

Endoscopic Entry and Drainage

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Disclosures

- Consultant: Boston Scientific, Metamodix, BFKW, USGI, Endogastric Solutions, DyaMx
- Research Support: Apollo Endosurgery, Boston Scientific, Aspire Bariatrics, GI Dynamics, Medgus, Medtronic, Spatz, Cairn.
- Speaker: Johnson & Johnson, Olympus
- Off label use: Axios stent

Revised Atlanta Classification

Entity	Type of Pancreatitis	Disease course. weeks	Solid debris present?	Encapsulated wall?
Acute fluid collection	Interstitial	<4	No	No
Acute necrotic collection	Necrotic	<4	Yes	No
Pseudocyst	Interstitial	>4	No	Yes
Walled Off Necrosis	Necrotic	>4	Yes	Yes

Intervention for Organized Pancreatic Necrosis

- Sterile - controversial
- After 4-6 weeks - *if* enlarging collection, intractable pain, GOO, systemically ill
- Infected Necrosis: widely acknowledged as an indication for intervention

Early (<4 Weeks) Versus Standard (\geq 4 Weeks) Endoscopically Centered Step-Up Interventions for Necrotizing Pancreatitis

Guru Trikudanathan, MD¹, Pierre Tawfik, MD², Stuart K. Amateau, MD, PhD¹, Satish Munigala, MBBS, MPH³, Mustafa Arain, MD¹, Rajeev Attam, MD¹, Gregory Beilman, MD⁴, Siobhan Flanagan, MD⁵, Martin L. Freeman, MD¹ and Shawn Mallory, MD¹

	NP < 4 weeks (n=76)	NP \geq 4 weeks (n=117)	p value
Median age (years), IQR	55 (39–68)	50 (37–63)	0.143
Sex			0.189
Male	51 (67.1%)	89 (76.1%)	
Female	25 (32.9%)	28 (23.9%)	
Race			
White	66 (86.8%)	107 (91.5%)	0.059
African American	5 (6.6%)	1 (0.9%)	Reference
Other	4 (6.6%)	9 (7.7%)	0.074
Etiology for pancreatitis			
Biliary	34 (44.7%)	53 (45.3%)	Reference
Alcohol	19 (25.0%)	30 (25.6%)	0.972
Other etiology ^a	9 (11.8)	10 (8.5)	0.813
Idiopathic	14 (18.4%)	24 (20.5%)	0.506

Outcomes	NP patients with interven- tions < 4 weeks (usually ANC collections) (n=76)	NP patients with interven- tions \geq 4 weeks (usually WON collections) (n=117)	p value
Mortality (%)	10 (13.2%)	5 (4.3%)	0.024
Morbidity (%)			
^a Median length of stay in days (IQR)	37 (27–61)	26 (0–207)	<0.001
^b Median length of ICU stay in days (IQR)	2.5 (0–22)	0 (0–3)	<0.001
Complications (procedure and disease related)			
Stent occlusion and infection	30(40%)	39(33%)	0.36
Bleeding	8 (10.5%)	12 (10.3%)	0.95
Perforation	0	7 (6.0%)	0.044
Fistulae (including pancreatic-, cyst-, or entero-cutaneous)	25 (32.9%)	24 (20.5%)	0.054
New-onset diabetes	15 (19.7%)	25 (21.4%)	0.785

Pancreatic Necrosis: Strategies for Intervention

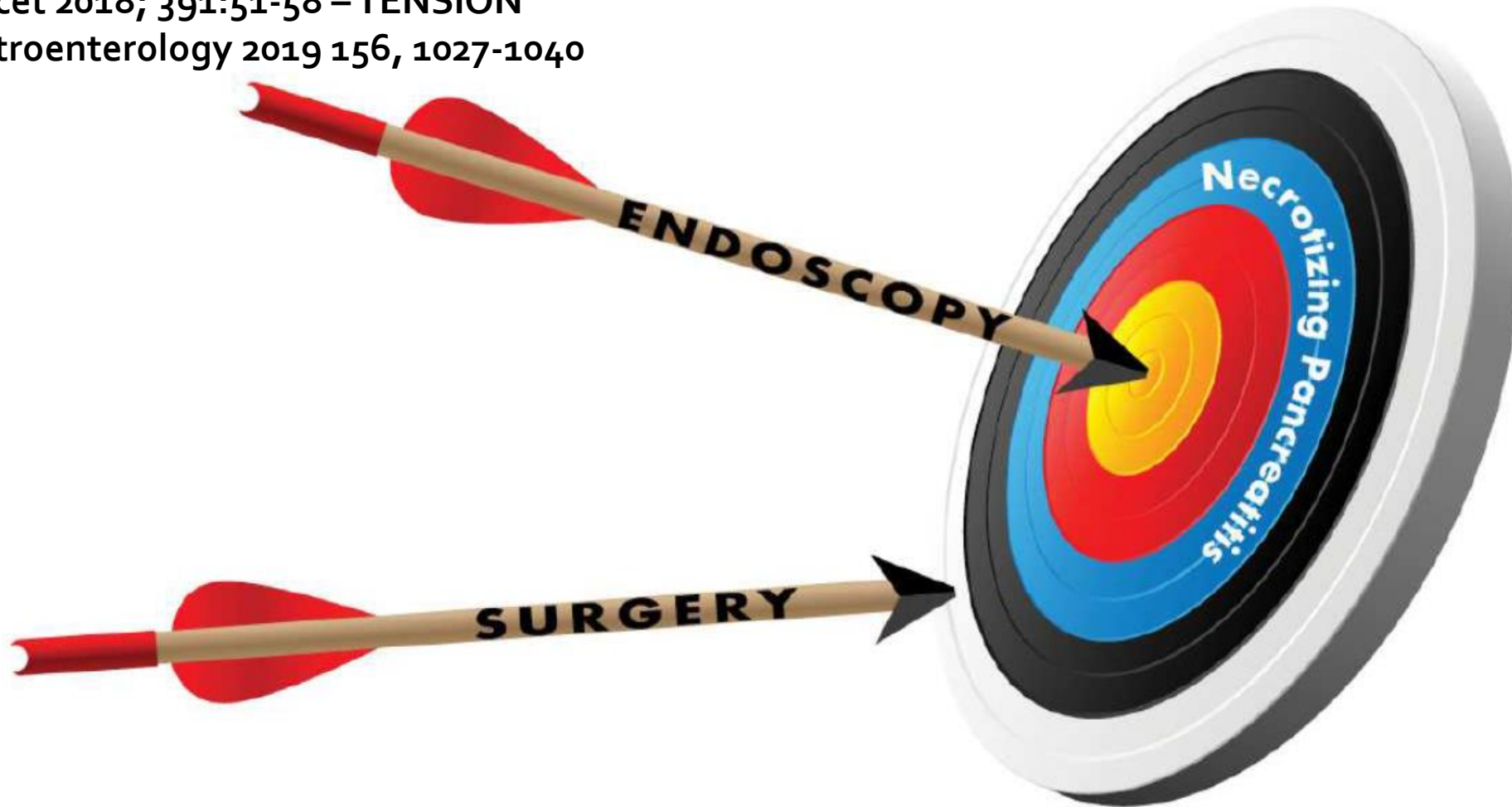
- Medical management
- Minimally invasive necrosectomy (percutaneous with VARD)
- Endoscopic
- Surgical

