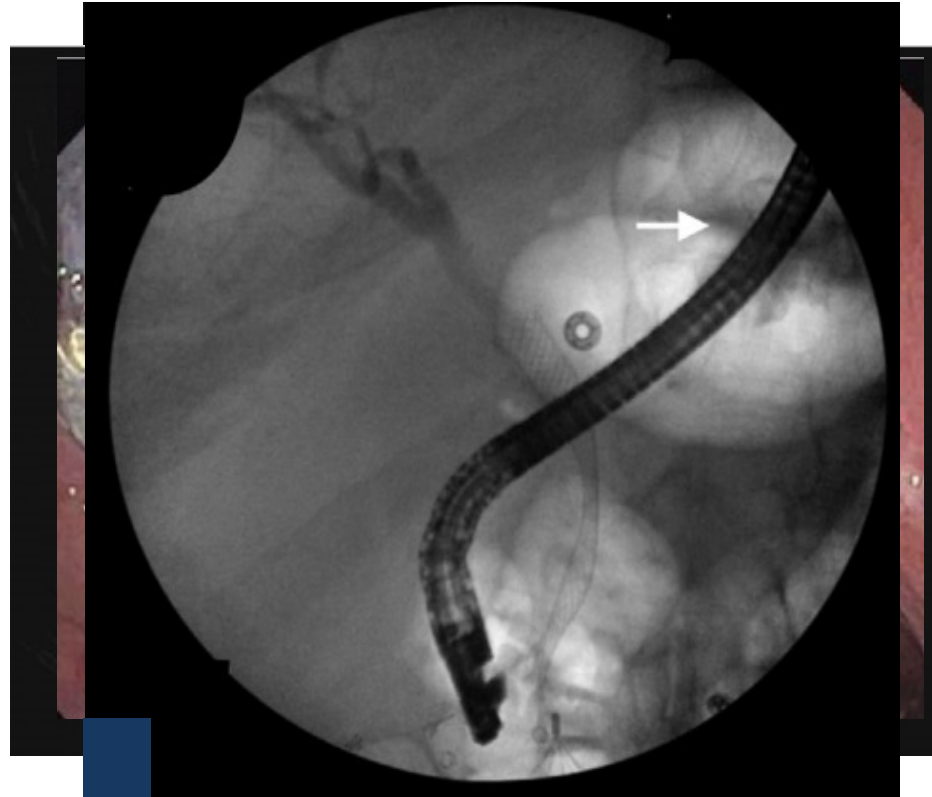
Anterograde EUS Outcomes

	Patients (n=37)
Technical Success (Hepatico-gastric/enteric fistula)	91.9%
Adverse Events (bile peritonitis)	8.1%
Clinical Success	91.9%
Procedure Time (range)	
One Stage	27.4 (22-35)
Two Stage	47.8 (14-84)

- Expert hands only
- Limited interventions, small simple stones only

EUS-Directed transGastric ERCP (EDGE)

- EUS-guided 19G needle puncture of excluded stomach
 - Transgastric or transjejunal
- Water +/- contrast injected
- 15 mm or 20 mm LAMS placed
 - Secured in place?
- ERCP performed immediately or in 2-3 weeks
- LAMS removed
 - Fistula closure?



Laparoscopic vs Enteroscopy

- Systematic review of 22 case series
 - Cannulation rates
 - LA-ERCP: 96%
 - SBE-ERCP: 62%
 - DBE-ERCP: 82%
 - Complications:
 - LA-ERCP: 18%
 - SBE-ERCP: 10%
 - DBE-ERCP: 2%

Comparison between Enteroscopy-Based and Laparoscopy-Assisted ERCP for Accessing the Biliary Tree in Patients with Roux-en-Y Gastric Bypass: Systematic Review and Meta-analysis

Alberto Machado da Ponte-Neto^{1,2}  • Wanderley M. Bernardo³ • Lara M. de A. Coutinho¹ • Iatagan Rocha Josino¹ • Vitor Ottoboni Brunaldi¹ • Diogo T. H. Moura¹ • Paulo Sakai¹ • Rogério Kuga¹ • Eduardo G. H. de Moura¹

LA-ERCP has higher success rate, but higher adverse events

EUS-directed Transgastric ERCP (EDGE) Versus Laparoscopy-assisted ERCP (LA-ERCP) for Roux-en-Y Gastric Bypass (RYGB) Anatomy

A Multicenter Early Comparative Experience of Clinical Outcomes

	EGDE (n=29)	LA-ERCP (n=43)
Technical Success	96.5%	100%
ERCP success	96.5%	97.7%
Adverse Events	24%	19%
Procedure time, min	73	184
Length of stay, days	0.8	2.7

