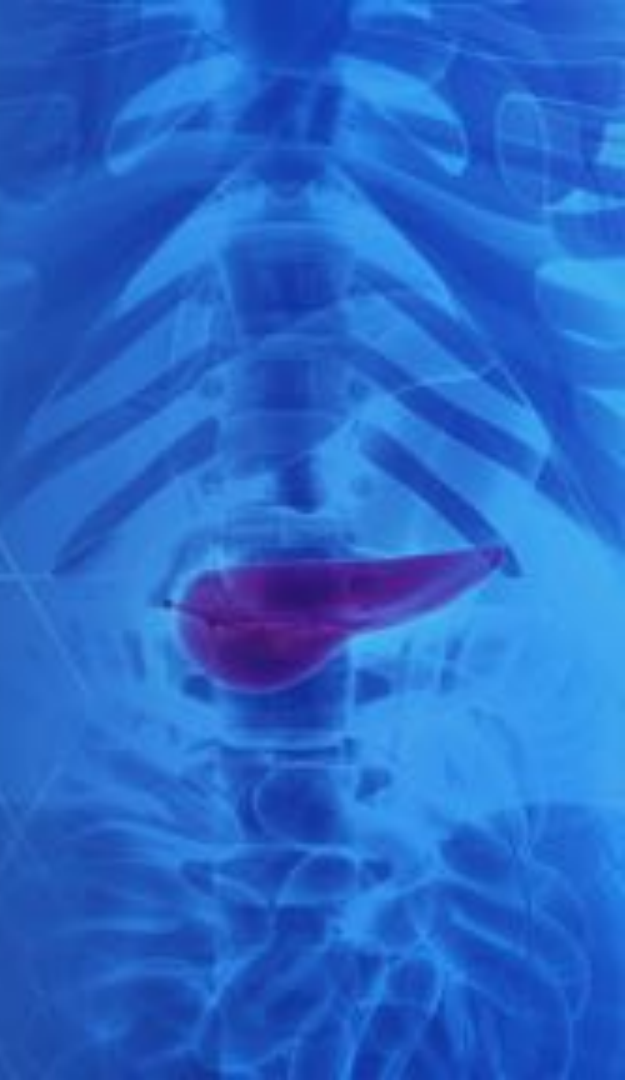
2018 CAPER Collaborative Alliance for Pancreatic Education and Research

PANCREAS ACADEMY



Rehoboth McKinley Christian Health Care Services

CAPER Collaborative Alliance for Pancreatic Education and Research

Jointly provided by the New Mexico Medical Society (NMMS) through the joint providership of Rehoboth McKinley Christian Health Care Services (RMCHCS) and the Collaborative Alliance for Pancreatic Education and Research.

2018 CAPER
PANCREAS ACADEMY

Management of Acute Pancreatitis and its Complications

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Division of Gastroenterology
Johns Hopkins University School of Medicine

Objectives

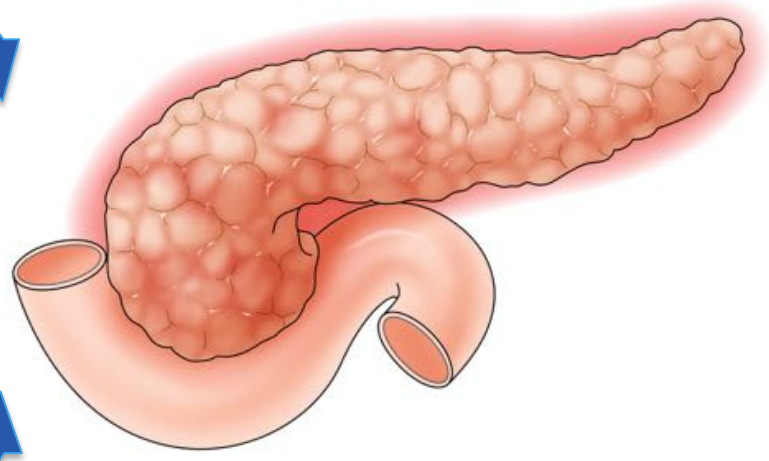
- Review the evidence based management of uncomplicated acute pancreatitis
- Overview of management of complications associated with acute pancreatitis
- Review the principles of management of acute pancreatitis by etiology or special situations

Overview

- Initial Management
  - Hydration, Pain Control, Nutrition
- Management of complications
  - Fluid collections, necrosis, others
- Management of underlying or predisposing conditions

