

# Cases & Complications

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# Objectives

Case Based Review – How do we put it all together



# Who?

- Acute interstitial pancreatitis
  - Mild acute pancreatitis
  - Moderately severe acute pancreatitis
  - Severe acute pancreatitis = organ failure
- 15-25% percent of patients have necrotizing pancreatitis
  - necrosis of the pancreatic parenchyma, the peripancreatic tissue, or both
- Mortality in necrotizing pancreatitis = 17%



Just because there is a collection....




# What?


Term	Timing	Location	Characteristics
Acute Peripancreatic Fluid Collection (APFC)	<4 weeks	Extrapancreatic	Homogenous simple fluid, no wall
Acute necrotic collection (ANC)	<4 weeks	Extra and/or intrapancreatic	Inhomogeneous, solid components, no wall
Pseudocyst	$\geq$ 4 weeks	Extrapancreatic	Homogeneous, fluid filled, discrete wall
Walled off necrosis (WON / WOPN)	$\geq$ 4 weeks	Extra and/or intrapancreatic	Inhomogeneous, solid components, discrete wall



# When?



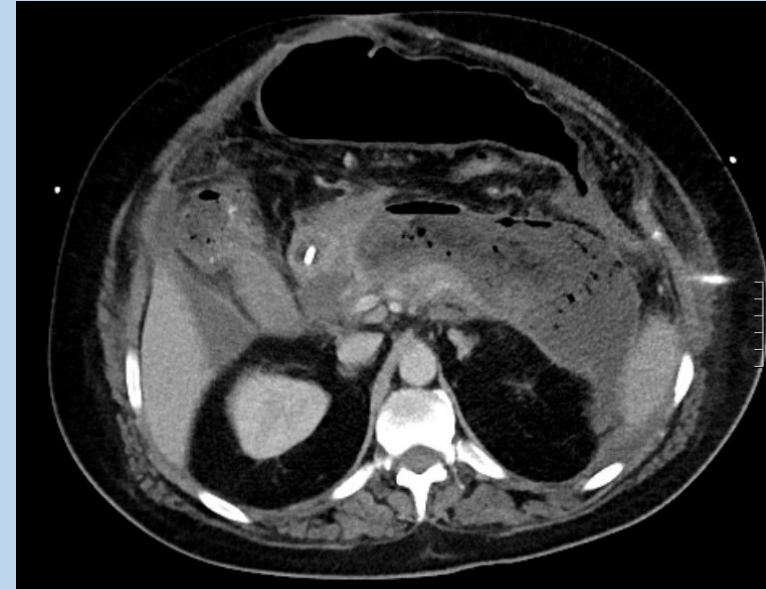
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# When?



46 days, still not there



25 days, ready to go

THE NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Immediate versus Postponed Intervention  
for Infected Necrotizing Pancreatitis

N ENGL J MED 385;15 NEJM.ORG OCTOBER 7, 2021

# When? Indications for Intervention

1. Infected necrosis – documented or suspicious
  - CT with air or fine needle aspiration (only 65-70% sensitive)
  - If clinical suspicion for infection high, no need for FNA
2. In absence of infection, persistent clinical deterioration
3. Sterile Necrosis
  - Ongoing obstruction (gastric, intestinal, biliary)
  - Persistently symptomatic (pain, “unwellness”)
4. Disconnected Duct Syndrome

Every case is unique!

Not every collection  
needs an intervention

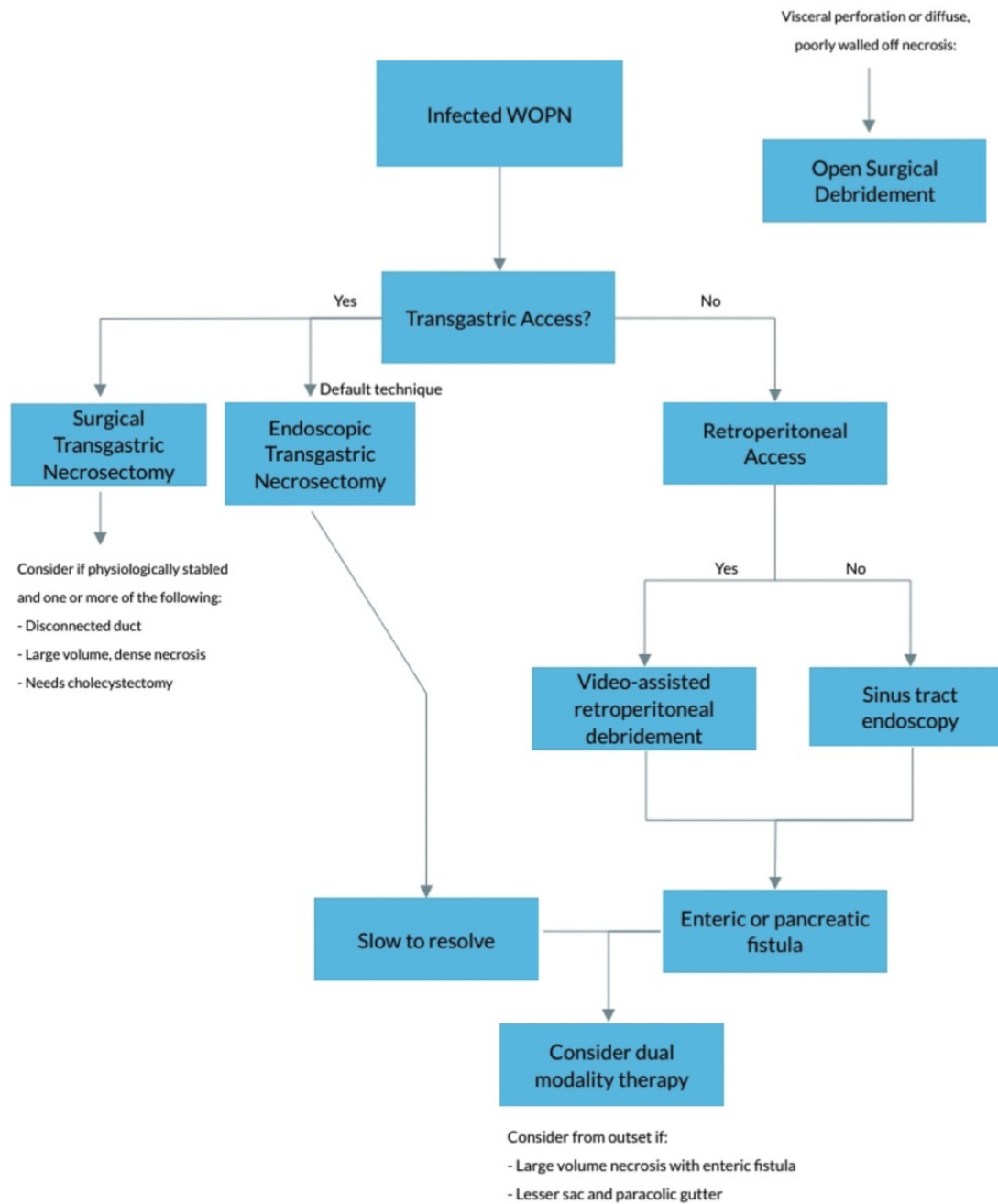


# How?

You have five options (in no particular order)

1. Open necrosectomy
2. Endoscopic transgastric necrosectomy
3. Surgical transgastric necrosectomy
4. Video assisted retroperitoneal debridement (VARD)
5. Sinus tract endoscopy





**Figure 1.** Flow diagram illustrating decision process involving minimally invasive surgery intervention. WOPN, walled of pancreatic necrosis.



# Open Necrosectomy

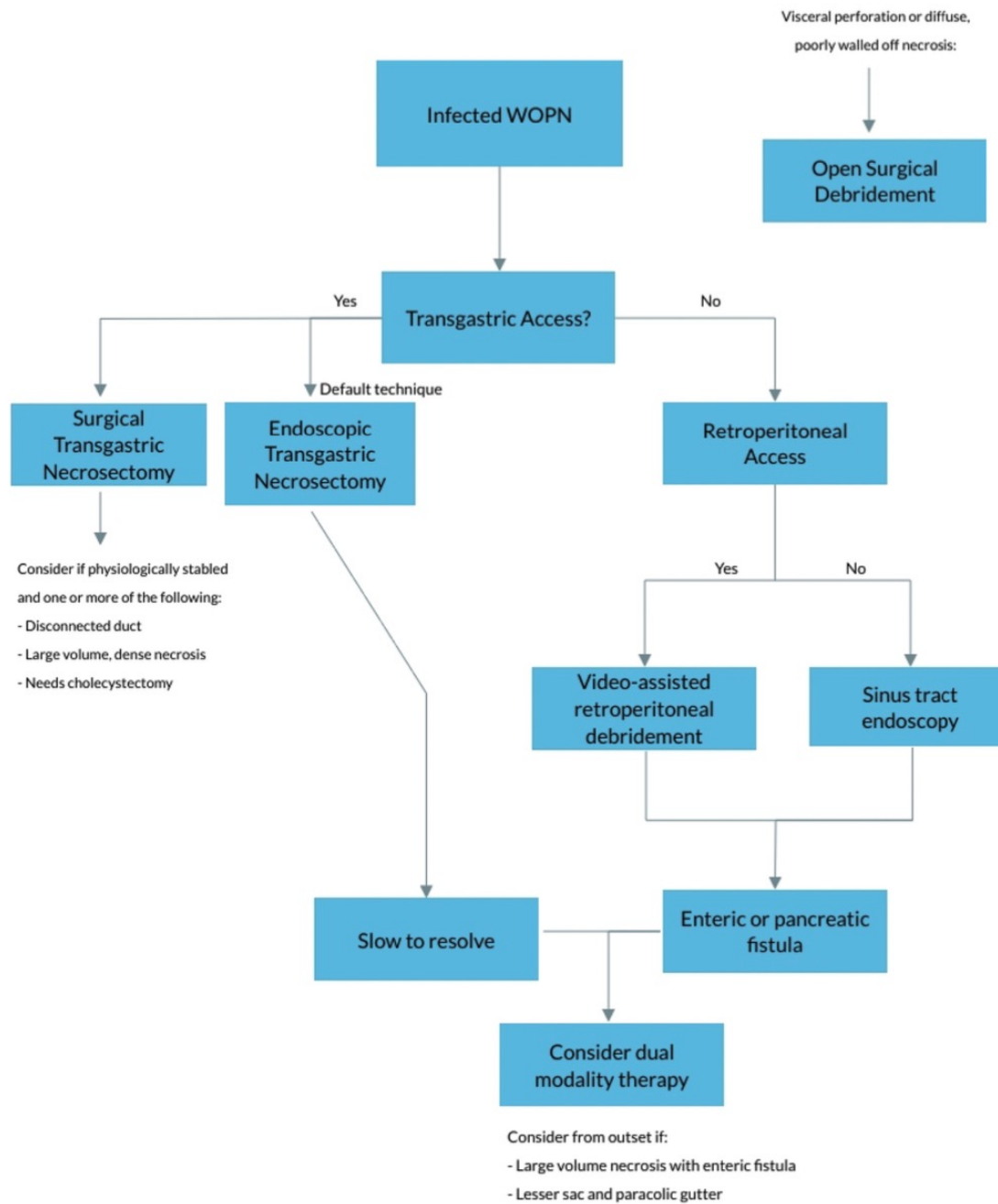


# The old-fashioned way = problems

- Worsening of sepsis (>50%)
- Enteric fistulae (1.2%)
- Pancreatic fistulae (35%-60%)
- Need for reoperation (15%: re-debride 8%, bleeding 3%, dehiscence 1%, intestinal necrosis/fistula 3%)
- Need for repeat intervention (30% need drain)
- Wound infections
- Hernias
- Pancreatic insufficiency (endocrine/exocrine)
- 11% Mortality

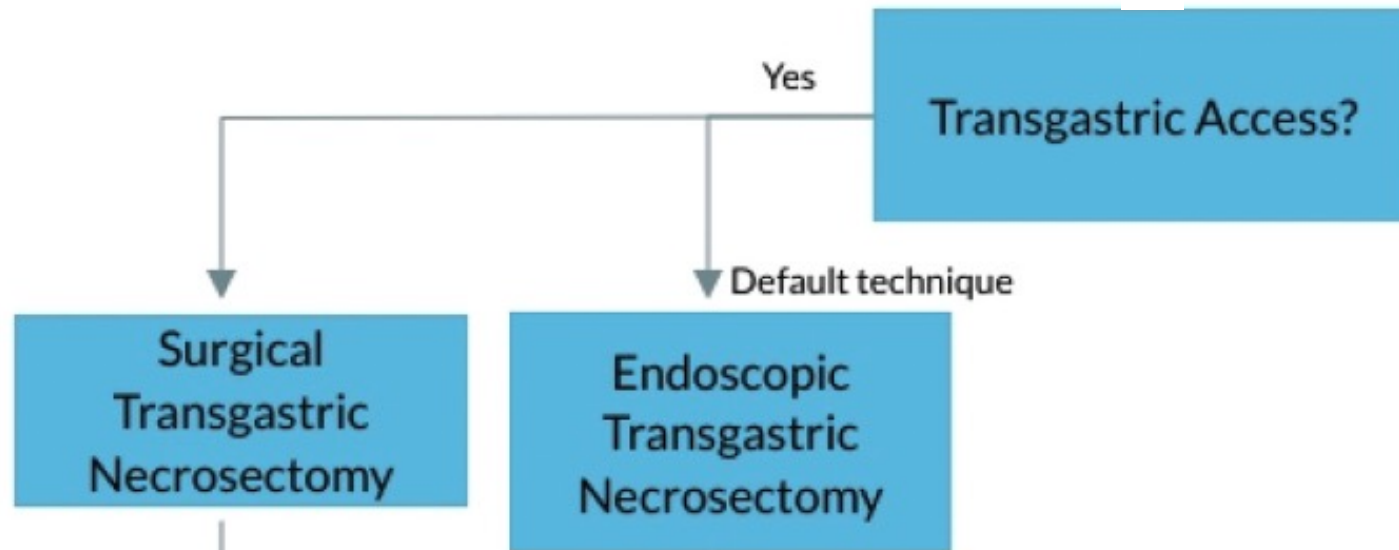
Can we do better? Yes!