An international, multicenter, comparative trial of EUS-guided gastrogastrostomy-assisted ERCP versus enteroscopy-assisted ERCP in patients with Roux-en-Y gastric bypass anatomy

Majidah Bukhari, MD,^{1,6} Thomas Kowalski, MD,² Jose Nieto, MD,³ Rastislav Kunda, MD,⁴
Nitin K. Ahuja, MD,¹ Shayan Irani, MD,⁵ Apeksha Shah,² David Loren, MD,² Olaya Brewer, MD,¹
Omid Sanaei, MD,¹ Yen-I Chen, MD,¹ Saowanee Ngamruengphong, MD,¹ Vivek Kumbhari, MD,¹
Vikesh Singh, MD,¹ Hanaa Dakour Aridi, MD,¹ Mouen A. Khashab, MD¹

	EGDE (n=30)	e-ERCP (n=30)
ERCP Success	100%	60%
Procedure time, min	49.8	90.7
Adverse Events	6.7%	10%
Mean weight change, kg	-1.1	+0.07
Length of stay, days	1	10.5

EDGE at DDW

- Multicenter international registry: US & Spain
 - 8 institutions, 2017-2022

Clinical Characteristics	Group A – Stent Fixation	Group B – No Stent Fixation
Number of Patients	N = 54 (48%)	N = 59 (52%)
Mean Age	60 Years	61 Years
Gender	40 Females (74%)	39 Females (66%)
Inpatient	42/54 (78%)	30/59 (51%)
Avg Time Since RYGB	11 Years	12.3 Years
Technical Success	53/54 (98%)	59/59 (100%)
Clinical Success	54/54 (100%)	56/59 (95%)

EDGE at DDW

Clinical Characteristics	Group A – Stent Fixation	Group B – No Stent Fixation
Average Follow Up	115 Days	144 Days
Fistula Suture Closure at LAMS Removal	31/54 (57%)	38/59 (64%)
APC Use During Fistula Closure	18/54 (33%)	16/59 (27%)
Avg Time From EDGE Procedure to Fistula Closure	103 Days	133 Days
Persistence of Fistula	3/54 (6%)	7/59 (12%)

Same session ERCP achieves a high technical and clinical success

Stent fixation may decrease likelihood of stent migration

Adverse Events	Group A – Stent Fixation	Group B – No Stent Fixation
Stent Migration	2/54 (4%)	7/59 (12%)
Bleeding	4/54 (7%)	2/59 (3%)
Abdominal Pain	5/54 (9%)	9/59 (15%)
Pancreatitis	0/54 (0%)	0/59 (0%)
Cholangitis	2/54 (4%)	0/59 (0%)

EDGE at DDW

- Same-session EDGE achieves a high technical and clinical success while maintaining an acceptable safety profile
- Stent fixation with suturing during same-session EDGE decreases the likelihood of stent migration and related adverse events
- Additional prospective studies are needed to advance EDGE towards a more standardized procedure

	Pros	Cons	Summary
Lap assisted	Widely available; requires little/no “extra” advanced endo skills	Difficulty with timing/coordination; High adverse events	Not first line May consider if pt also needs chole
Enteroscopy-assisted	Relatively low AEs; single session	Time consuming; access to DBE, low success rate	Can be used as first line when adv techniques not available
Antegrade EUS / EAC	Single session; allows for easy rendezvous if antegrade not successful	Requires advanced EUS skills; modest AE rates; stenting is problematic	Only for experienced hands in select indications
EDGE (LAMS-assisted)	Quicker, allows for use of duodenoscope; can allow for single session*	Requires advanced EUS skills; modest AE rates; may require 2 nd ERCP	Becoming first line, especially if urgent ERCP not needed

Conclusion

- Involve your local interventional endoscopist in a multidisciplinary discussion of management of patients with
 - Gastric outlet obstruction, malignant or benign
 - +/- biliary obstruction
 - Cholecystitis
 - Biliary/pancreatic disease in patients with Roux en Y gastric bypass
- *As well as: gastric varices (EUS-glue/coil), obesity (ESG, TORe, duodenal resurfacing), achalasia (POEM), gastroparesis (G-POEM), GI tract neoplasia (EMR, ESD, FTR), Subepithelial tumors (STER, FTR, loop-ligation), pain due to pancreatic cancer (EUS-CPN), Barrett's (EMR/ESD, RFA, cryo), and many others...*

