

Digestive Diseases of the Caribbean '22

Peri-Pancreatic Fluid Collections: avoiding the pitfalls

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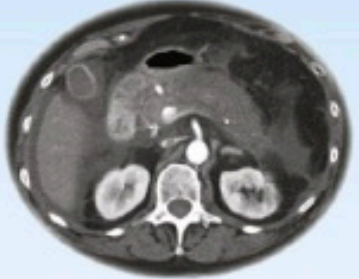

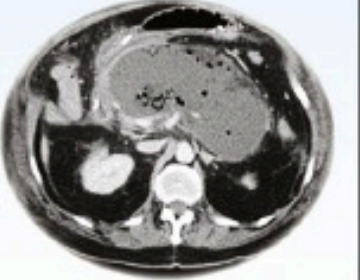
Columbia University Medical Center-NYPH

Disclosures

- Boston Scientific- consultant, research
- Olympus- consultant
- Fujifilm- consultant
- Medtronic- consultant
- Interscope- consultant

Pancreatic Fluid Collections and Necrosis: definitions

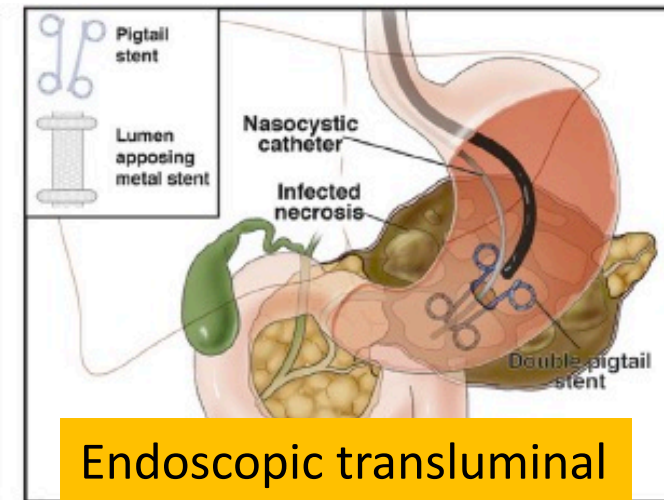
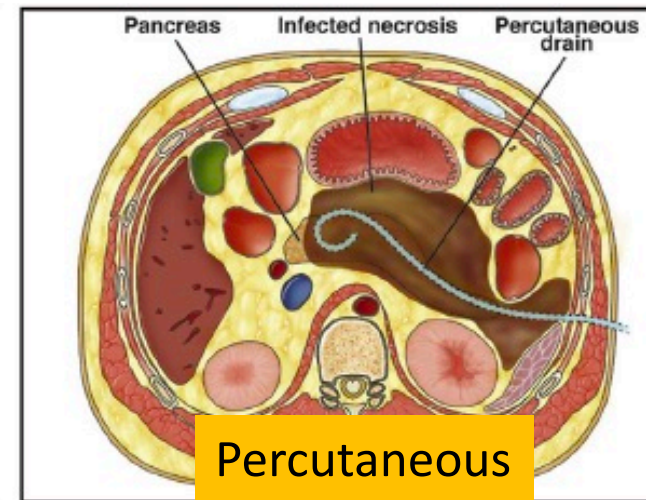
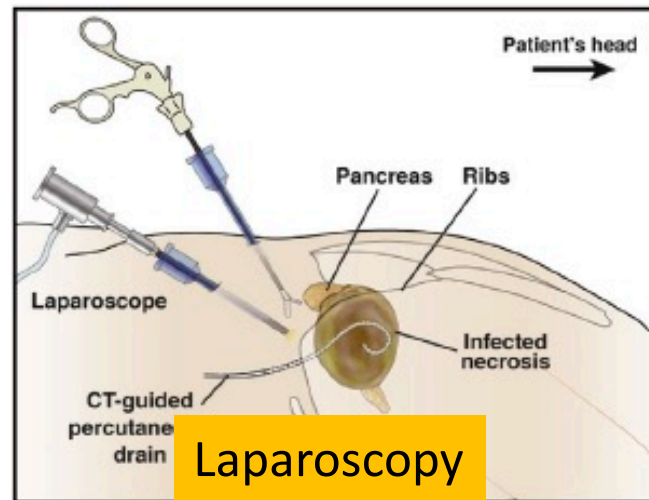
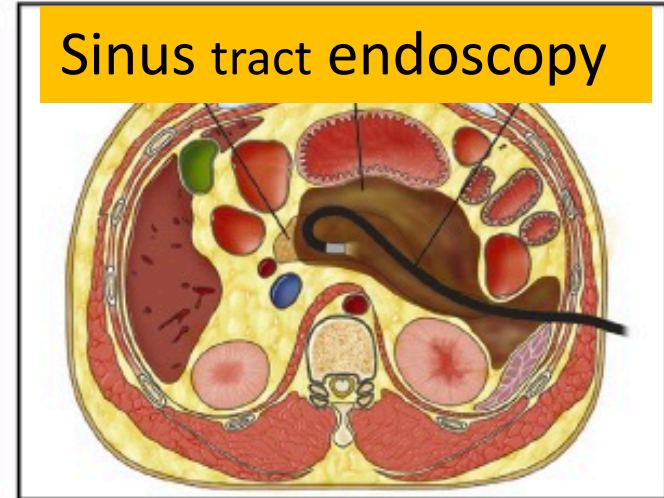
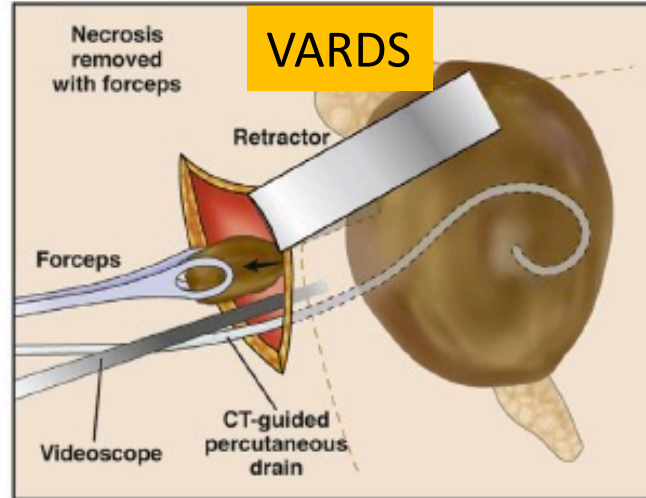
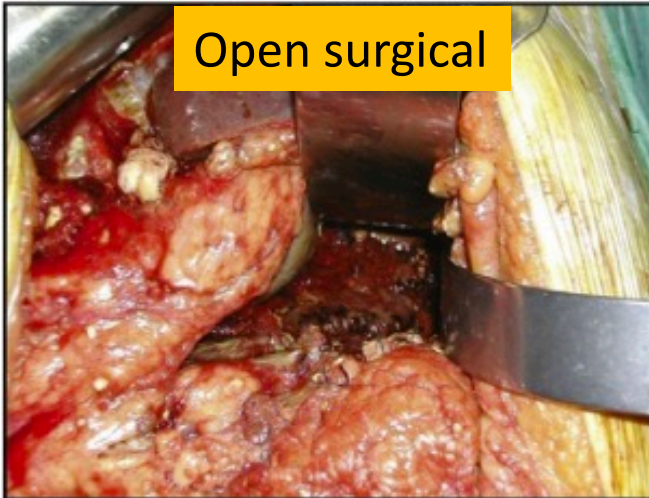
Contrast enhanced CT