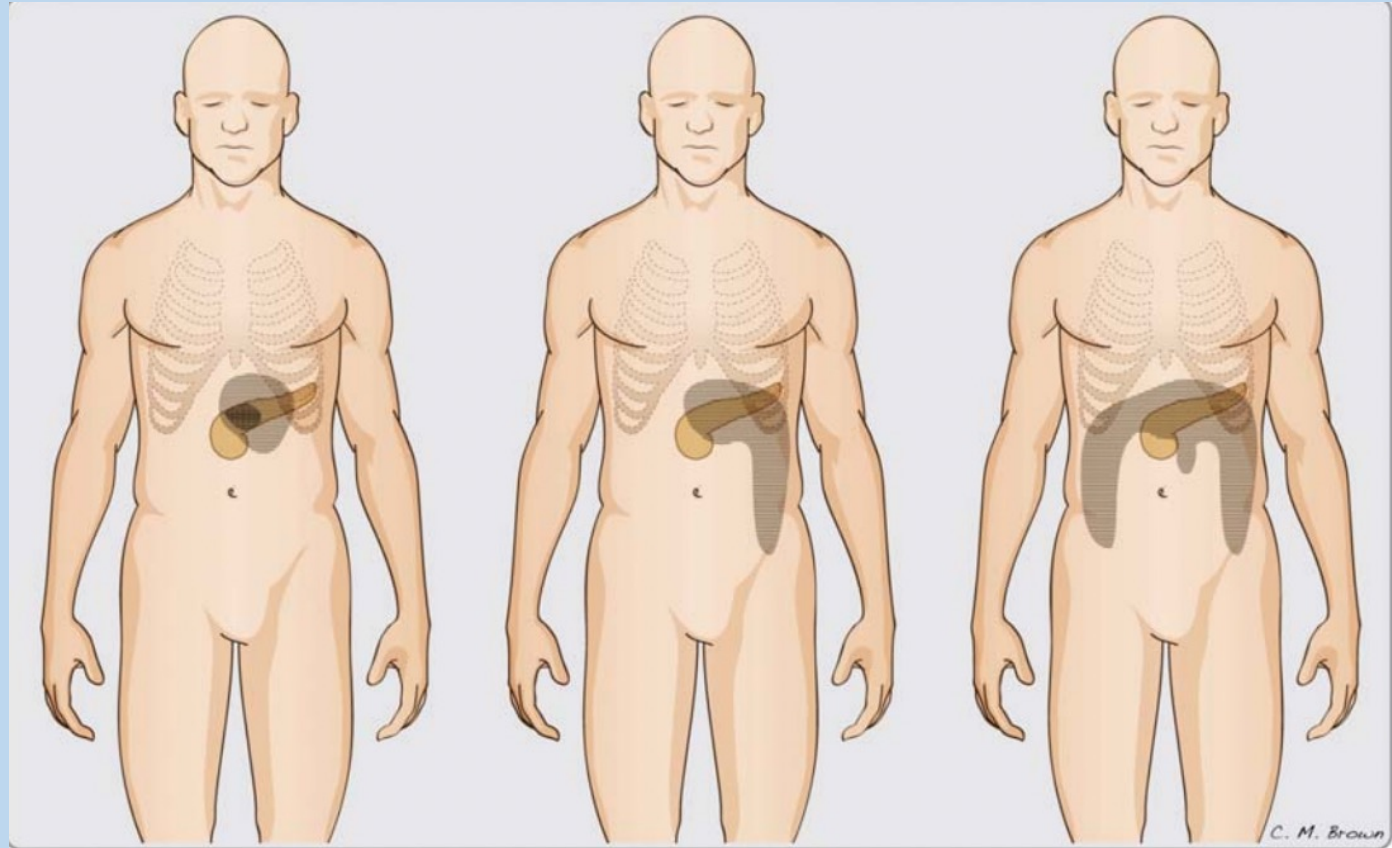
**Figure 1.** Flow diagram illustrating decision process involving minimally invasive surgery intervention. WOPN, walled of pancreatic necrosis.





Consider if physiologically stabled  
and one or more of the following:

- Disconnected duct
- Large volume, dense necrosis
- Needs cholecystectomy

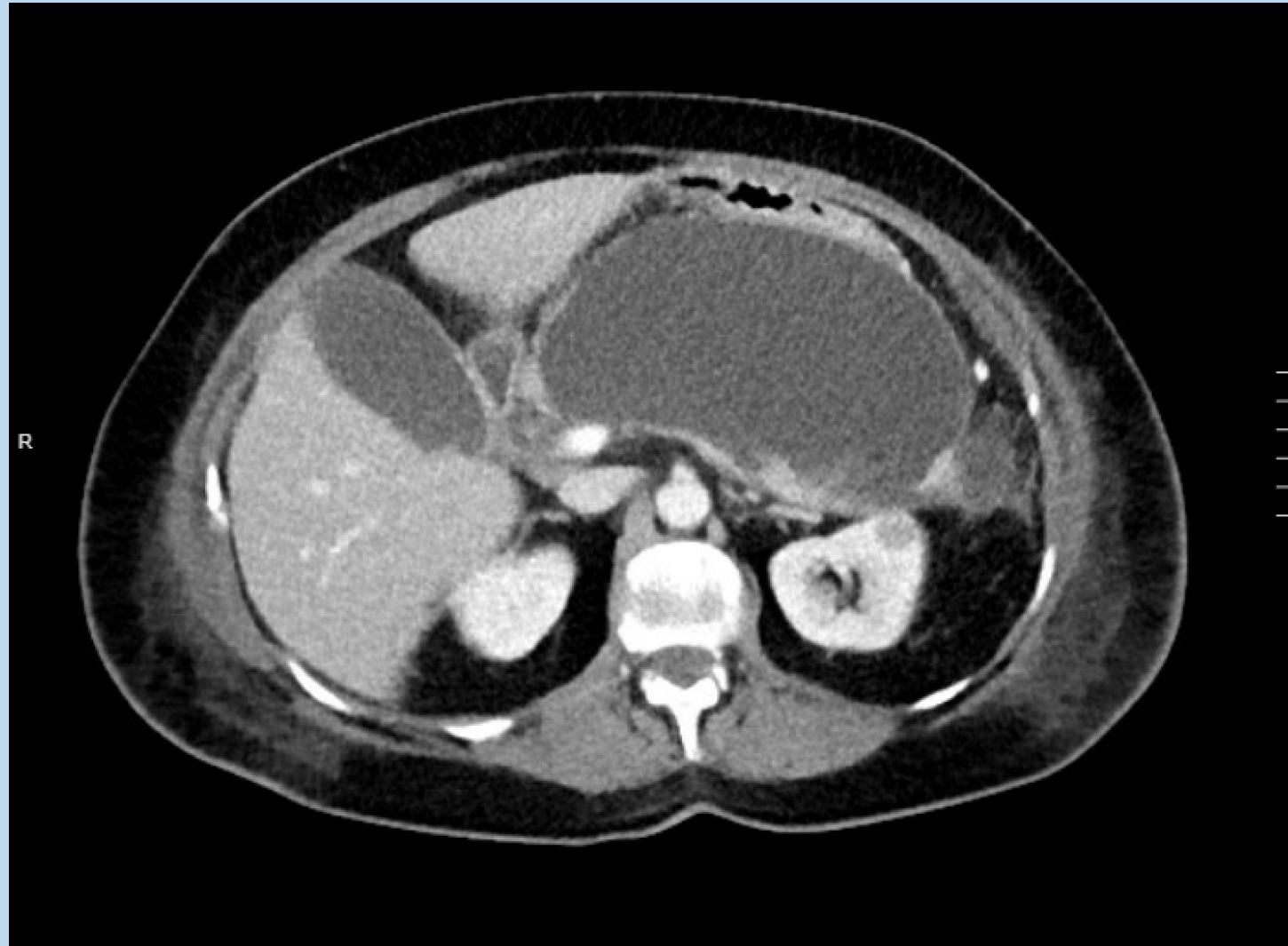


C. M. Brown

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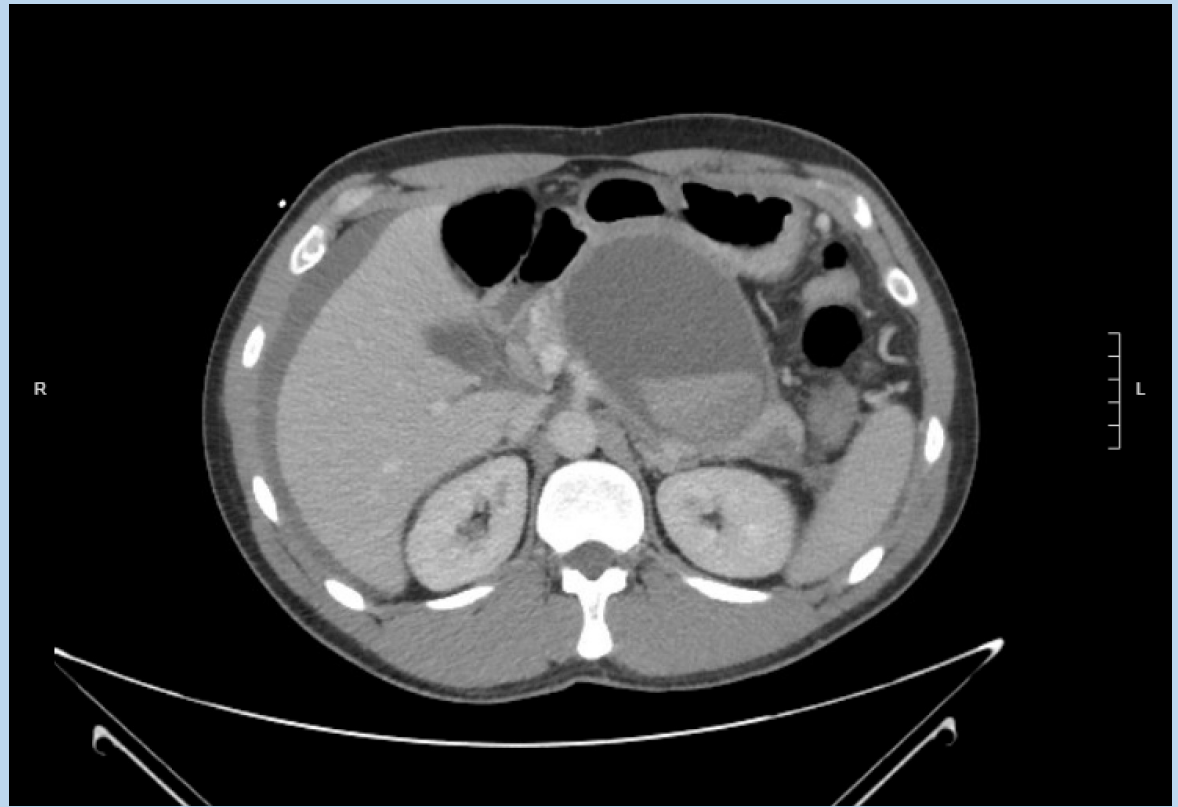
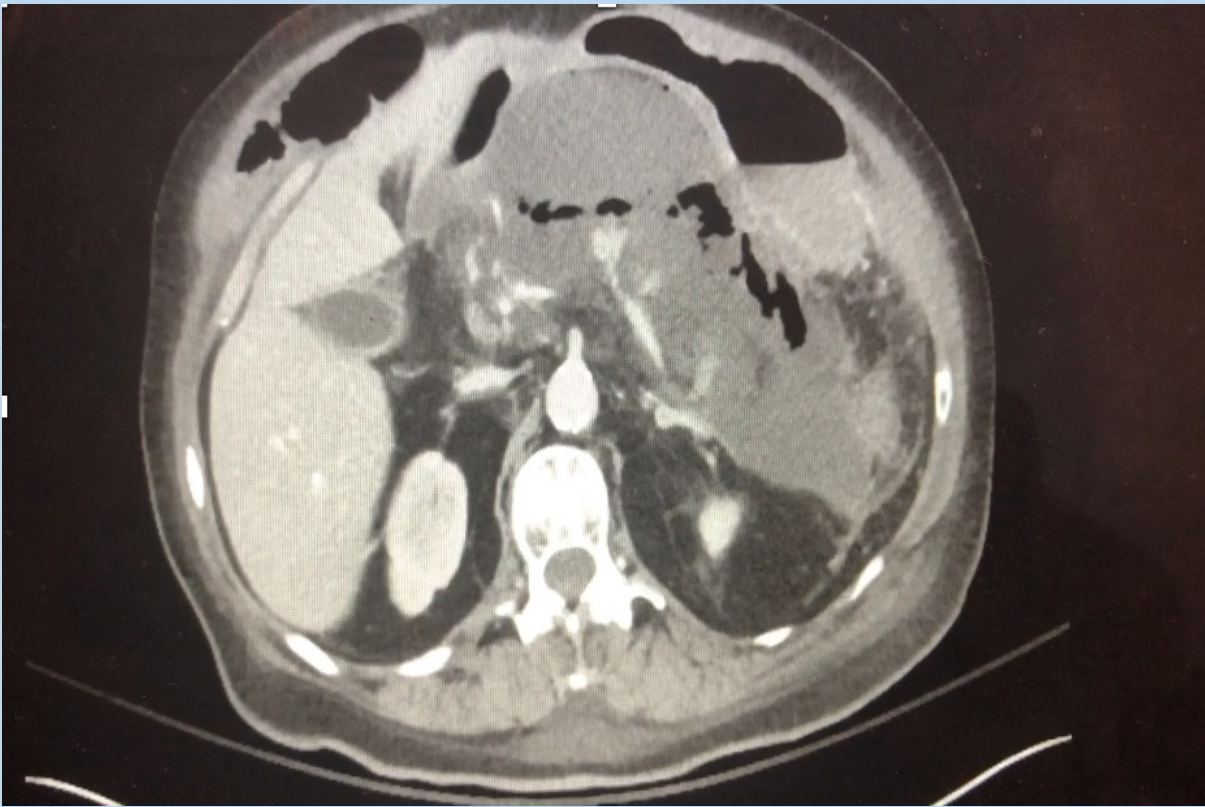