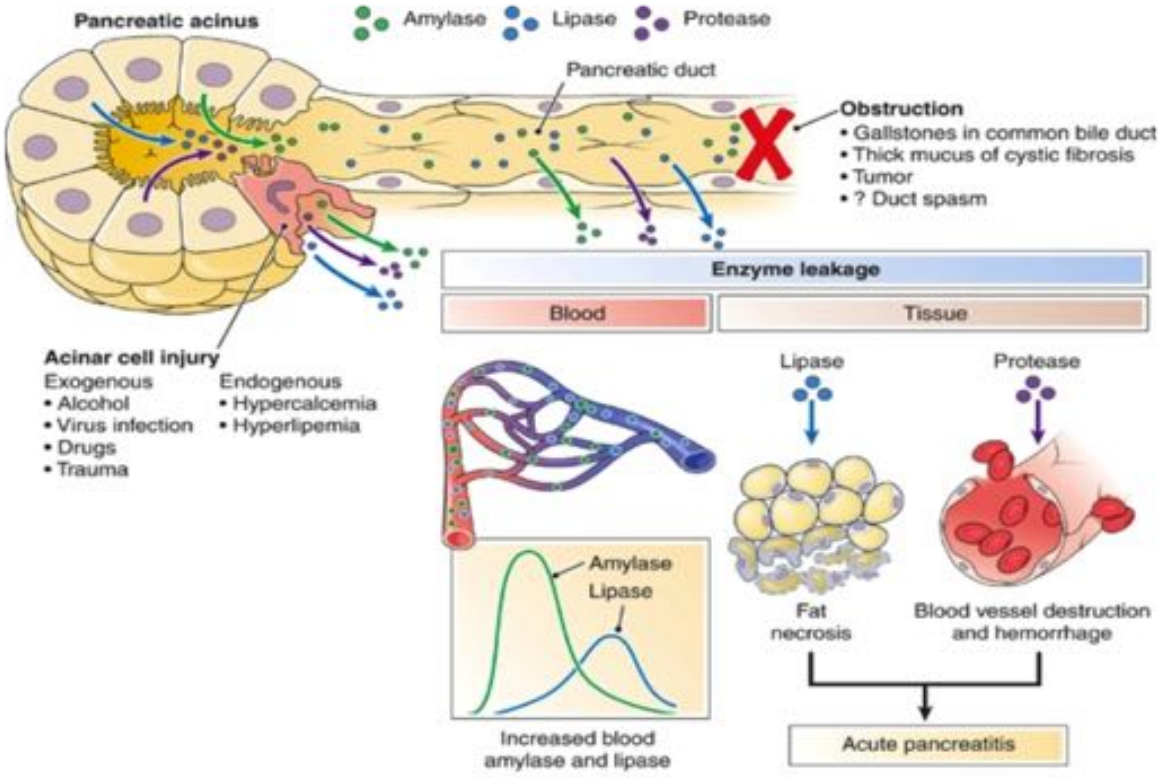
INITIAL MANAGEMENT

Fluid resuscitation

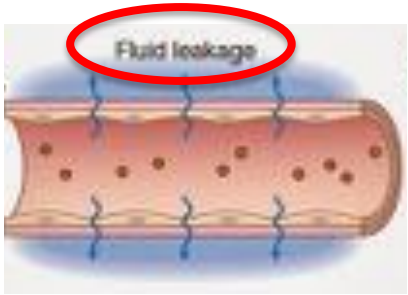


Most effective treatment in acute pancreatitis

Fluid resuscitation



Fluid therapy does not fix capillary leak!



Fluid resuscitation

IMPROVED OUTCOME

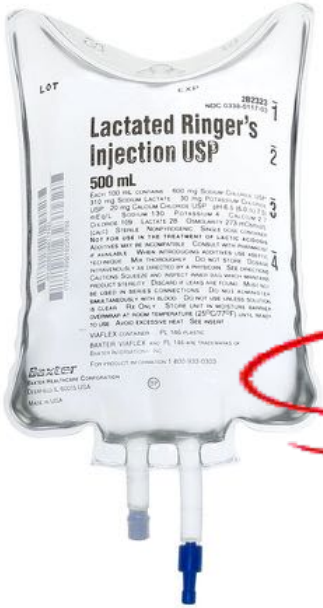
Brown 2002
Gardner 2009
Wall 2011
Warndorf 2011
Wandrof 2011
Buxbaum 2018