	Interstitial edematous pancreatitis	Necrotizing pancreatitis
< 4 weeks	Acute (peri)pancreatic fluid collection Homogenous fluid adjacent to pancreas without a recognizable wall 	Acute necrotic collection Intra and/or extra pancreatic necrotic collection without a well-defined wall 
≥ 4 weeks	Pancreatic pseudocyst An encapsulated, well-defined, usually extrapancreatic fluid collection with minimal solids 	Walled off necrosis Intra and/or extra pancreatic necrotic collection with a well-defined wall 

Pancreatic Fluid Collections: Indications for intervention

- Suspected infected necrosis with clinical deterioration
 - Preferably when walled off but not absolute
- Ongoing organ failure or FTT, weeks after onset, preferably when WON
- Symptoms secondary to WON or PC
 - Obstruction: gastric outlet, biliary, intestinal
 - FTT secondary to pain/early satiety
 - Disconnected pancreatic duct w/symptoms (DPDS)

Intervention for Pancreatic Necrosis: Approaches



Treatment of WON: Endoscopy vs Surgery (RCT's)

- PANTER Trial: Open necrosectomy vs Step-up Approach
 - Step-up approach associated with decreased rate MOF, lower risk of incisional hernia, new onset DM, pancreas insufficiency, and cheaper cost
- PENGUIN and TENSION Trial: Endoscopic Step-up vs Surgical Step-up
 - No differences in mortality or morbidity
 - Endoscopic approach w/ fewer major complications (MOF, pancreatic fistula), shorter LOS, lower indirect costs
 - Endoscopic approach with lower rate of new diabetes, required fewer sessions
- MISER Trial: MIS (VARDS or Lap) vs Endoscopic Approach
 - Endoscopic approach with few major complications (12% vs 40%), no enteropancreatic fistula (vs 28% surgery), lower overall cost (75K vs 117K), higher QOL scores

Endoscopic drainage: an evolution

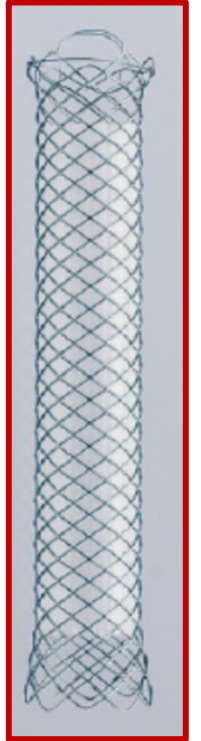
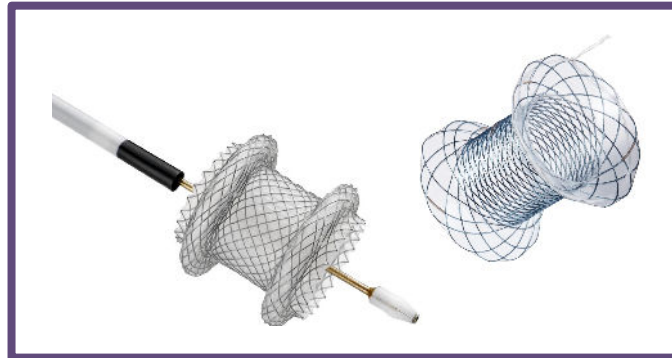
Non-EUS guided: needle knives, DP stents