Case 1: 79yo female with recent admission for gallstone pancreatitis complicated by necrotizing pancreatitis now with early satiety and failure to thrive

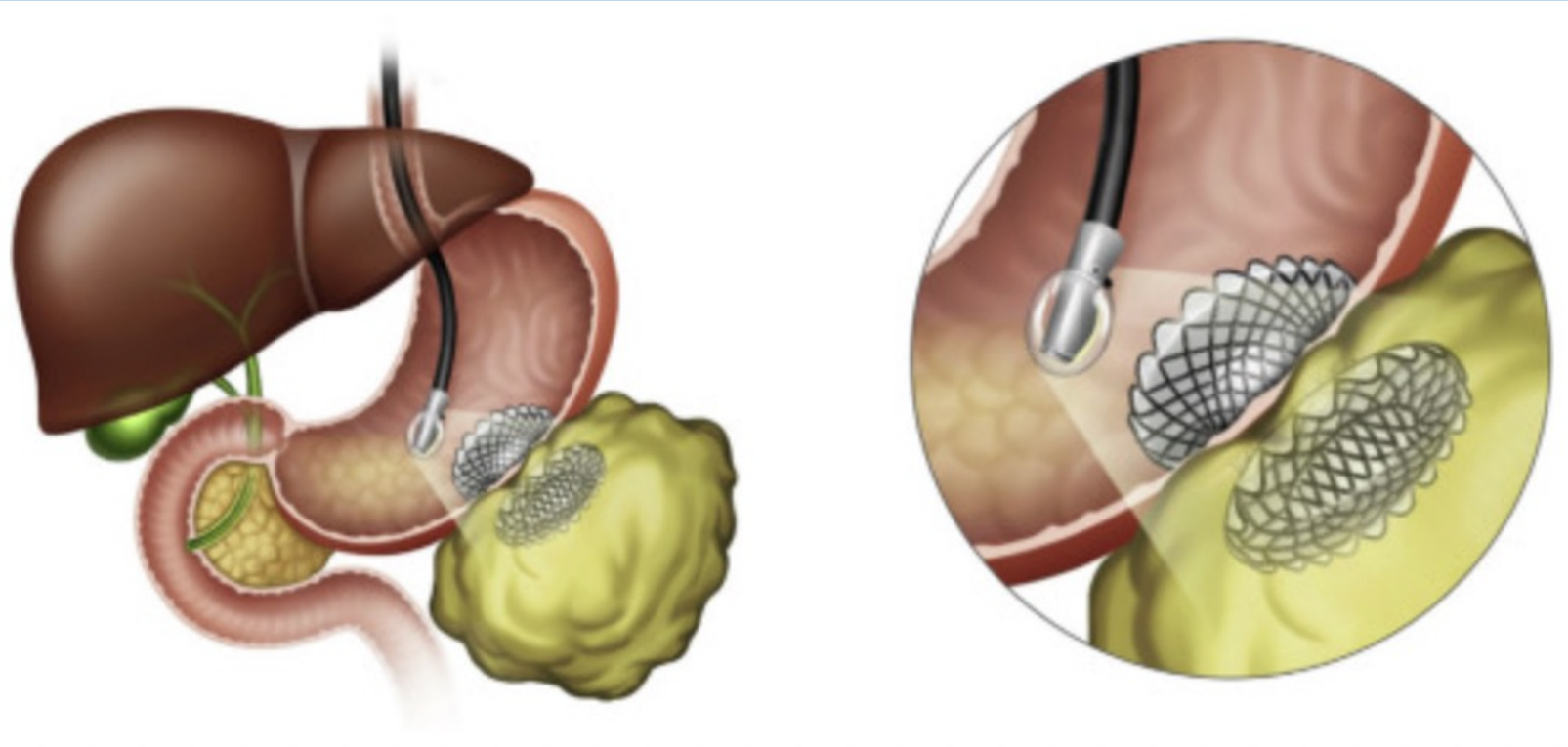




# Endoscopic Necrosectomy



# Endoscopic Necrosectomy



# Endoscopic Necrosectomy



# Pros & Cons

## PROS

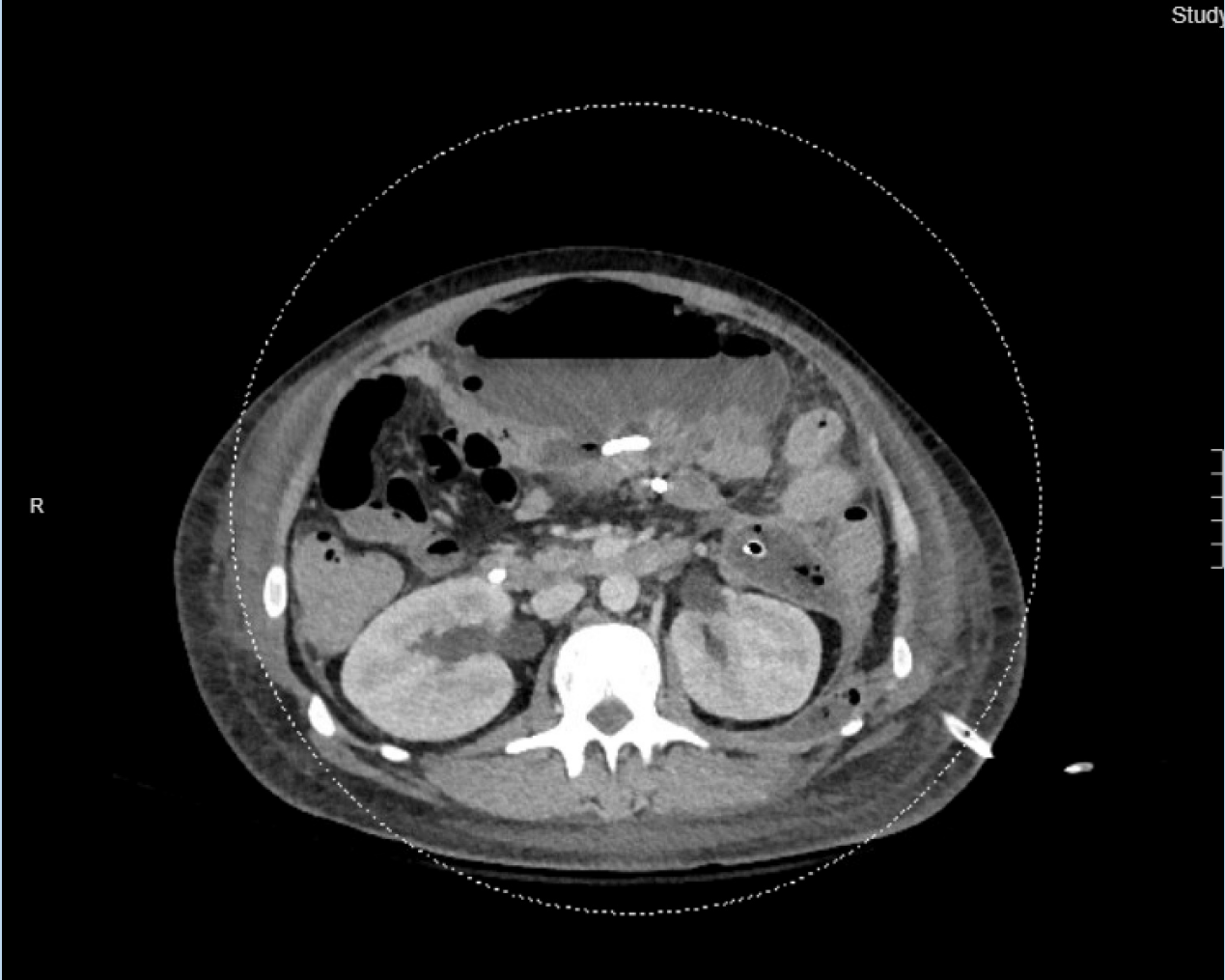
- Incisionless
- No external fistula
- Frail patients

## CONS

- Only if correct anatomy
- Multiple interventions
- Limited by varices/vessels



# Endoscopic Necrosectomy



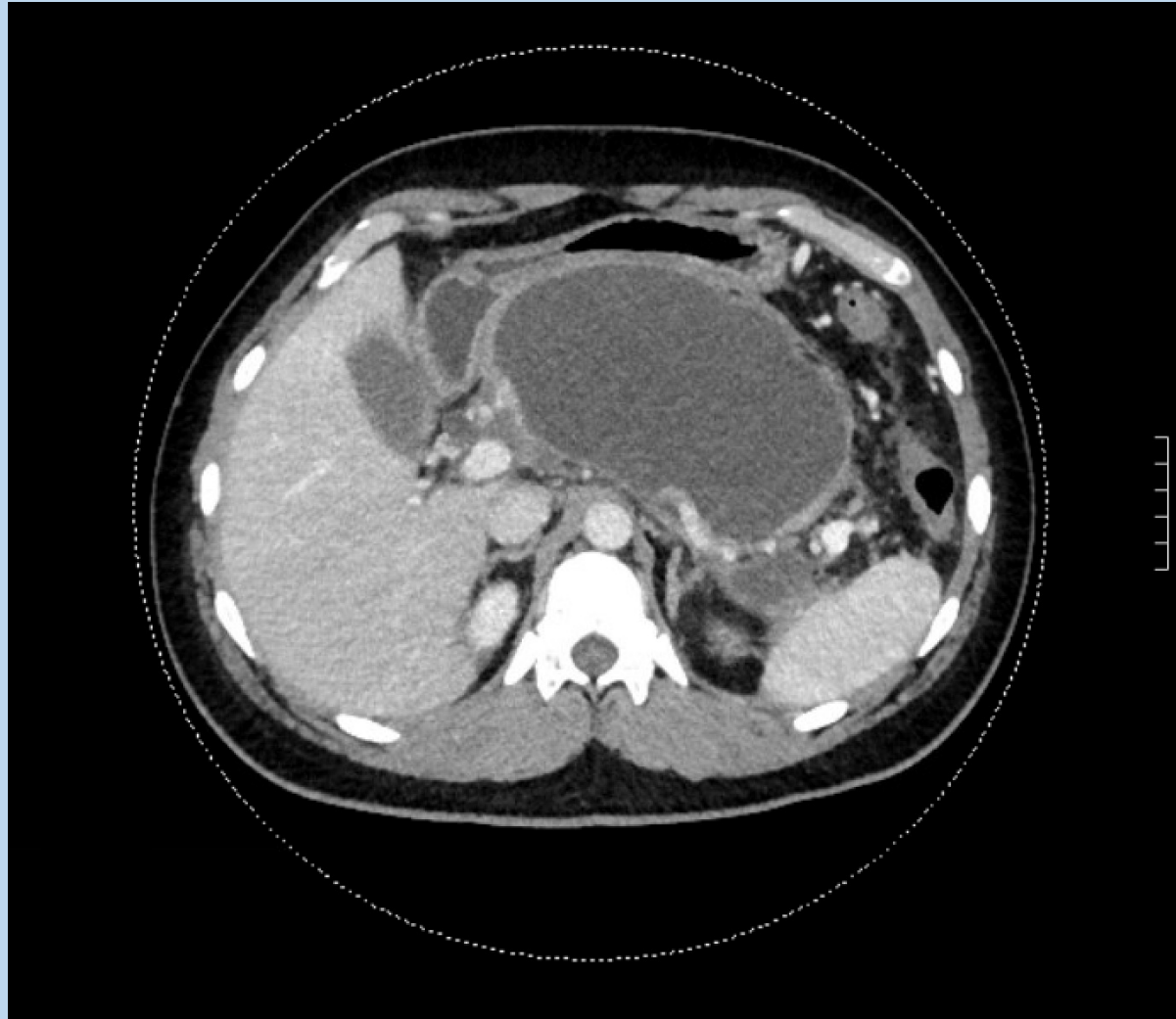
# Surgical Transgastric Necrosectomy

If physiologically stable, and.....