Three RCTs Endo vs. Surgery

Bakker OJ, et al. JAMA 2012;307:1053-61 – PENGUIN

Lancet 2018; 391:51-58 – TENSION

Gastroenterology 2019 156, 1027-1040

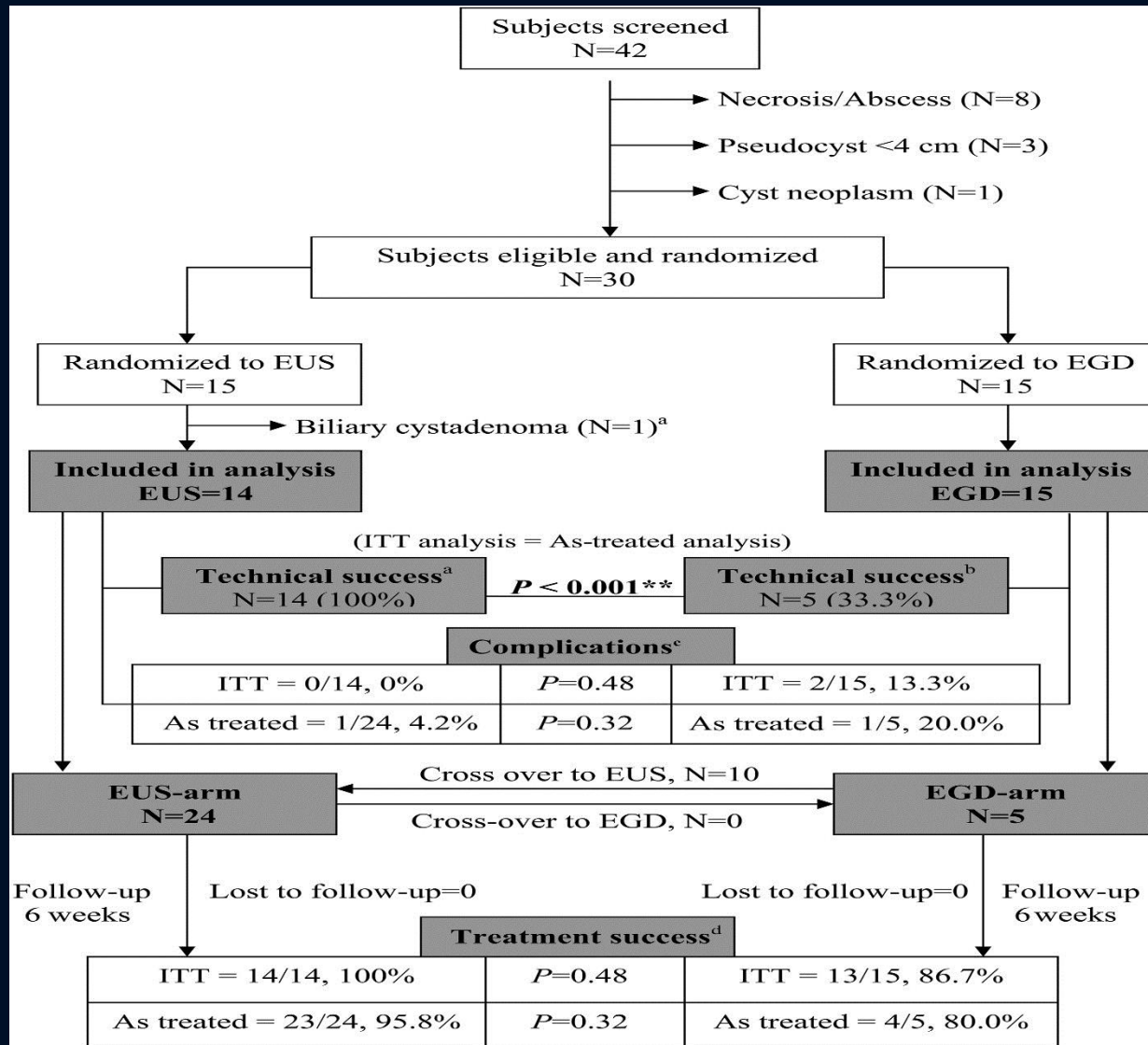