EUS-guided: Seldinger technique, DP stents → FSEMS

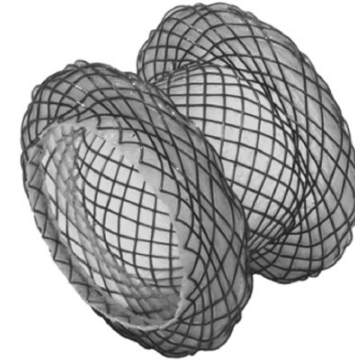


EUS-guided: Direct cautery access → LAMS

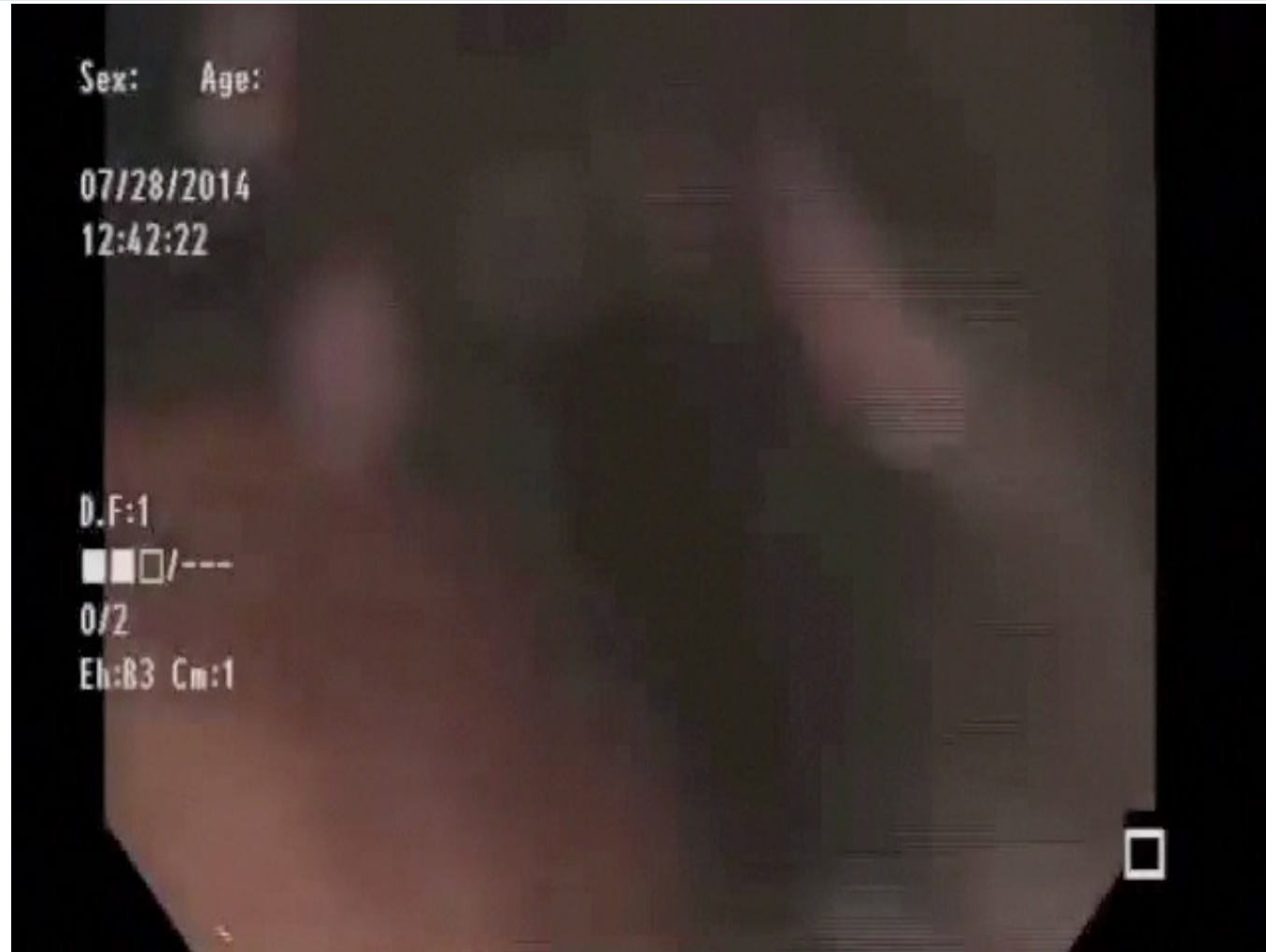


EUS-Guided LAMS

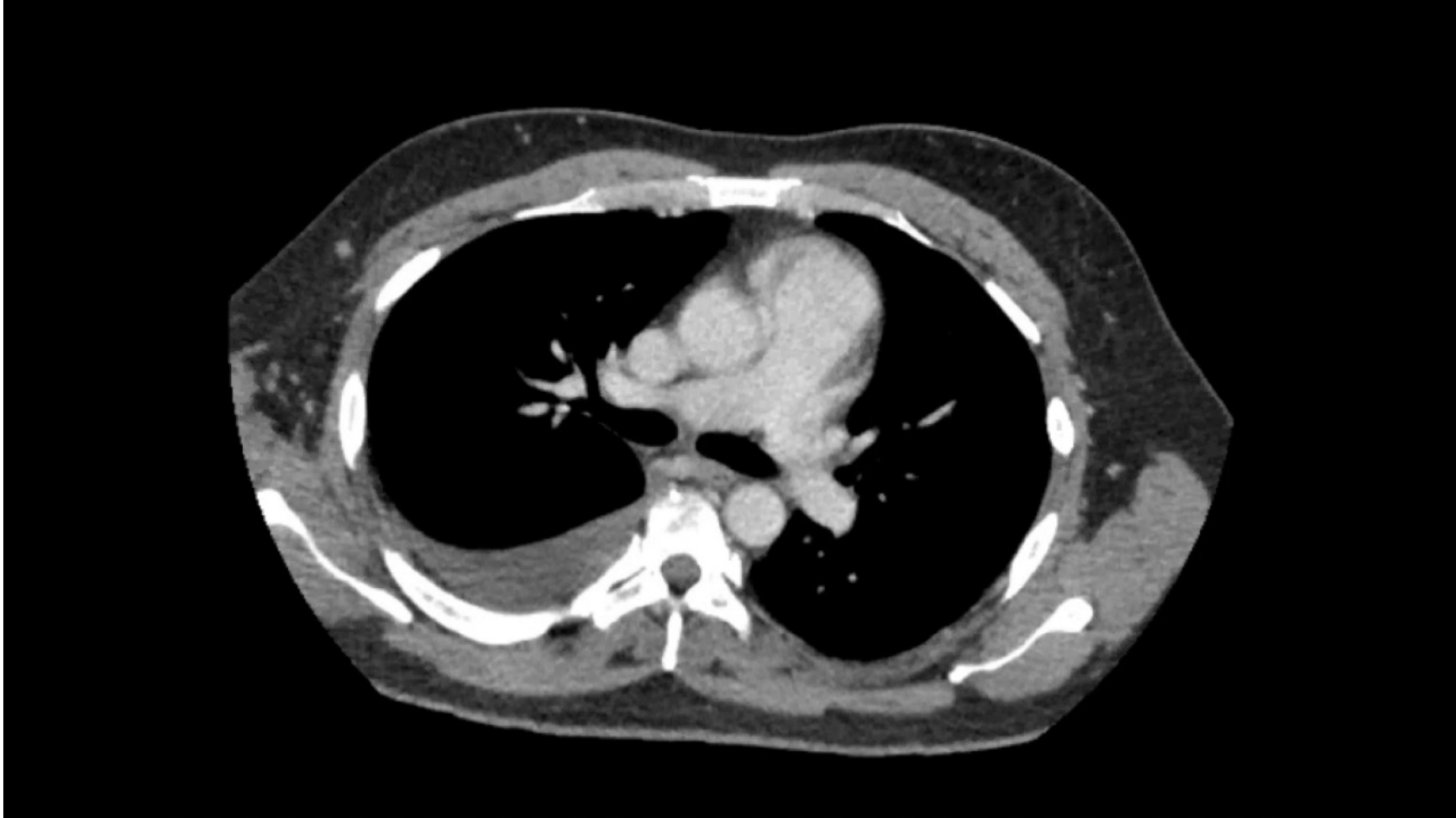
- Fully covered lumen apposing metal stent
- Cautery enhanced and non-enhanced
- Multiple sizes (6, 8, 10, 15, 20mm)
- Can be performed wire-guided or freehand
- Can be performed by EUS-guidance only or endoscopically
- Can be performed without fluoroscopy
- Allows for large diameter stent with low risk of wall separation, perforation, leakage, migration
- Approved for drainage of PPC and WON