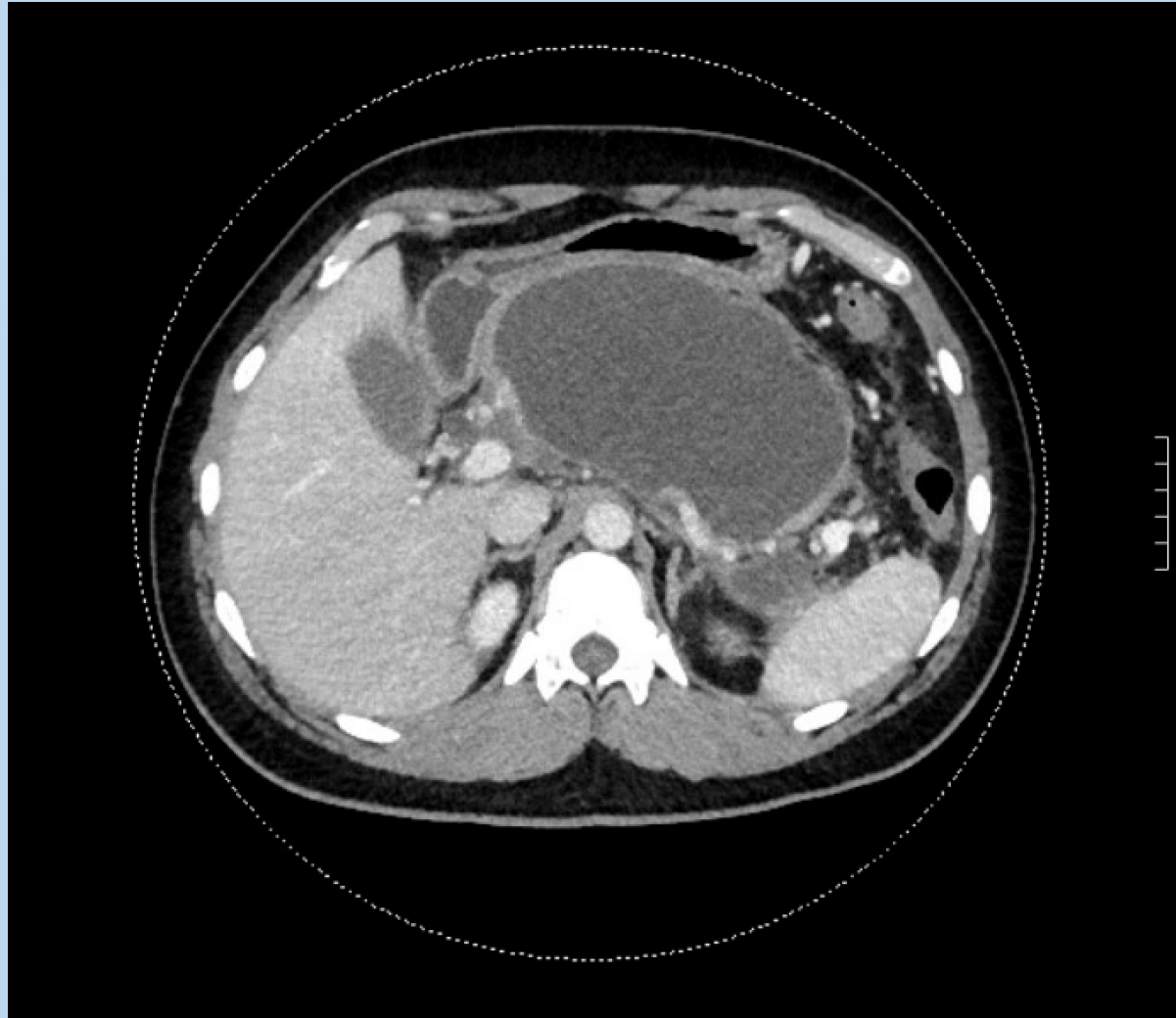
- Large volume, dense necrosis
- Needs cholecystectomy
- Disconnected duct syndrome



Case 2: 45yo male with recent admission for gallstone pancreatitis complicated by necrotizing pancreatitis now with early satiety and pain

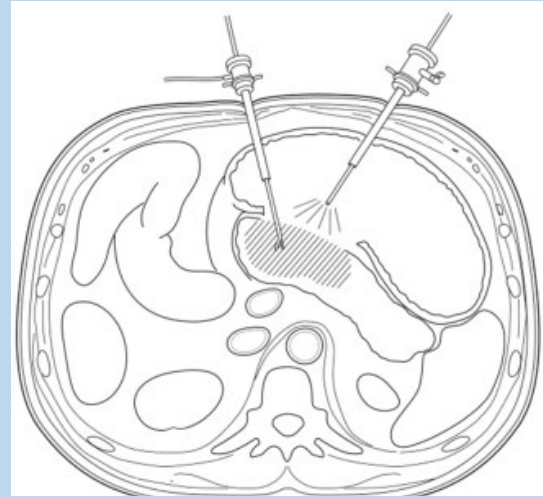
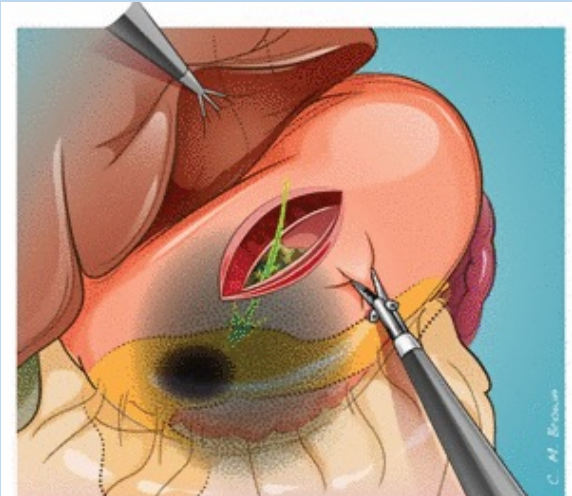


# Surgical Transgastric Necrosectomy

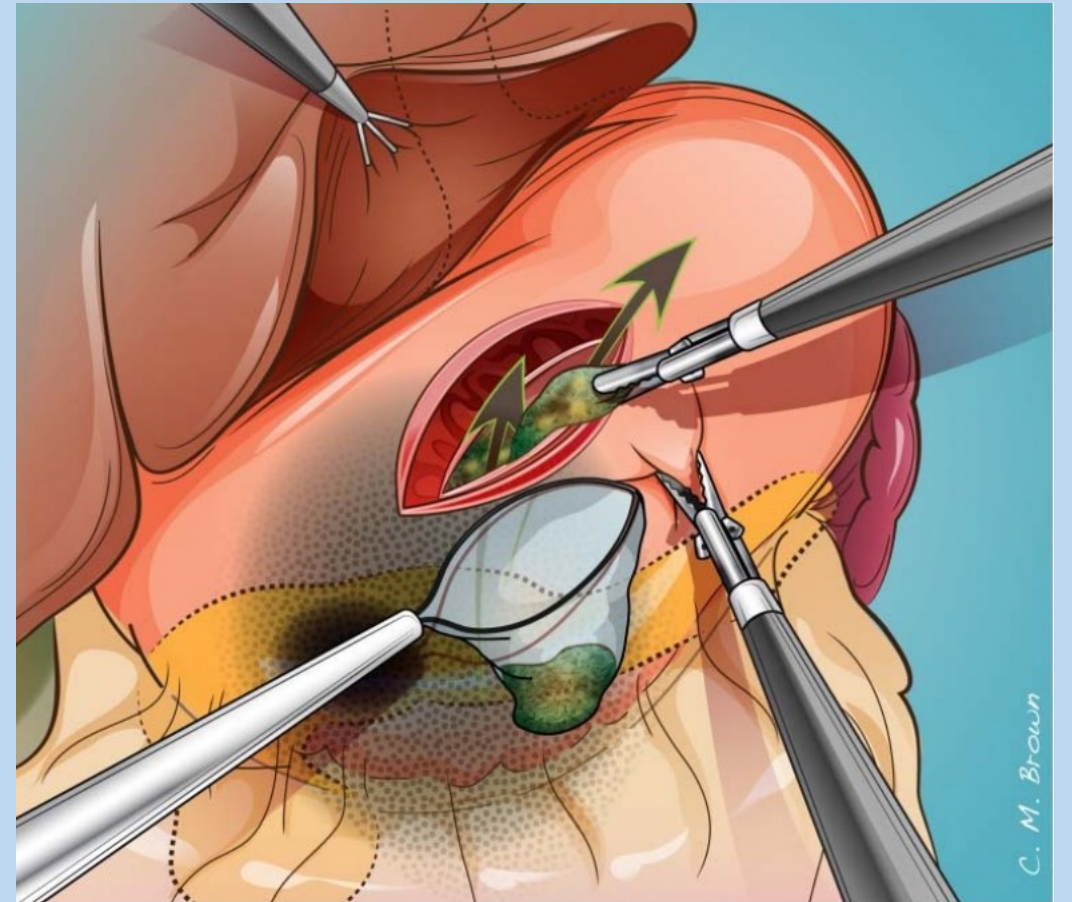
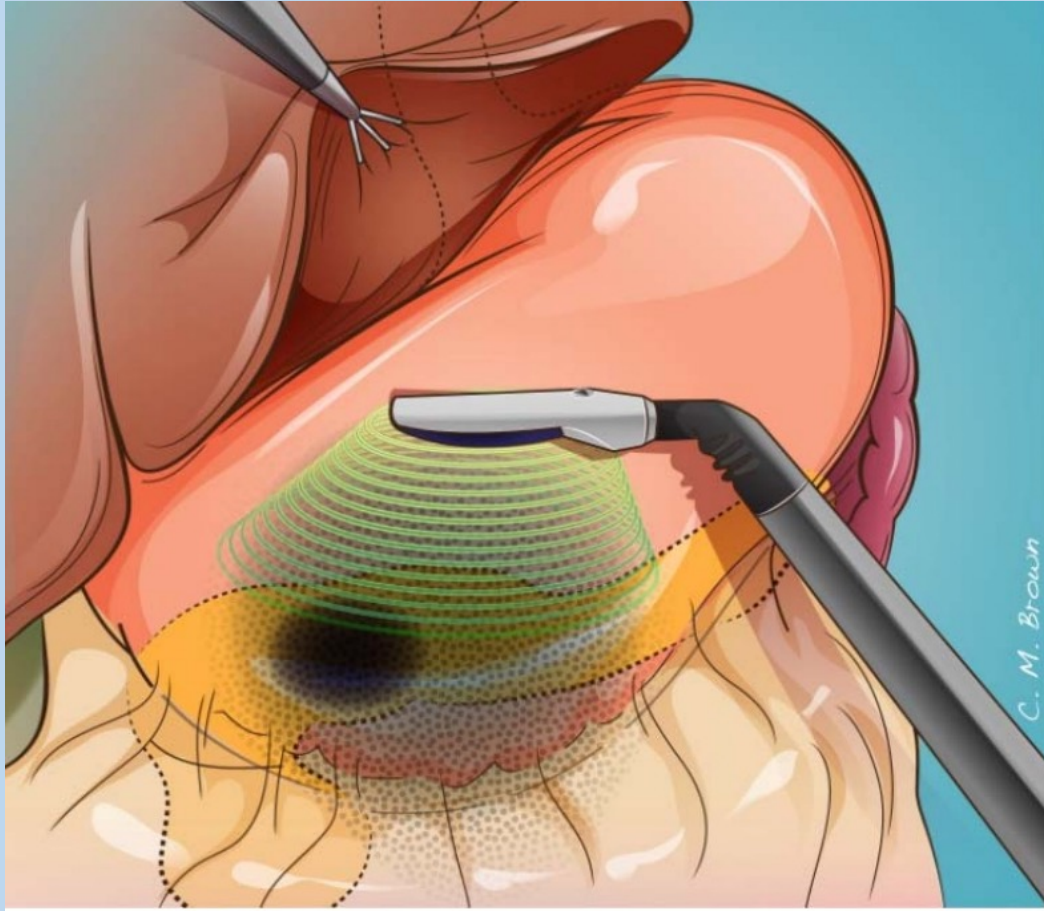