Entry

- EUS vs. Endoscopy
- Multiple Gateway

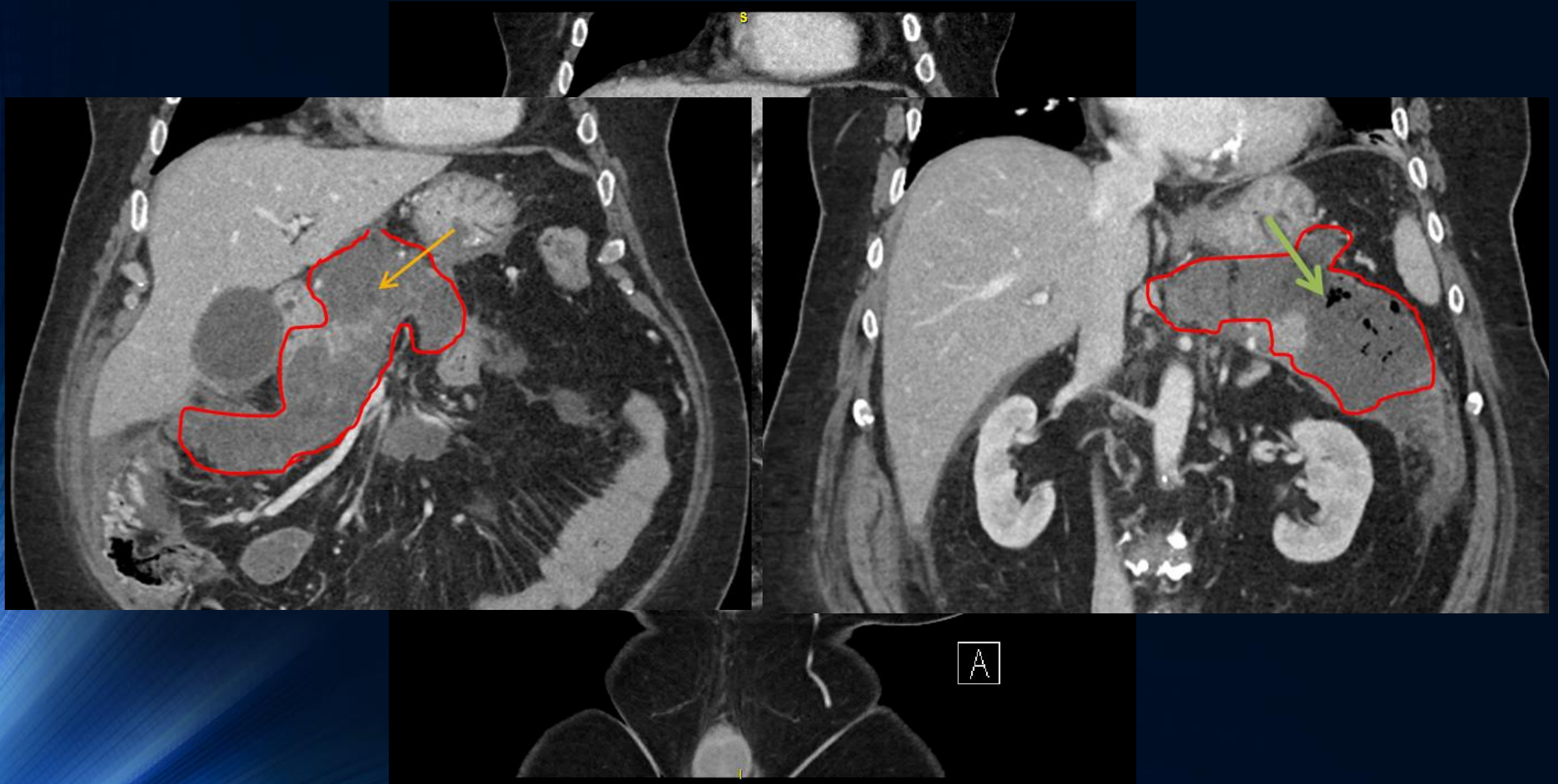
Prospective randomized trial comparing EUS and EGD for transmural drainage of pancreatic pseudocysts