PFC drainage: LAMS

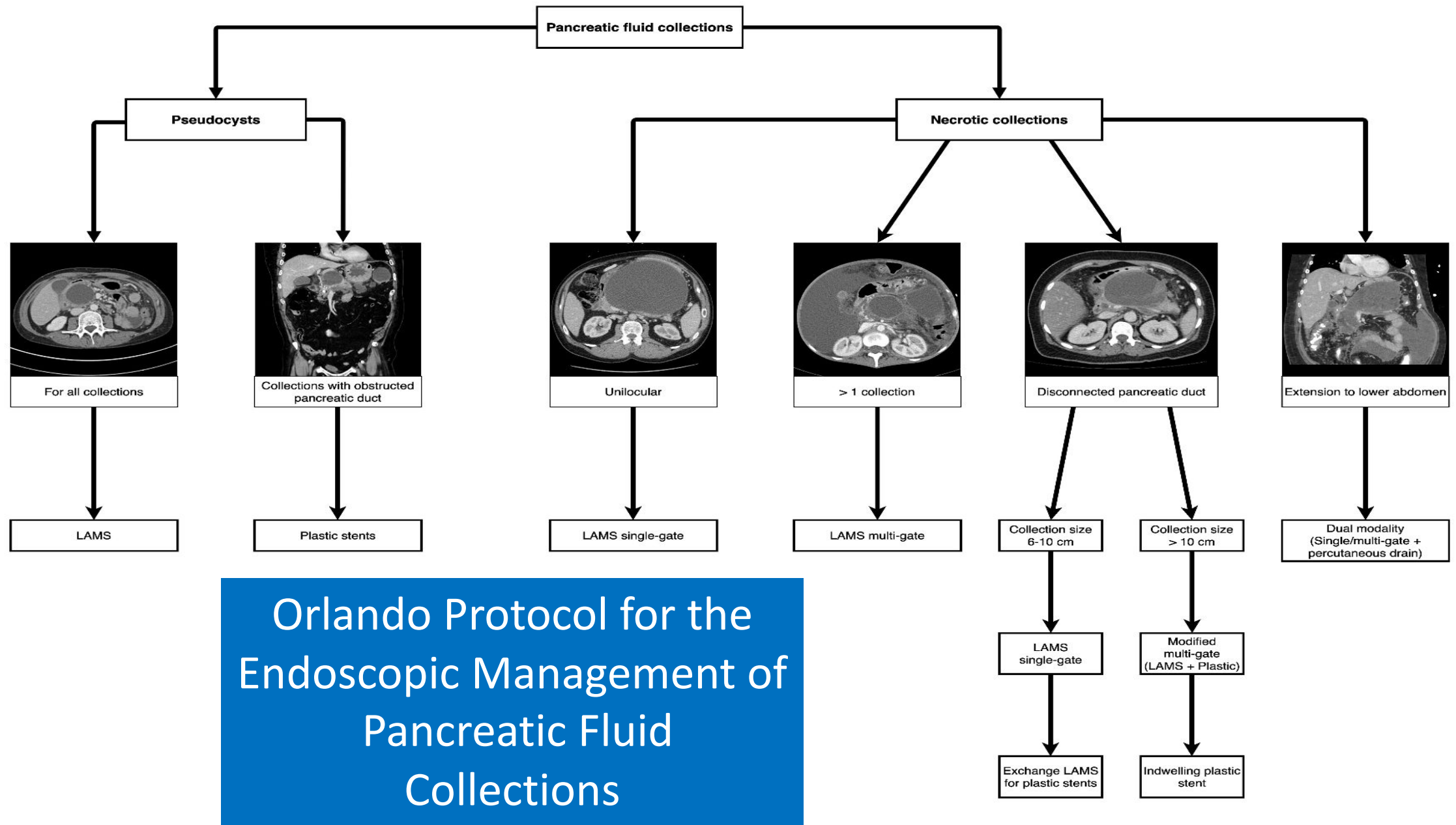


WON Drainage and Direct Endoscopic Necrosectomy (DEN)



Considerations in approach

- Technique?
- LAMS vs Plastic? What size?
- When to intervene initially?
- How often to intervene in process?
- Managing complications?
- How to manage DPDS?



LAMS vs DPS for WON

Retrospective

Mean size 90.2mm x 60.2mm

61.8% infected necrosis

TABLE 2. Clinical Outcomes

	LAMS, n (%)	Traditional, n (%)	<i>P</i>
Technical success	31 (91.2)	78 (100.0)	0.026
Initial clinical success	30 (88.2)	60 (76.9)	0.203
Resolution of WON	32 (94.1)	70 (92.1)	0.510
Time to resolution, mean (SD), d	86.9 (85.1)	133.6 (136.5)	0.038
Number of procedures until resolution, mean (SD)	1.5 (0.8)	1.5 (0.8)	0.871
Recurrence of WON	2 (6.3)	18 (23.1)	0.032
Switched from traditional to LAMS cystoenterostomy	—	4 (5.1)	—
Switched from LAMS to traditional cystoenterostomy	4 (11.8)	—	—
Required percutaneous drainage	1 (2.9)	5 (6.4)	0.666
Required surgical necrosectomy	0 (0.0)	10 (12.8)	0.031

LAMS vs DPS: Adverse events

TABLE 3. Adverse Events

	LAMS, n (%)	Traditional, n (%)	<i>P</i>
Total adverse events	14 (41.2)	6 (7.7)	<0.001
Pain requiring premature stent removal	1 (2.9)	0 (0.0)	0.304
Bleeding	3 (8.8)	1 (1.3)	0.083
Stent occlusion requiring premature procedure	4 (11.8)	2 (2.6)	0.068
Stent migration requiring premature procedure	1 (2.9)	1 (1.3)	1.000
Perforation/dislodgement during deployment	3 (8.8)	0 (0.0)	0.026
Pneumoperitoneum	1 (2.9)	1 (1.3)	1.000
Peritoneal leak	0 (0.0)	1 (1.3)	1.000
Death before WON resolution	1 (2.9)	0 (0.0)	0.304

Plastic vs Metal: Prospective

- Non-inferiority study, LAMS (n=31) vs DPS (n=29) for WON
- No difference in # of procedures performed, treatment success, clinical adverse events, readmissions, LOS, and overall costs
- Shorter duration for LAMS (15min vs 40min)
- Initially, increased number of stent-related AE's with LAMS (32.3 vs 6.9%)
- Change in protocol (imaging 3wks post LAMS with removal) → no difference in adverse events
- Increased procedural costs with LAMS (\$12,155 vs \$6,609)

LAMS: What size?