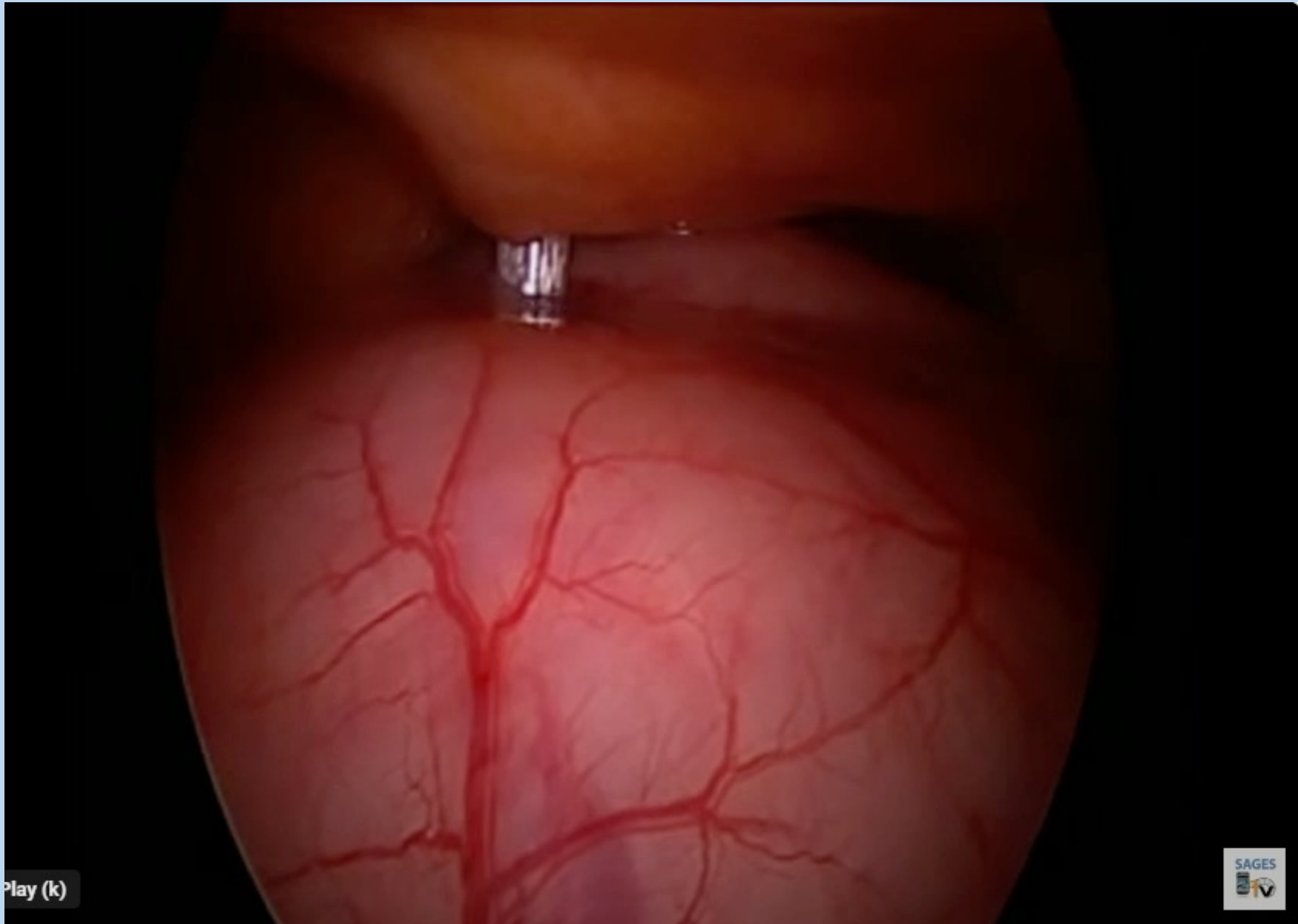


# Surgical Transgastric Necrosectomy



- Anterior gastrotomy /Posterior gastrotomy (open or lap)
- Intra-gastric ports (lap)
- Debridement through posterior gastrotomy
- Maturation/anastomosis of posterior gastrotomy
- Closure of anterior gastrotomy





Play (k)



# Surgical Transgastric Necrosectomy

## PROS

- Internalizes fistulae
- Rapid debridement of large volume
- Allows other intraabdominal procedures (e.g. cholecystectomy)

## CONS

- Difficult to reach the paracolic gutters
- Angles can be a challenge
- More invasive



# Transgastric Approaches

## Endoscopic

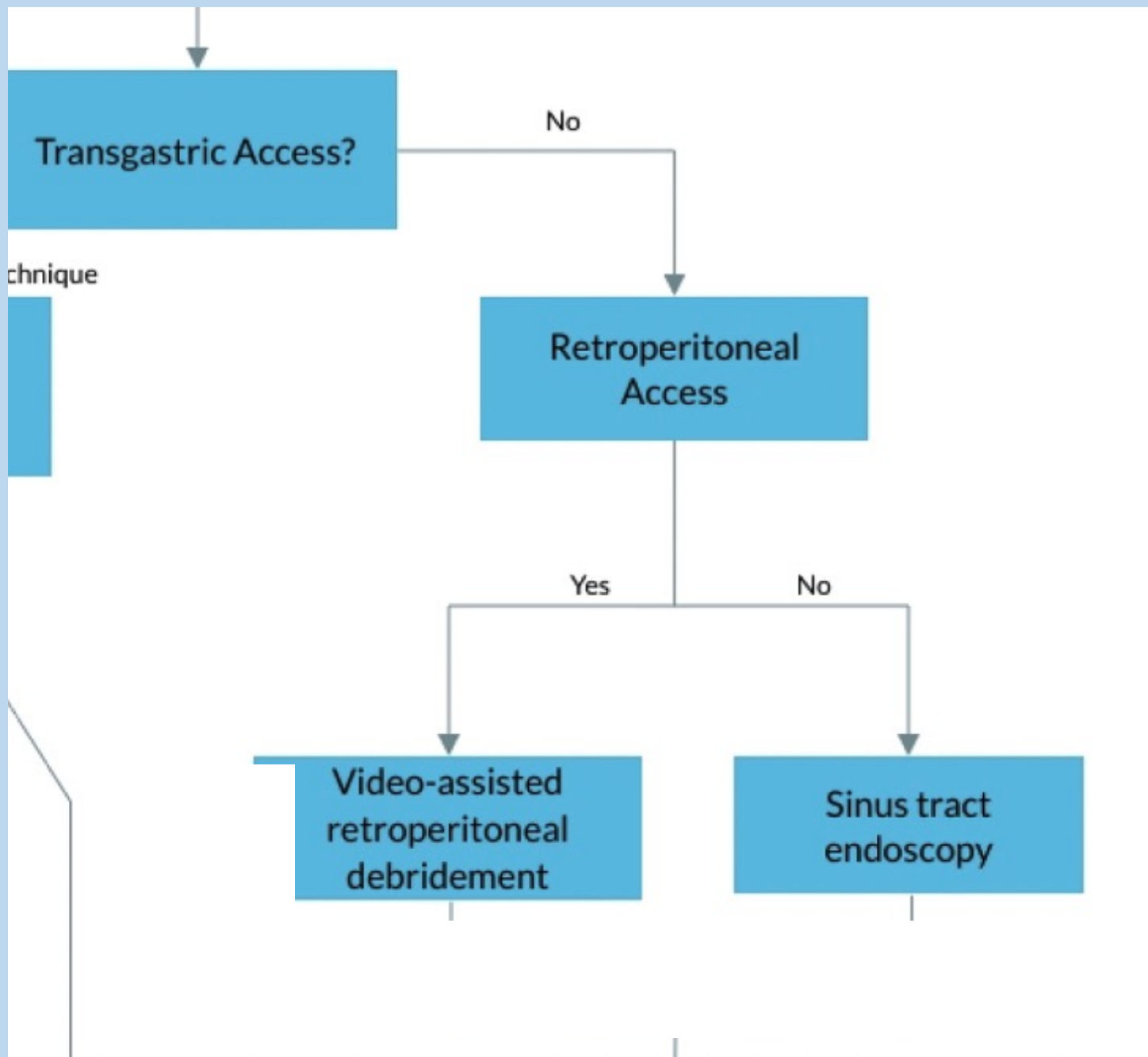
- Transgastric access without disconnected pancreatic remnant



## Surgical

- Significant necrosis in lesser sac, disconnected duct, needs cholecystectomy, not septic, nutrition adequate





chnique

# Percutaneous Drainage

Who gets drained?

1. Early intervention for infection
2. Inaccessible via endoscopic route

ALWAYS place drains with future surgical interventions in mind



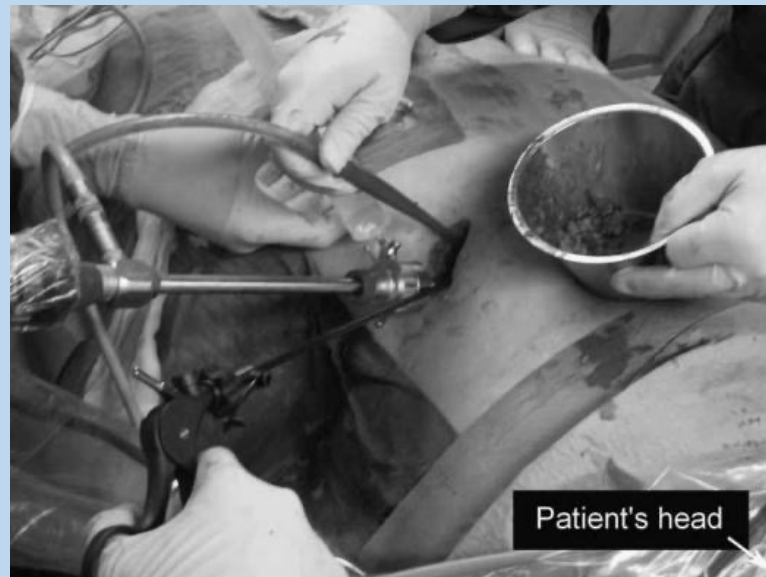
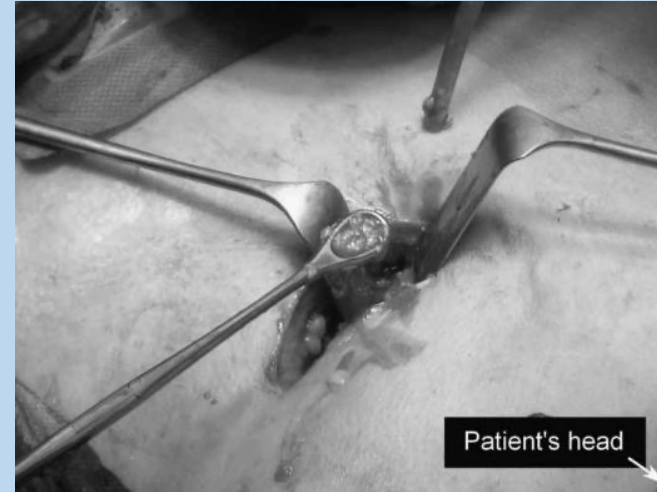
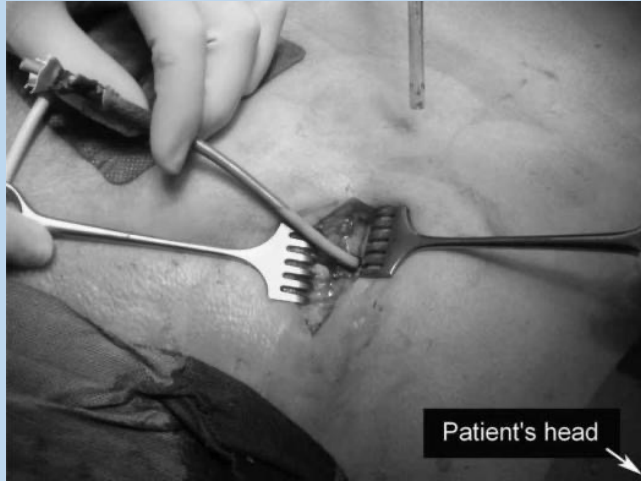
# Primary Drainage