Gastrointest Endosc. 2008 Dec;68(6):1102-11

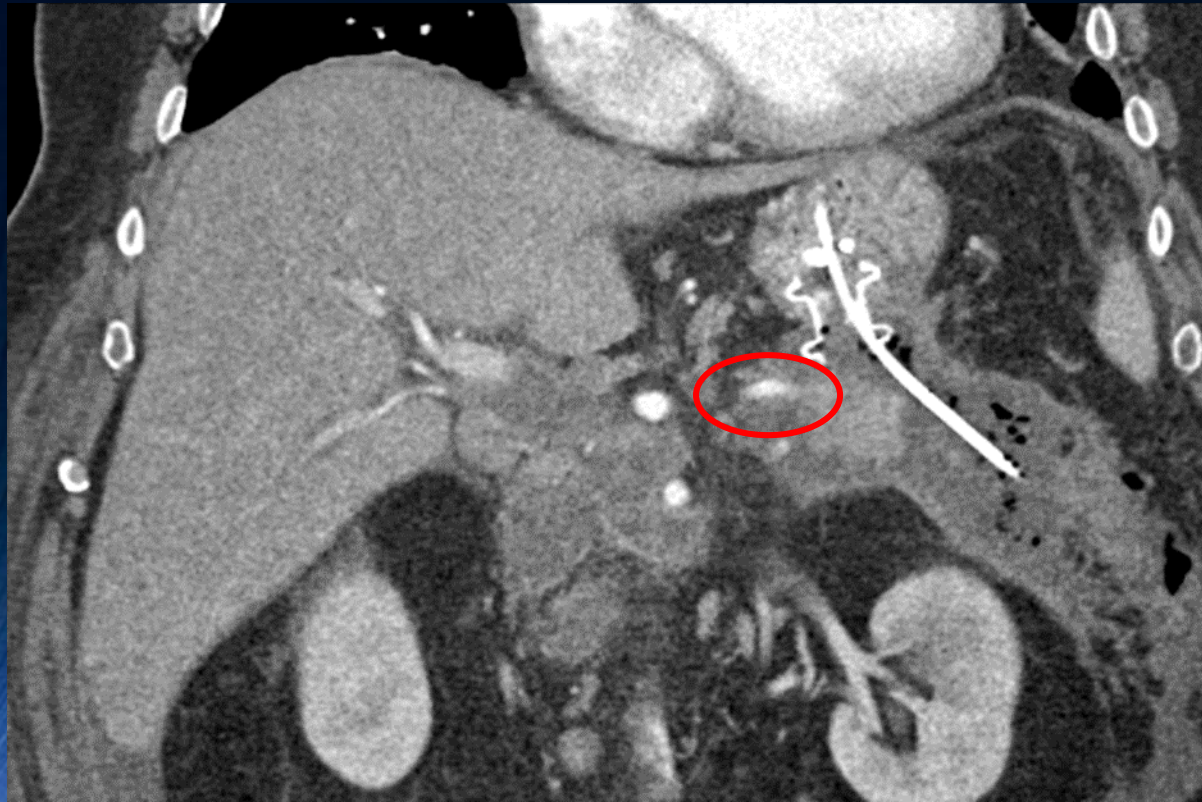


Two bleed in EGD arm – one lethal

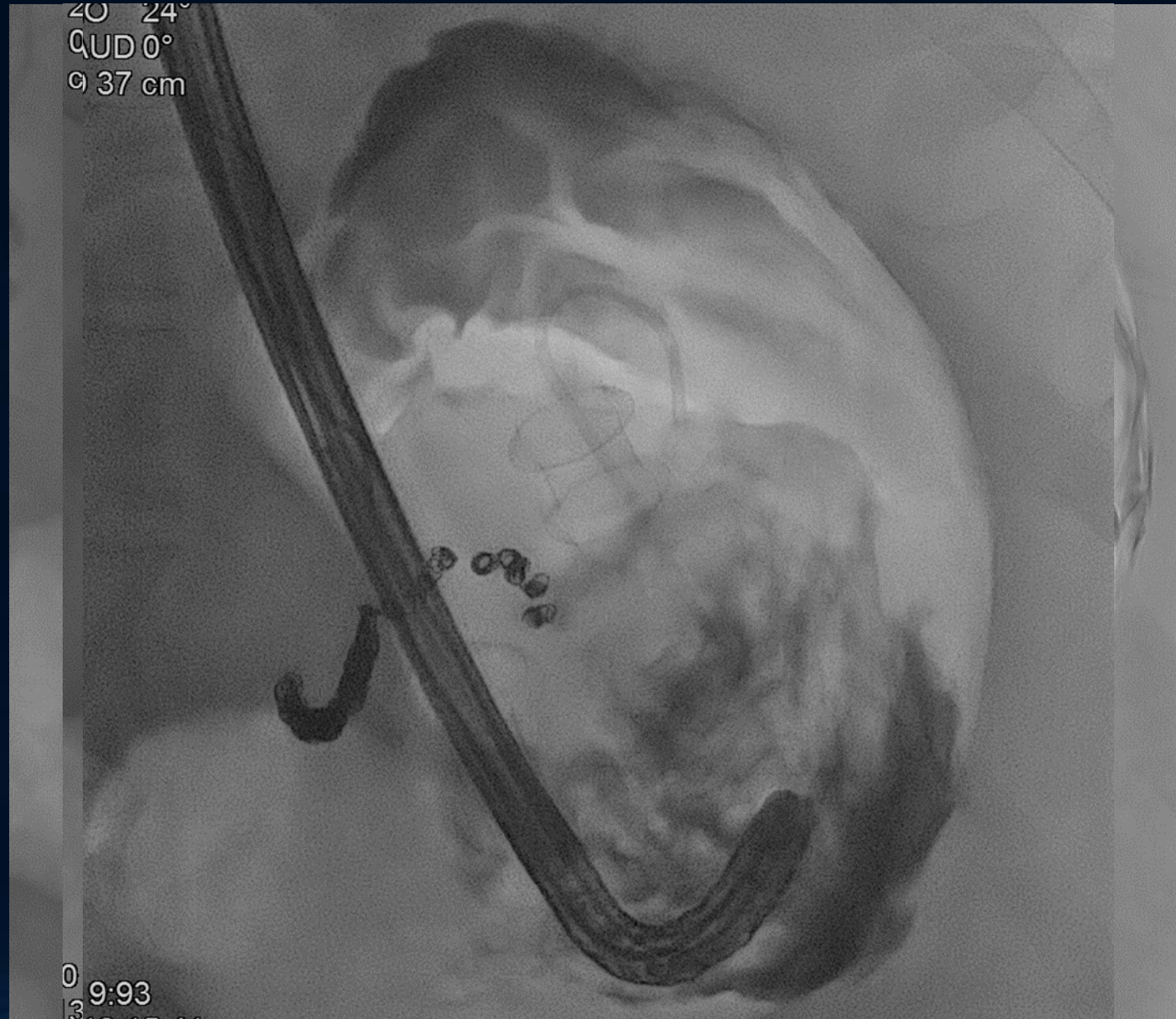
Better Access Planning



Better Access Planning

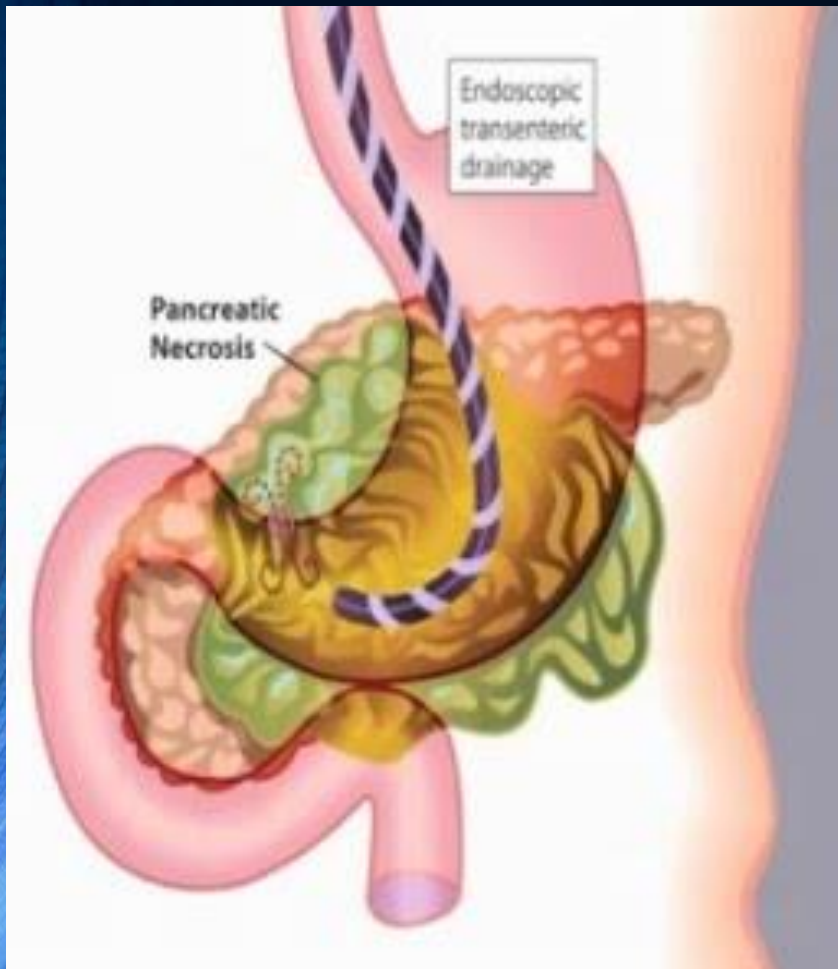


Better Access Planning



Multiple transluminal gateway technique for EUS-guided drainage of symptomatic walled-off pancreatic necrosis

Gastrointest Endosc. 2011 Jul;74(1):74-80.



60 patients

12 MTGT vs. 48 CDT

Resolution 91.7% MTGT vs. 52.1% CDT

1 necrosectomy in MTGT vs. 3 CDT

17 required surgery and 3 died of multiple-organ failure in CDT arm

Drainage

- Plastic
- Metal: SEMS vs. Lumen Apposing
- Both plastic and Metal





OPEN ACCESS

	LAMS (n = 31)	Plastic (n = 29)	P values
Resolution of SIRS at 24 hours post-treatment: n (%)	4 (44.4)	9 (69.2)	0.384
Resolution of organ failure at 24 hours post-treatment: n (%)	1 (50.0)	1 (25.0)	0.999
Treatment success: n (%)	29 (93.5)	28 (96.6)	0.999