DETRIMENTAL

Eckerwall 2006
Mao 2007
Mao 2009
Mao 2010
de-Madaria 2011

Vege et al. Gastroenterology 2018

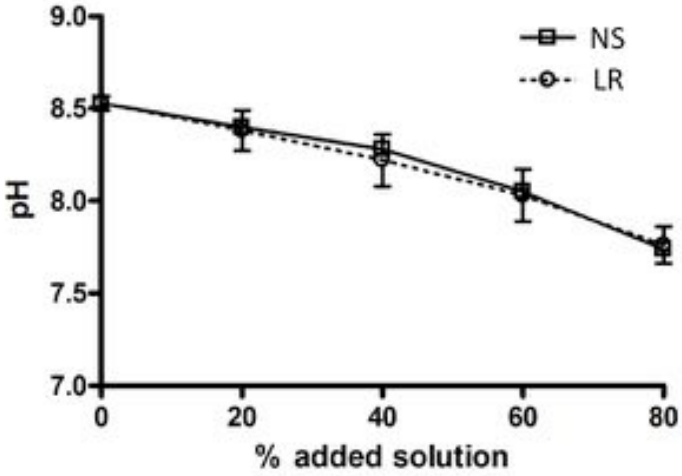
Fluid resuscitation

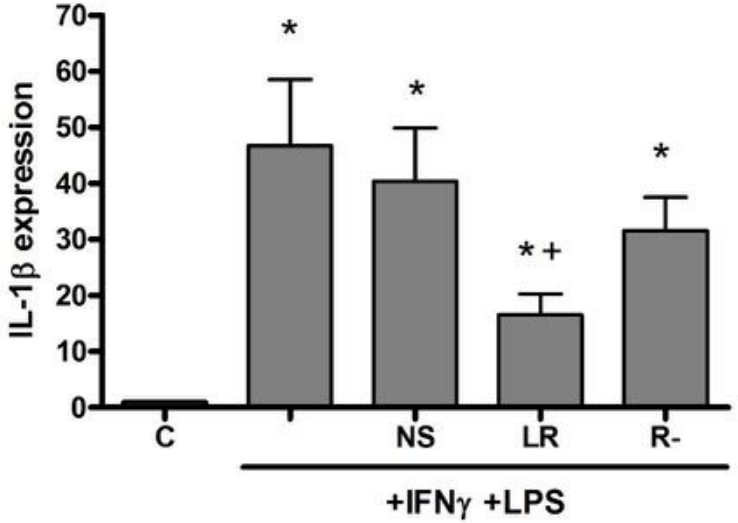


Lactated Ringers	Normal Saline
pH 6.5	pH 5.5
130 mEq Na	154 mEq Na
109 mEq Cl	154 mEq Cl
28 mEq lactate	
4 mEq K	
3 mEq Ca	

Fluid resuscitation

Lactated Ringer's does not Change pH but Inhibits Macrophages





De-Madaria et al. United Eur Gastroenterol J 2018; 6: 63-72

Fluid resuscitation

Guidelines	Journal and year	Initial fluid administration	Maintenance fluid administration
AGA guidelines	Gastroenterology 2018	*Goal directed*	*Goal directed maintenance*
ACG guidelines	Am J Gastroenterol 2013	*Goal directed* Aggressive 250-500 mL/h crystalloid	*Goal directed maintenance*
IAP/APA guidelines	Pancreatology 2013	*Goal directed* 5-10 mL/kg/h	*Goal directed maintenance*

Goal directed – To maintain urine output >0.5-1.0 cc/kg per hour
Heart rate < 120
Mean Arterial Pressure 65-85 mm Hg
Hematocrit 35-44%

Fluid resuscitation

RCT Author	Journal and year	Initial fluid administration	Maintenance fluid administration
de-Madaria et al.	United European Gastroenterol J 2018	*Goal directed* Aggressive LR/NS 15 mL/kg bolus Standard LR/NS 10 mL/kg bolus	Aggressive LR / NS 1.2 mL/kg/h Standard LR / NS 1 mL/kg/h
Buxbaum et al.	Am J Gastroenterol 2017	*Goal directed* Aggressive LR 20 mL/kg bolus Standard LR 10 mL/kg bolus	Aggressive LR 3 mL/kg/h Standard LR 1.5 mL/kg/h
Wu et al.	Clin Gastroenterol Hepatol 2011	*Goal directed* LR / NS 20 mL/kg bolus Standard physician directed LR / NS	Goal directed LR / NS 3 mL/kg/h or 1.5 mL/kg/h

Goal directed – To maintain urine output >0.5-1.0 cc/kg per hour
Heart rate < 120
Mean Arterial Pressure 65-85 mm Hg
Hematocrit 35-44%

Fluid resuscitation

Early Aggressive Hydration Hastens Clinical Improvement in Mild Acute Pancreatitis

James L. Buxbaum, MD[1], Michael Quezada, MD[1], Ben Da, MD[1], Niraj Jani, MD[1], Christianne Lane, PhD[2], Didi Mwengela, MD[1], Thomas Kelly, MD[1], Paul Jhun, MD[3], Kiran Dhanireddy, MD[4] and Loren Laine, MD[5,6]