35% improve with percutaneous drainage alone

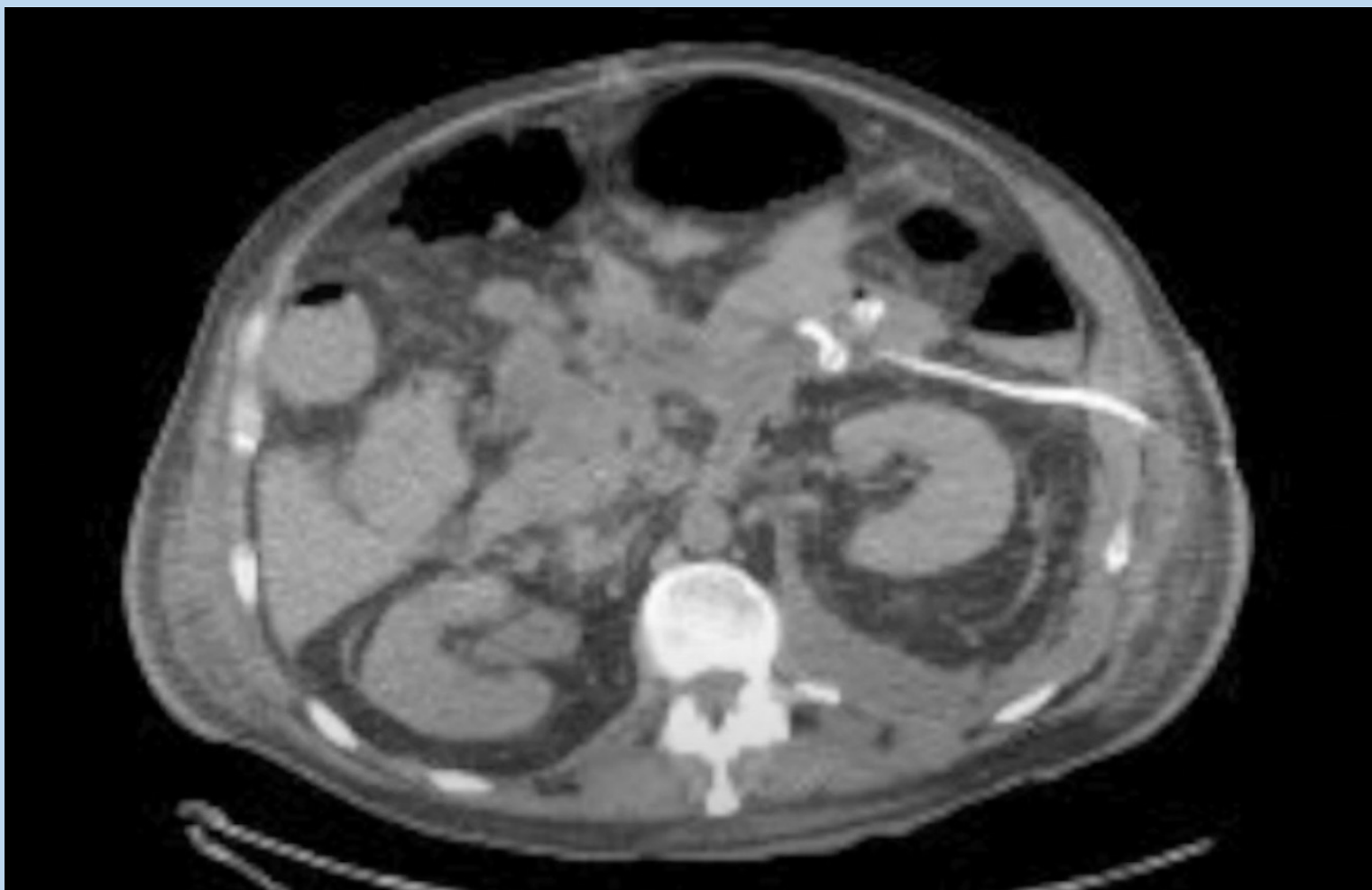


# VARD

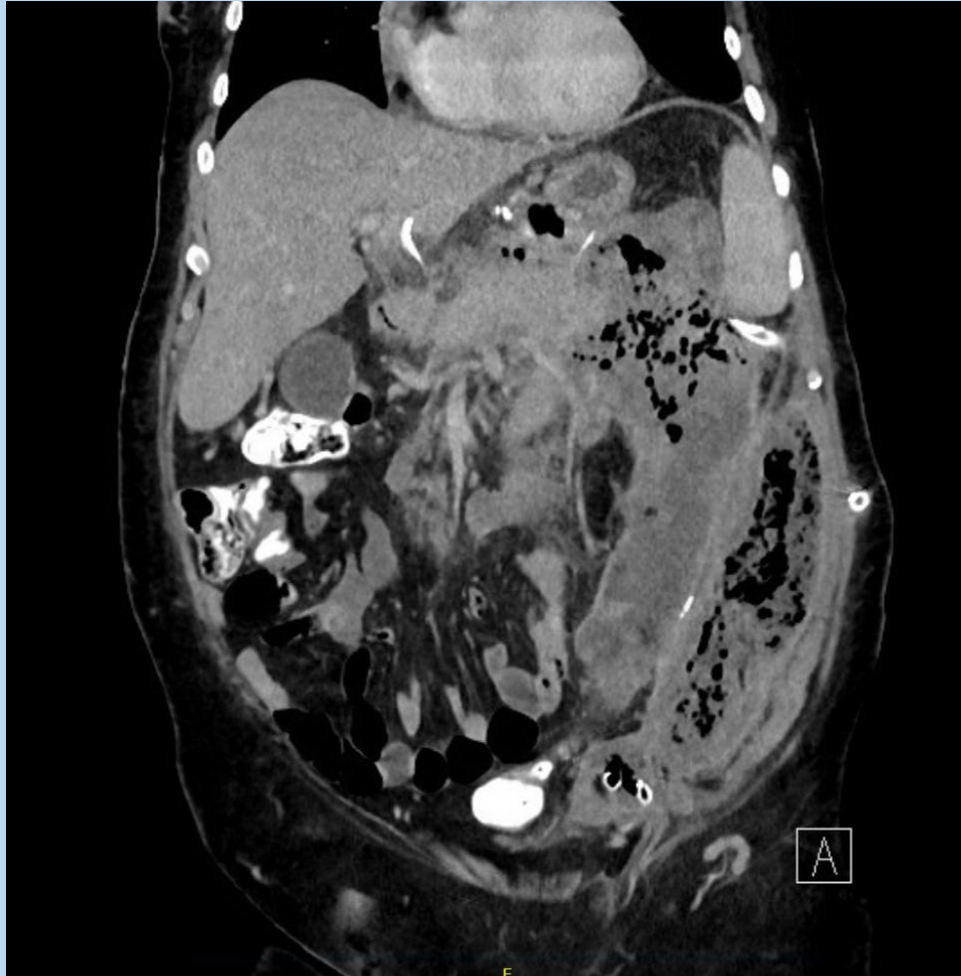


[van Santvoort HC](#), et al. Videoscopic assisted retroperitoneal debridement in infected necrotizing pancreatitis. *HPB (Oxford)*. 2007;9(2):156-9.

First, and most importantly, your drain



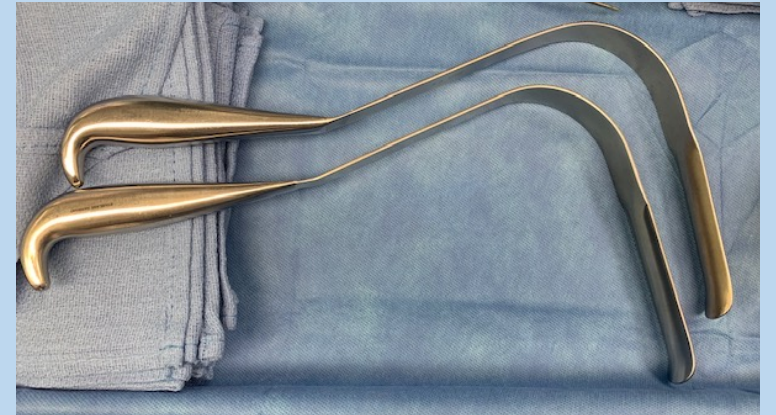
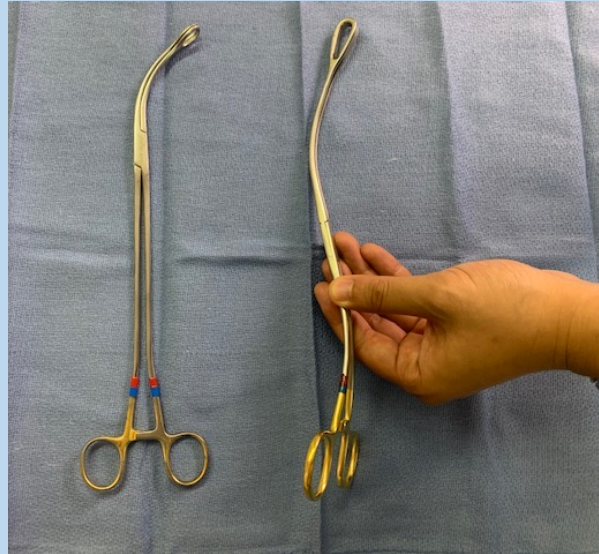
# Ideal VARD



Large volume of necrosis  
Tracking laterally  
Retroperitoneal access

# VARD - How We Do It

- 10mm 0-degree laparoscope
- Standard ring forceps and laparoscopic bowel graspers
- Yankauer and laparoscopic suction



# Video Assisted Retroperitoneal Debridement (VARD)





# VARD - Execution

- Positioning – If any doubt use partial lateral decubitus
- Tissue Handling – Do not have to remove every scrap
- Build your mental map – Are there landmarks (e.g. other drains)?
- Closure
  - Interrupted multiple layers
  - Try to bring drains out counter incisions



# VARD - Bleeding

- An ounce of prevention is worth a pound of cure
  - Choice of drain route
  - Gentle tissue handling
- Escalating response
  - Direct control
  - Packing (VARD advantage)
  - Angioembolization
  - Open conversion





# Pros & Cons

## Pros

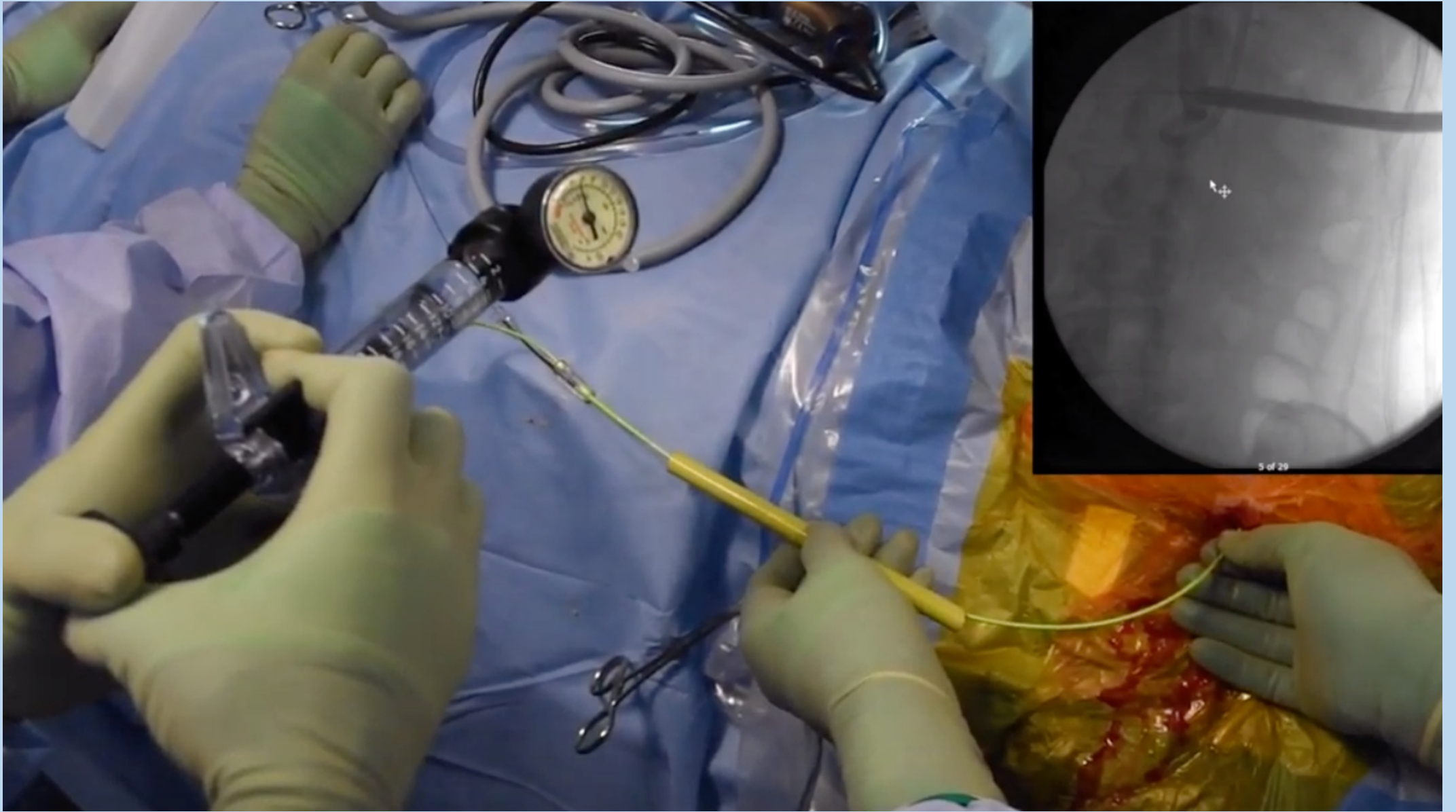
- No access via stomach
- Large volume rapid debridement (single procedure)
- Less short and long term morbidity than open debridement