Length of hospital stay (days):			
Mean (SD)	6.2 (9.0)	12.2 (21.1)	0.129
Median	3	4	
IQR	6	13	
Range	0–38	0–103	
Adverse events: n (%)			
Overall	13 (41.9)	6 (20.7)	0.077
Stent-related	10 (32.3)	2 (6.9)	0.014
Prior protocol change	8 (25.8)	0	0.005
After protocol change	2 (6.5)	2 (6.9)	0.999
Clinical	3 (9.7)	4 (13.8)	0.702
Total no. of procedures for treatment success: n (%)			
Mean (SD)	2.8 (1.2)	3.2 (1.5)	0.192
Median	2	3	
IQR	1	2	
Range	2–7	2–7	
Total no. of readmissions: n (%) *			
0	21 (67.7)	18 (62.1)	0.645
1	8 (25.8)	9 (31.0)	
2	0	2 (6.9)	
3	2 (6.5)	0	
WON recurrence: n (%)	1 (3.2)	0	0.999
Mean costs, 2017 US\$:			
Total cost†	53 117	50 132	0.775
Procedure cost	12 155	6609	<0.001

(n=6)
5)
pic drainage (n=2)

5 over
5 in a

),

:1–10.

SYSTEMATIC REVIEW AND META-ANALYSIS

Metal stents versus plastic stents for the management of pancreatic walled-off necrosis: a systematic review and meta-analysis