- 15 mm vs 20mm: No difference in technical or clinical success, but fewer procedures for 20mm
- LAMS can successfully be reused for multiple successive DEN
**off-label*
 - Resolution w/median 2 sessions, LAMS removed mean 64 days

Necrosectomy: how to make more efficient

Motorized endoscopic debridement

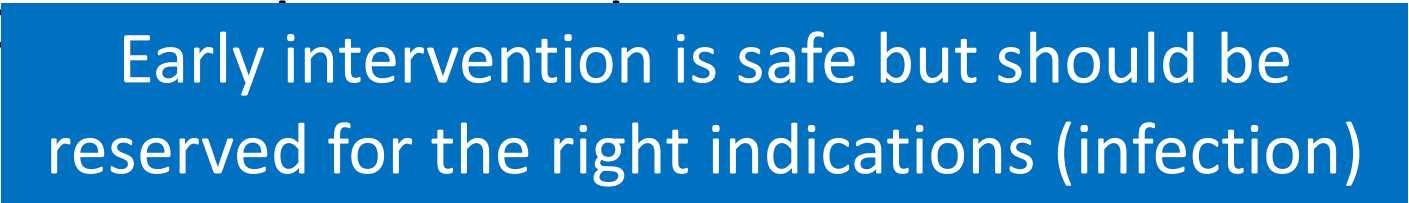
- 12 pts, 27 procedures
- 3pts w/prior failed necrosectomy
- Mean WON size: 117.5mm x 51.9mm
- Median procedure time: 38 min
- Mean #procedures for complete debridement: 2 (1-7)
- No procedure-related AE's
- Ease of use: 8.2 (Likert scale)
- Efficacy: 8.2

Outcomes of early endoscopic intervention for pancreatic necrotic collections: a matched case-control study



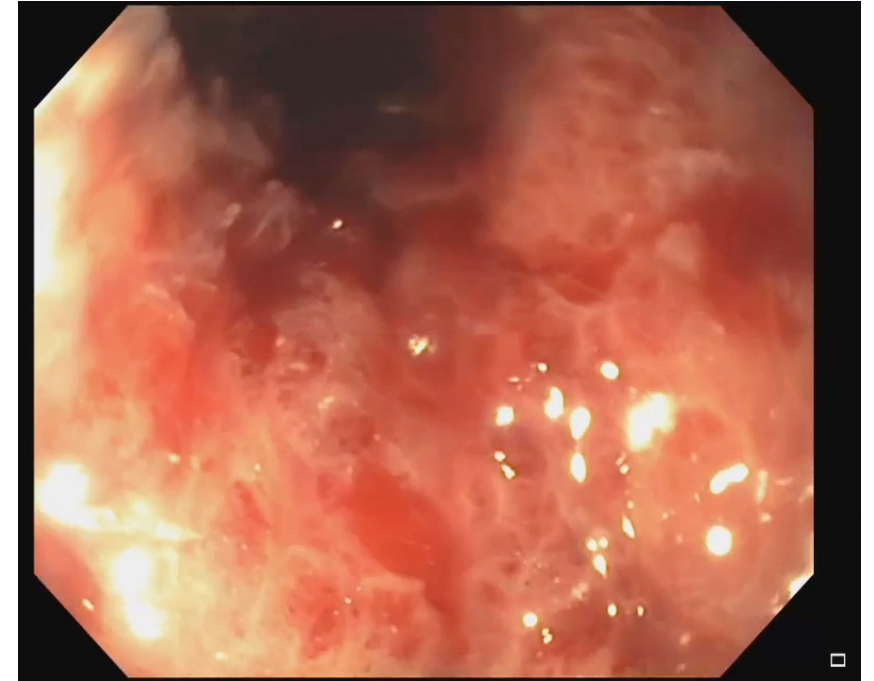
Nicholas Oblizajek, MD,¹ Naoki Takahashi, MD,² Sevda Agayeva, MD,¹ Fateh Bazerbachi, MD,¹
Vinay Chandrasekhara, MD,¹ Michael Levy, MD,¹ Andrew Storm, MD,¹ Todd Baron, MD,³ Suresh Chari, MD,¹
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Ryan Lennon, MS,⁴ Mark Topazian, MD,¹ Barham K. Abu Dayyeh, MD, MPH¹

Rochester, Minnesota

- 19pts w/early intervention (<4wks) (median 23d)
- 11/19 w/co 
- 100% w/su
- Longer duration of therapy in pts w/early intervention compared to controls (103d vs 69d)
- No diff in AE or mortality

Complications

- Bleeding
- Pneumoperitoneum
- Air embolism
- Pseudoaneurysm
- Tract occlusion with further infection
- Stent migration