## Cons

- Wound complications
- Pancreatic fistula
- Limited to retroperitoneum

# Sinus Tract Endoscopy









# Sinus tract endoscopy

## Pros

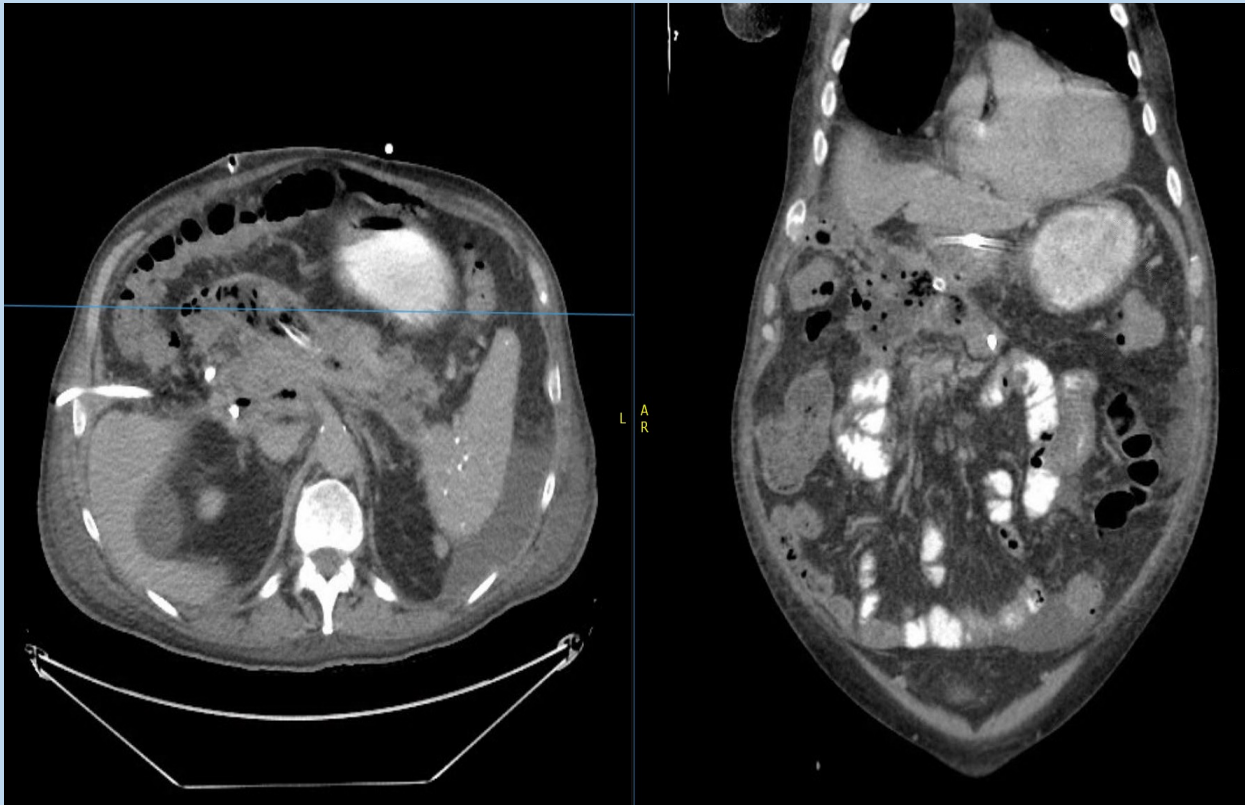
- Can reach anywhere – does not require retroperitoneal path
- Minimal wound complications

## Cons

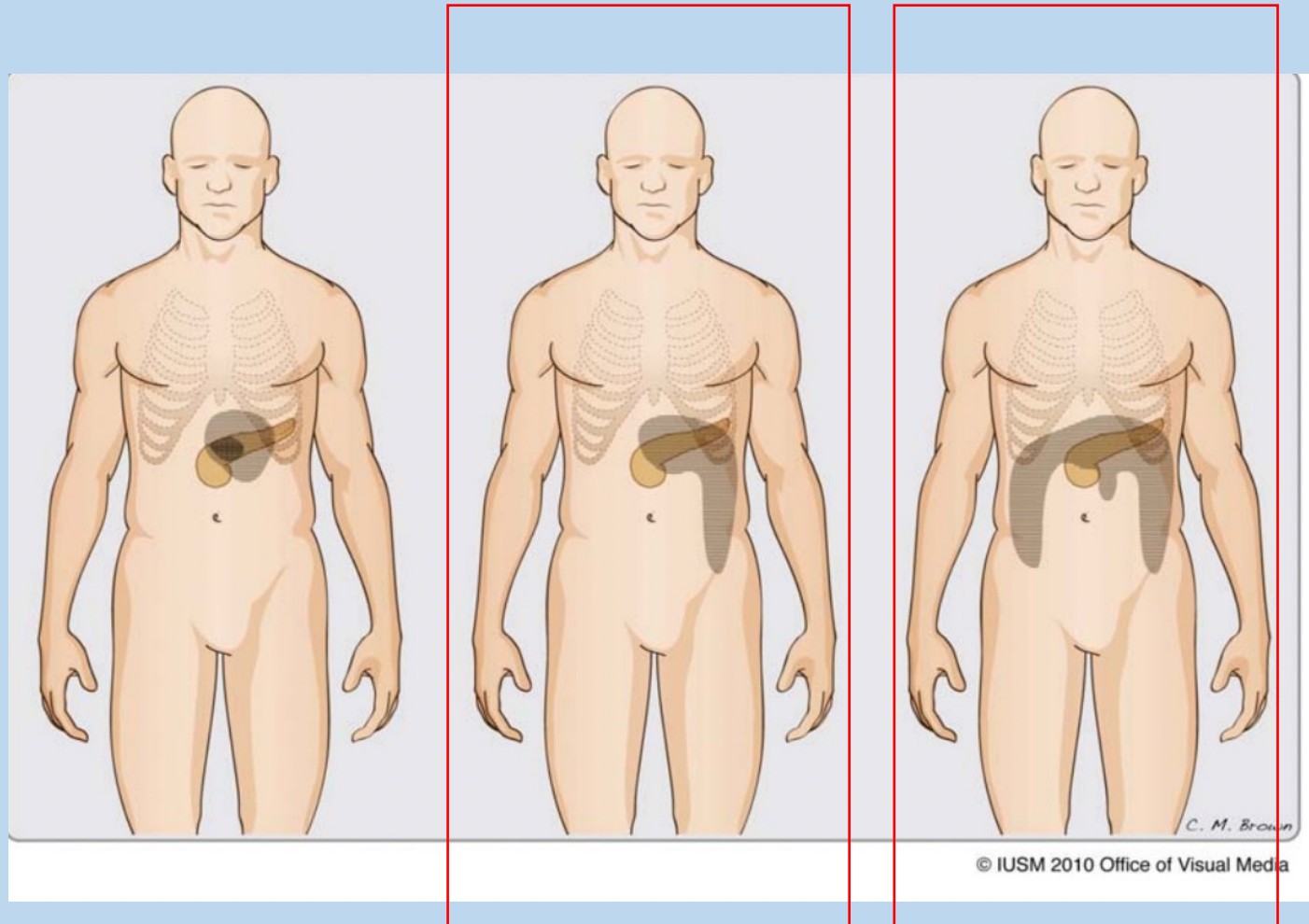
- Large collections often require re-intervention (median = 3)
- Pancreatic fistula
- Any bleeding difficult to deal with

# Ideal Sinus Tract

Small collection around drain OR walled off necrosis  
with difficult or no RP or transgastric window



# Dual Modality





# Dual Modality

Endoscopic Transgastric Necrosectomy +

- Percutaneous drainage
- VARD/Sinus Tract Endoscopy

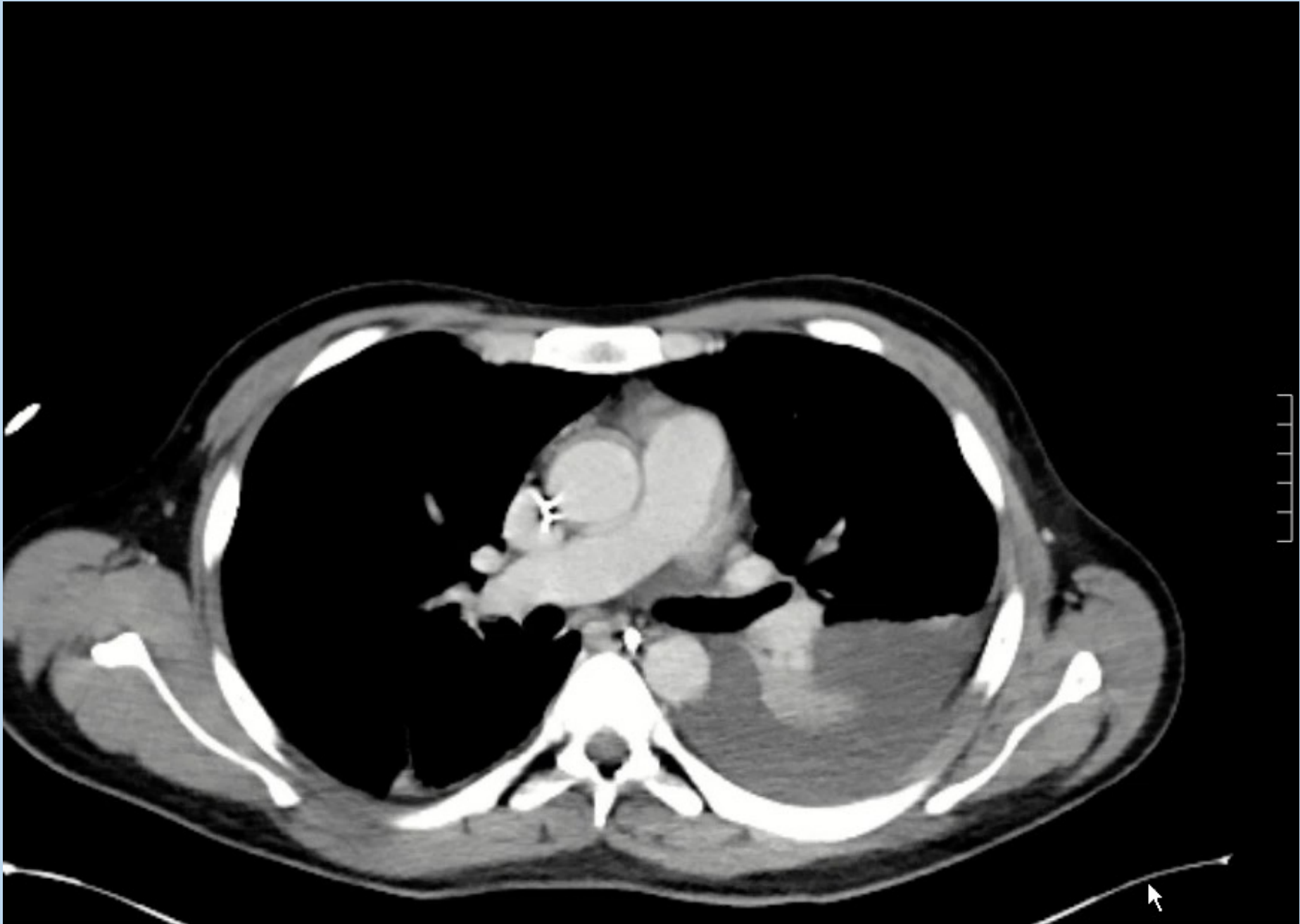


# Dual Modality

## Benefits

- Decreased rate of pancreatic fistula
- Decreased number of endoscopic interventions
- Ability to debride difficult to reach areas of necrosis