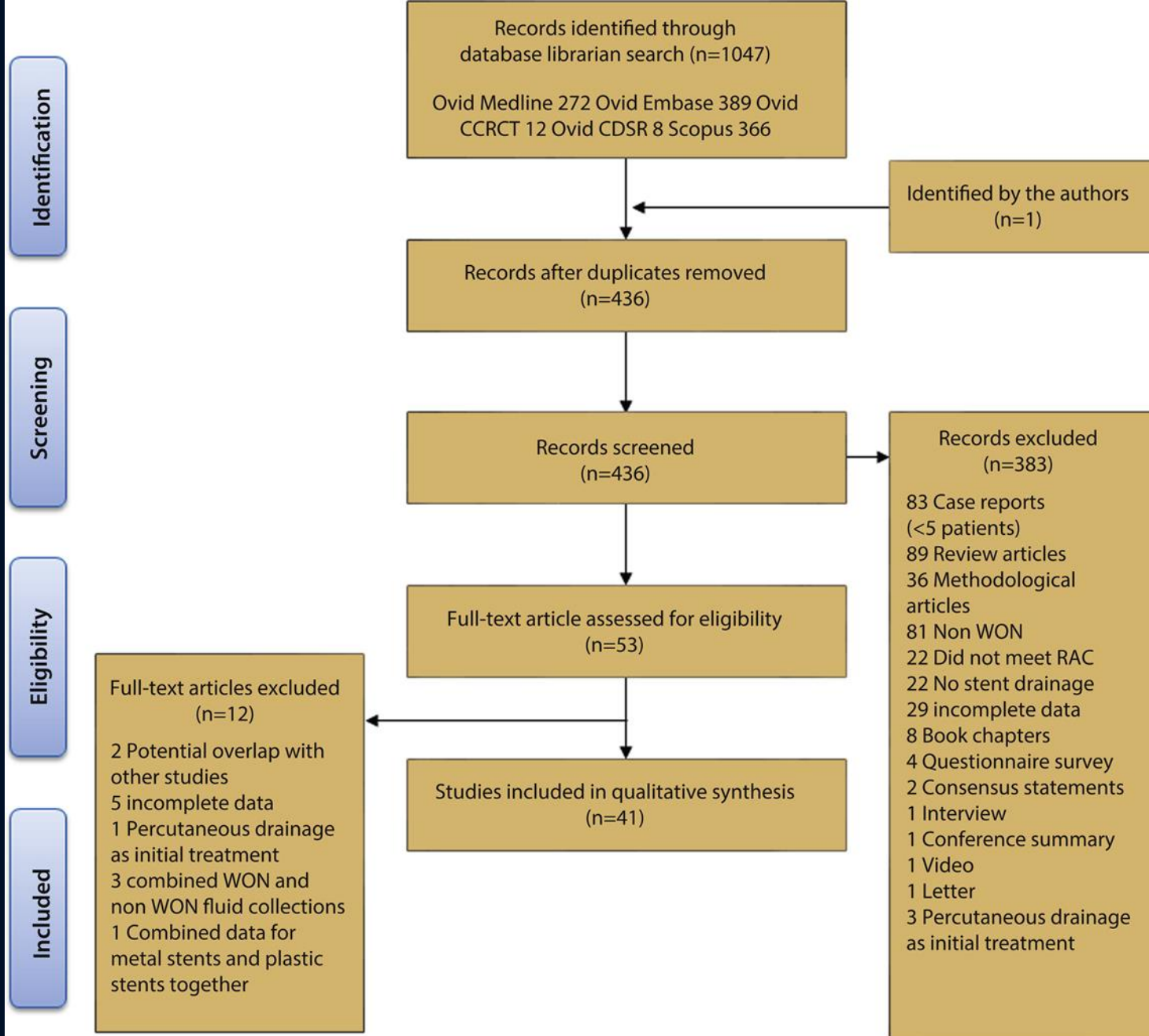


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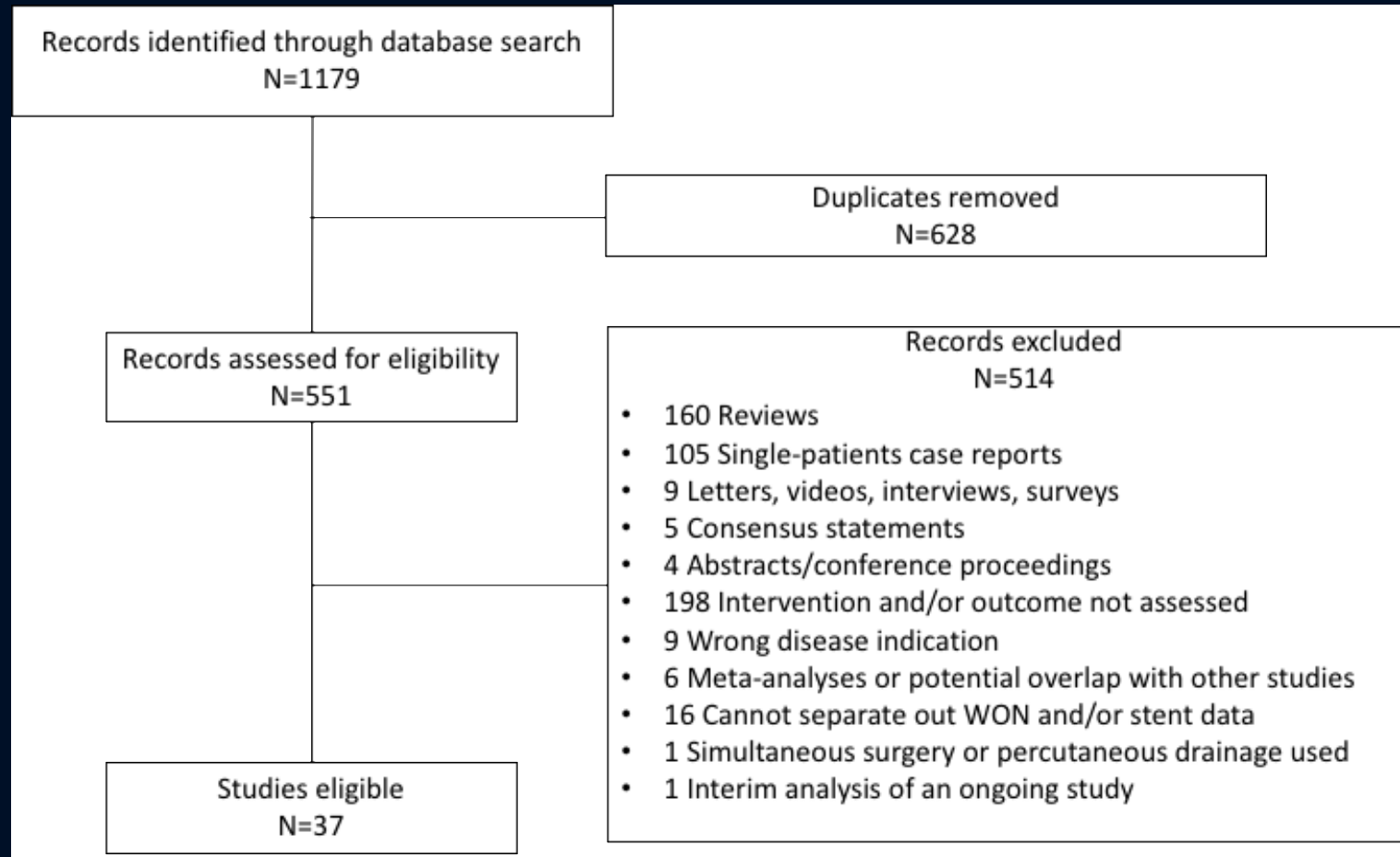
GIE 2018