Multicenter study of LAMS-associated AE's for PPC and WON drainage

- 15 international centers, 333 procedures
- Technical success: 97.9%
- Clinical success: 89.5%, f/u 153 days
- LAMS-related AE's: 74/304 (24.3%) pts
- ASGE classification:
 - Mild 25.3%, moderate 68.9%, severe 6.3%
- Management: endoscopic 58.2%, conservative 34.2%, IR 7.6%

LAMS-associated AE's

Adverse event	N. of events (%)	Early (< 14 days)	Late (>14 days)
Bleeding	22 (27.8%)	13	9
Stent Migration	20 (25.3%)	6	14
Infection	10 (12.7%)	5	5
Stent Occlusion	5 (6.3%)	3	2
Buried Stent Syndrome	3 (3.8%)	-	3
Occlusion of the Pylorus	1(1.3%)	1	-

AE

To avoid complications:

- b CT 3wks post LAMS, if resolved,
- to stent is removed

on

How to avoid infection/occlusion?

- Multiple transluminal gateway approach
 - 97% (11/12) success (1 session)
- Use of nasocystic tube if signs of infection or in WON
- Irrigation with H₂O₂-no trials
- Hold PPI's-no trials
- Use of double pigtail stents to maintain patency

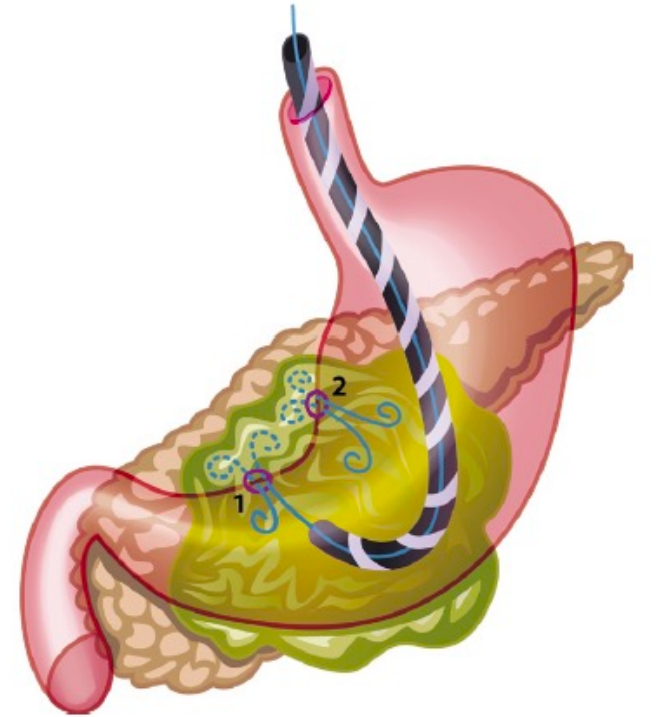


Figure 1. Illustration of MTGT for performing drainage of walled-off pancreatic necrosis.

Post Intervention: managing complications

- **Fistula**
 - Consider ERCP w/trans-papillary stent (if collection <5cm)
 - Associated w/shorter time to closure (71 v 120d) compared to conservative rx
- **SVT:** AC only recommended if PV or mesenteric thrombosis

Disconnected pancreatic duct syndrome (DPDS)

- DPDS^D
 - Can occur in 30-50% of necrotizing pancreatitis
 - Shown to reduce rate of recurrent collection (1.7% vs 17.4%)
- ESGE: leave 2 DPS long term if duct disruption
 - Remove DPS 6wks after placement if no disruption
- ACG: Accepted practice to leave DP stent in collection indefinitely

DPDS: LAMS+DPS vs no DPS

- 48/96 pts with DPDS
- Technical success of LAMS + DPS: 43.8%
- Recurrence 5% vs 37% (DPS vs no DPS)
- LAMS + DPS improved recurrence-free survival (HR 0.09, p=.033)
- Longer LAMS indwell time negatively associated with successful DPS placement

Multivariate logistic regression model			
Area of collection (per 10-unit increase)	0.27	0.96	(0.90, 1.02)
Duration of LAMS placement (per 5-day increase)	0.0019	1.33	(1.11, 1.59)

Take Home Points

- EUS-guided drainage is first line therapy for peri-luminal collections
- Fluid filled PC can be drained effectively by just DPS, however need to be familiar with method
- LAMS should be considered for WON w/anticipated need for repeat DEN
- Consider early removal of LAMS to avoid complications
- Multiple devices/techniques for DEN with evolving dedicated innovation
- Early intervention safe but should be avoided unless indicated
- Evaluate for DPDS and consider long term stent placement

Thank You!



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