# Disconnected Duct Syndrome

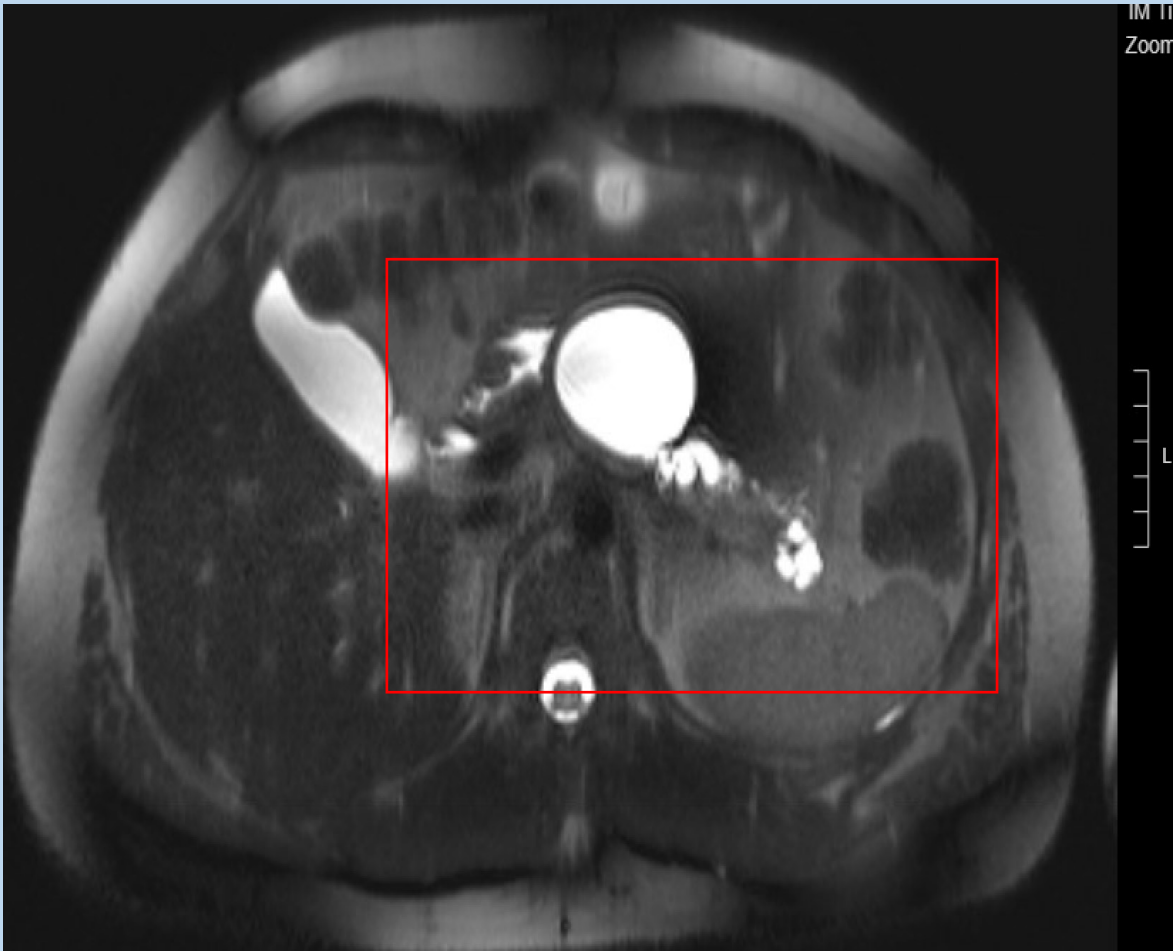
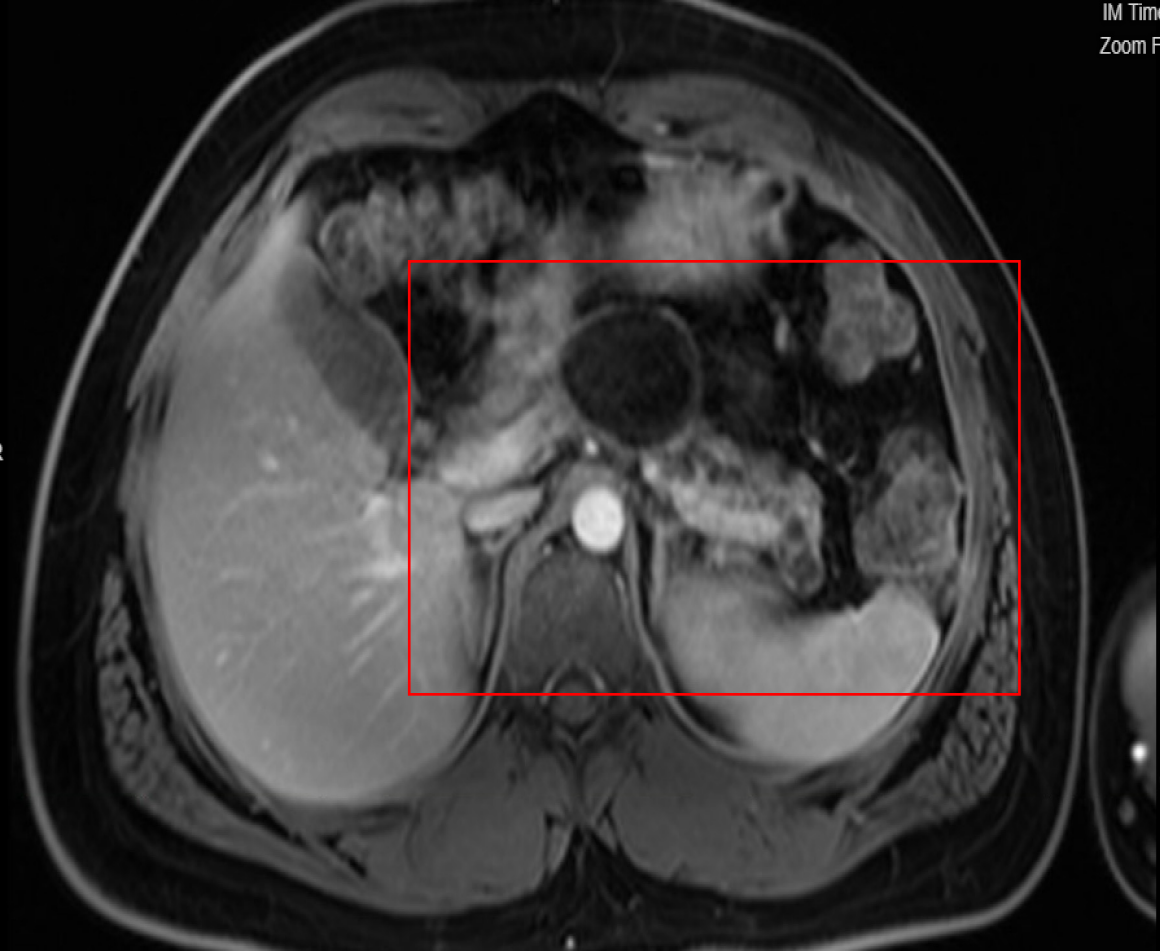
## Disconnected Pancreatic Duct: Radiographic definition

- >2cm of parenchymal gap
- Pseudocyst or WOPN with distal dilated duct entering at 90 degree angle

## Disconnected Duct Syndrome: Radiographic evidence + symptoms

- Pain, enlarging pseudocyst, recurrent pancreatitis, unresolving fistula

# Disconnected Duct Syndrome



# Disconnected Duct Syndrome

Management – Depends on the situation

- Complex advanced endoscopy
- Surgical management
  - Cystgastrostomy/Cystjejunostomy
  - Puestow Procedure (longitudinal pancreaticojejunostomy)
  - Distal pancreatectomy



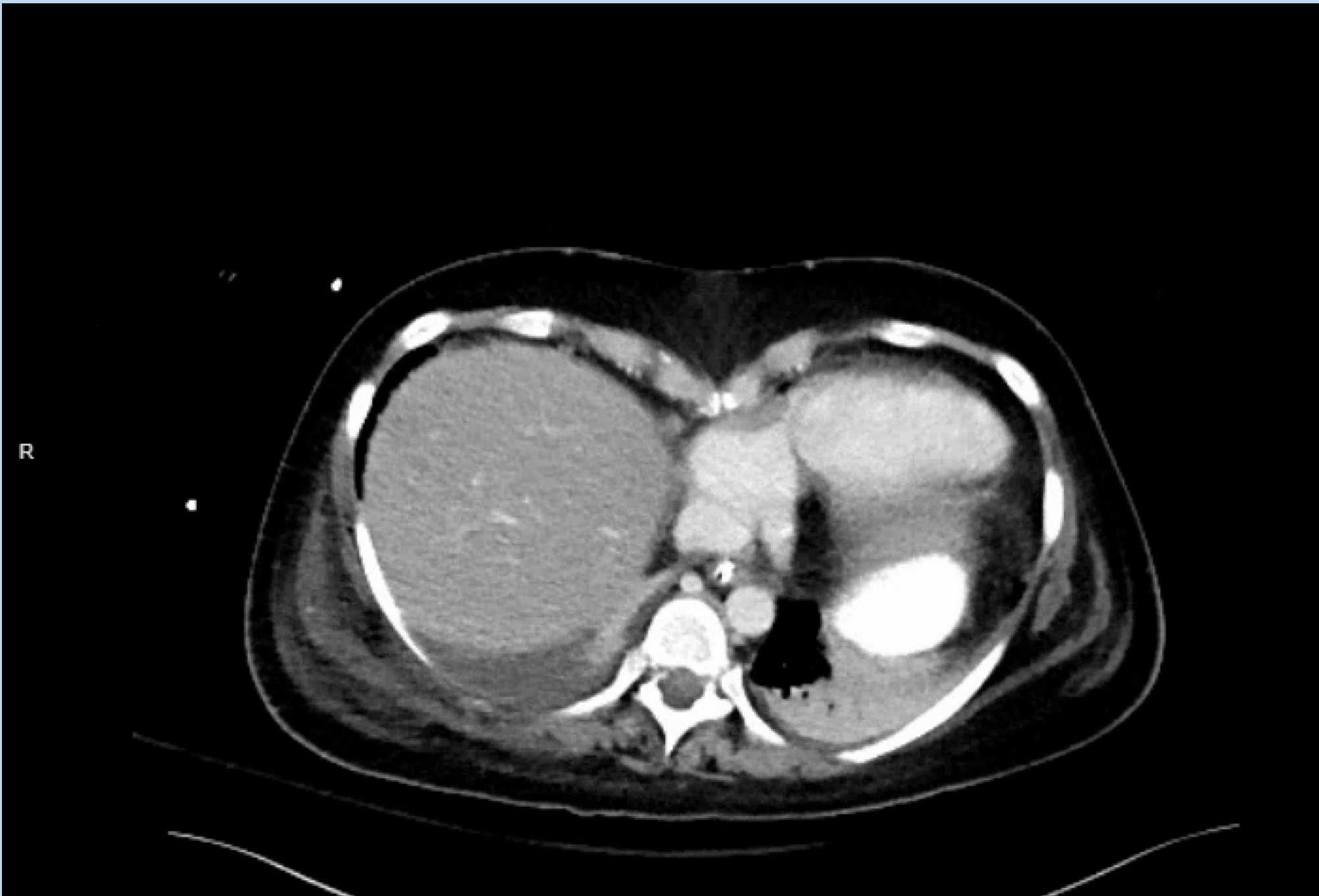
# Complex Case - Patient AH

- 31F with h/o alcohol use disorder who presented to an OSH on 7/4 with pancreatitis c/b shock, respiratory failure, abdominal compartment syndrome, and cholecystitis. Transferred to MGH on 7/15 intubated with open abdomen and PCT

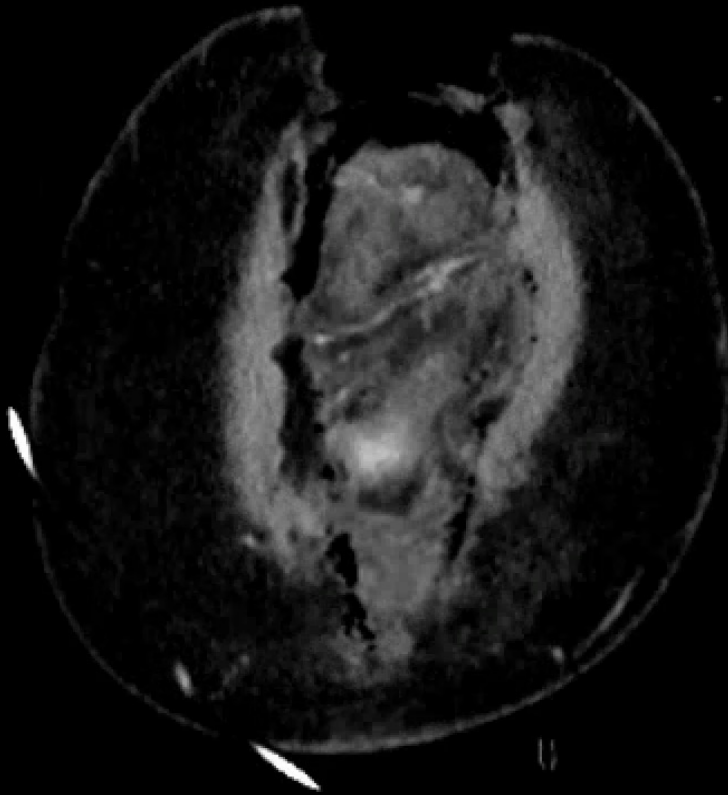




R



H



A

# Complex Case - Patient AH

- Where do you start?
- What we did
  - Abdominal washout, open CCY (7/17)
  - Partial closure with VAC (7/19)
  - 20F G-tube, tracheostomy and abdominal closure (7/24)
  - IR Thal drainage x 3 (7/30)
  - Course complicated by PSA s/p IR embolization (8/13)
  - IR drain upsize (8/19)
  - IVC filter (9/6)
  - Sinus tract endoscopy x 5 (September/October)





# Why we do this

- Critical illness => recovery
  - Yes, patients do actually get better!!!
- Challenging and interesting patient population
- Great multi-disciplinary care
  - Surgery, IR, GI, Nutrition, Pain, Endocrinology



Questions???