n=2213



Metric	Plastic stents	Metal stents	Lumen-apposing metal stents
Two arm-studies			
Overall resolution	80.9%	92.1% (OR: 2.8; 95% CI, 1.7-4.6; $P < .001$)	91.5% (OR, 2.5; 95% CI, 1.4-4.3; $P = .001$)
Rate of resolution with a single procedure	43.4%	47.1% (OR: 1.3; 95% CI, 0.7-2.4; $P = .2$)	52.3% (OR, 1.4; 95% CI, 0.56-3.6; $P = .4$)
Number of procedures to achieve resolution	Mean difference -0.92 (95% CI, -1.283 - $.561$, $p < 0.001$) (favoring metal stents)		
Bleeding	7.1%	3.6% (OR: 0.5; 95% CI, 0.15-1.7; $P = .2$)	5% (OR, 0.64; 95% CI, 0.13-3.1; $P = .5$)
Perforation	3%	1.9% (OR: 0.6; 95% CI, 0.15-2.7; $P = .5$)	4% (OR, 1.2; 95% CI, 0.24-6.18; $P = .8$)
Stent migration	5.3%	6.7% (OR: 1.3; 95% CI, 0.6-2.6; $P = .4$)	6.3% (OR, 1.12; 95% CI, 0.51-2.47; $P = .7$)
Stent occlusion	16.9%	11.7% (OR: 0.6; 95% CI, 0.34-1.1; $P = .1$)	3.8%(OR, 0.36; 95% CI, 0.03-4; $P = .4$)
One-arm studies			
Bleeding	12.6% [95% CI, 9.5%-16.5%]	5.6% [95% CI, 3.6%-8.6%] ($P = .002$)	6.2% [95% CI, 3.9%-9.6%] ($P = .007$)
Perforation	4.3% [95% CI, 3.1%-6%]	2.8% [95% CI, 1.6%-5%] ($P = .2$)	3.8% [95% CI, 2.1%-6.9%] ($P = .7$)
Stent migration	5.1% [95% CI, 2.6%-10.1%]	8.1% [95% CI, 5.1%-12.6%] ($P = .2$)	7.8% [95% CI, 4.7%-12.5%] ($P = .3$)
Stent occlusion	17.4% [95% CI, 9.4%-29.9%]	9.5% [95% CI, 7.5%-12.1%] ($P = .07$)	7.5% [95% CI, 5.6%-9.9%] ($P = .015$)

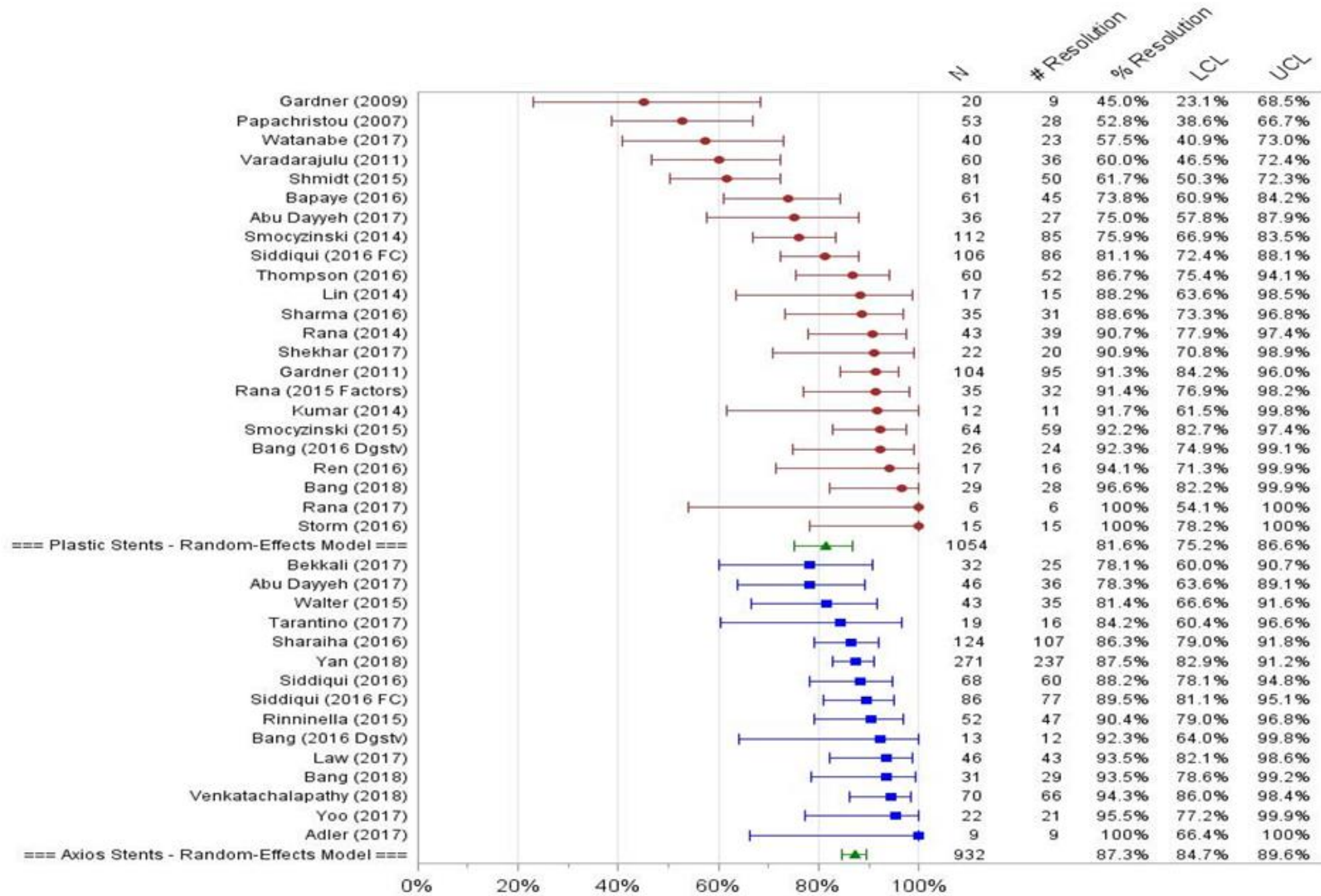
Update Meta-analysis with LAMS vs. Plastic



N= 1108 Plastic
N= 1004 LAMS

Update Meta-analysis with LAMS vs. Plastic

Plastic vs Axios - % Resolution
Percent and 95% Exact CL

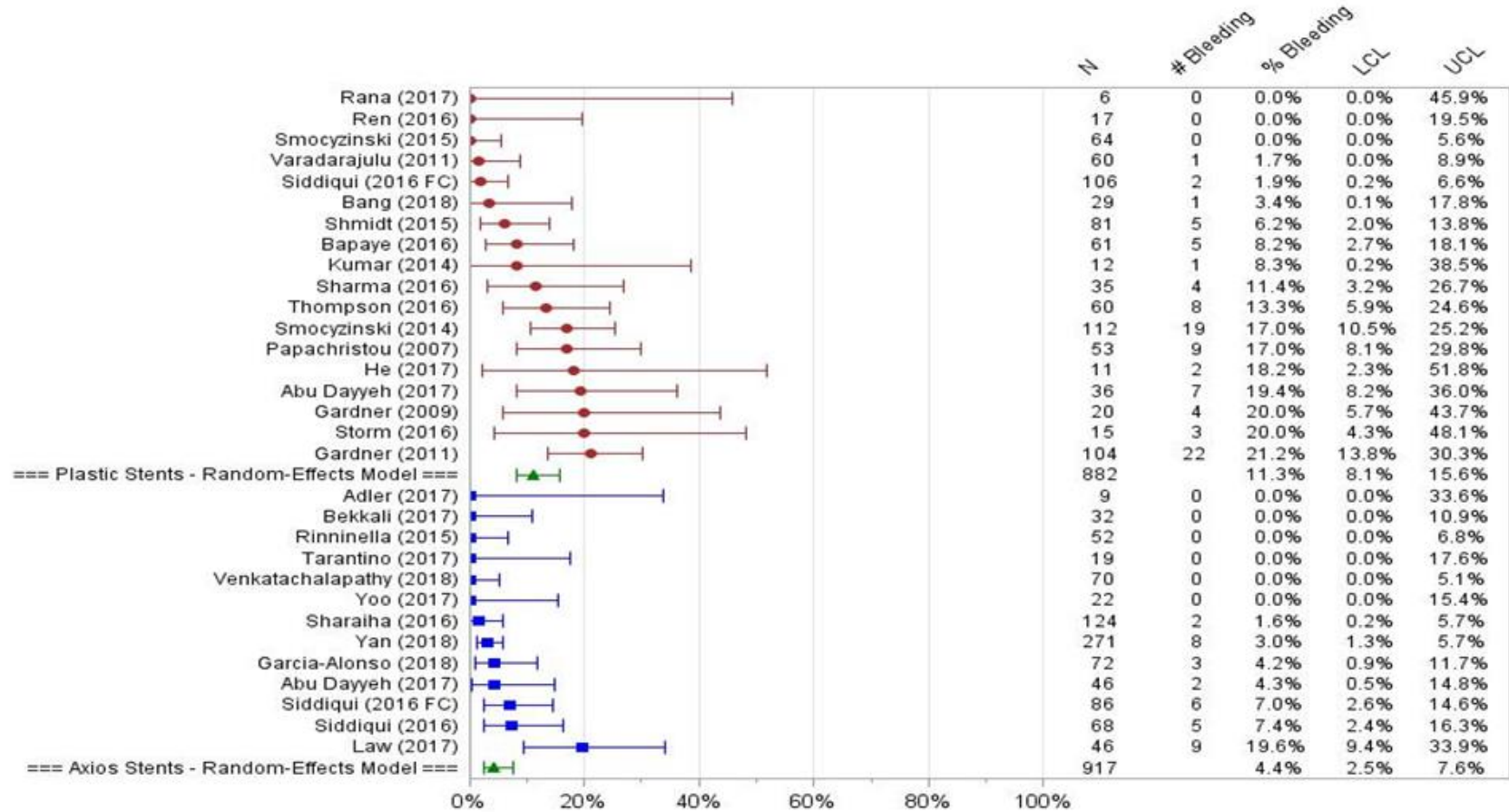


Plastic: 81.6%

LAMS: 87.3%

Update Meta-analysis with LAMS vs. Plastic

Plastic vs Axios - % Bleeding
Percent and 95% Exact CL



Plastic: 11.3%

LAMS: 4.4%

Endoscopic management is variable

- 1) Are we comparing the same WONs?
- 2) Is there truly a step-up approach?
- 4) How we can get resolution rates to 100% with even lower complication rate?

AXIOS Lumen Apposing Metal Stent for Walled Off Necrosis Drainage IDE Study

Mayo Clinic, Emory, U of Colorado, U of Indiana, BWH

- **Prospective only WON with > 30% necrosis**
- **Protocolize approach for drainage and necrosectomy**

In Summary

- Accurate classification of the WON is critical ideally with index MRI
- Intervene at the right-time guided by a patient-centric approach
- Endoscopic WON management is superior to surgical and percutaneous approaches
- EUS is a must
- Single or multi gateway access depending on WON characteristics
- LAMS seem superior to plastic in WON with significant solid component. However, optimal protocols for use and follow-up need to be defined to minimize associated risk.
- More prospective data needed

Questions & Discussion