	Aggressive hydration (N=27)	Standard hydration (N=33)	Adjusted odds ratio (95% CI)
Clinical Improvement within 36 h	19 (70%)	14 (42%)	7.0 (1.8–27.8)
Development of SIRS	4 (14.8%)	9 (27.3%)	0.14 (0.02–0.92)
Persistent SIRS	2 (7.4%)	7(21.2%)	0.12 (0.02–0.94)
Development of hemoconcentration	3 (11.1%)	12 (36.4%)	0.08 (0.01–0.49)

CI, confidence interval; SIRS, systemic inflammatory response syndrome.

Aggressive hydration

20 mL/kg bolus
then 3 cc/kg/h

Standard hydration

10 mL/kg bolus
then 1.5 c/kg/h

Pain Control

- *Abdominal pain is the predominant symptom in patients with acute pancreatitis*
- *Hypovolemia and fluid losses associated with AP can result in pain from visceral ischemia*
- *Adequate fluid hydration is therefore important*

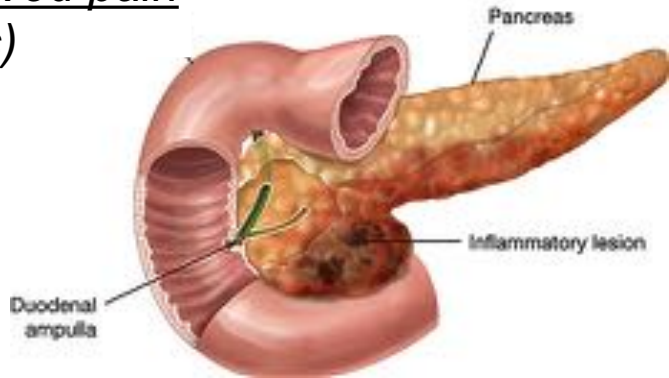
Pain Control

- *A mild episode of AP might be adequately treated with NSAIDs alone*
- *A Cochrane review of trials of non-opioids and opioids analgesics found similar improvements in pain at 2 days for all analgesics*
- *Opioid analgesics increase GI dysmotility and delay oral refeeding*
- *Oxycodone is preferred over morphine*

Basurto Ona X et al. Cochrane Reviews 2013
Wu LM et al. Pancreas 2017

Nutrition – Re-initiation oral feeding

- *Prolonged NPO status affects gut-mucosal barrier, increasing risk of transmigration of gut flora*
- *Early initiation of oral feeding reduces risk of infectious complications, overall morbidity and mortality*
- *In the absence of ileus, nausea or vomiting, improved pain – oral feeding can be initiated early (within 24 hours)*



Tenner S et al. Am J Gastroenterol 2013
Vaughn VM et al. Ann Intern Med 2017

Nutrition – Re-initiation oral feeding

- *Soft low fat, low-residue diet provides more calories vs clear liquid diet, without increase in pain recurrence*

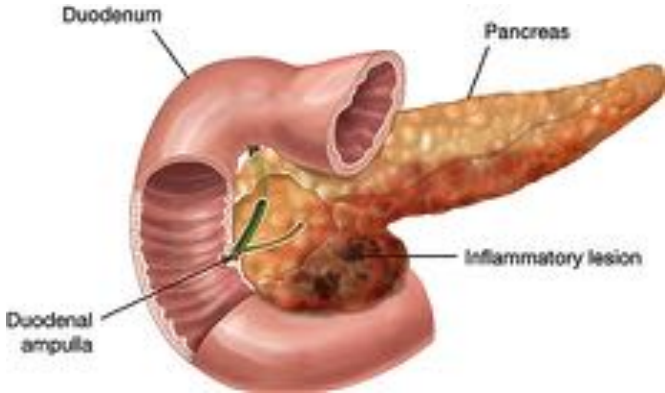
- *Diet and Symptoms at discharge predict risk of early readmission*

	Odds ratio (95% CI)	*P* value
GI symptoms at discharge	44.2 (4.1–472.1)	0.0017
Discharge on less than solid diet	23.8 (4.8–118.2)	0.0001
Moderate to heavy alcohol use	10.1 (1.2–82.6)	0.0308
Abdominal drains on discharge	8.0 (0.7–165.8)	0.0831
Antibiotics on discharge	4.0 (0.9–19.0)	0.0773
Pain on discharge	1.2 (0.9–1.5)	0.0740

Whitlock TL et al. Am J Gastroenterol 2010

Nutrition – Non-oral Enteral vs Parenteral

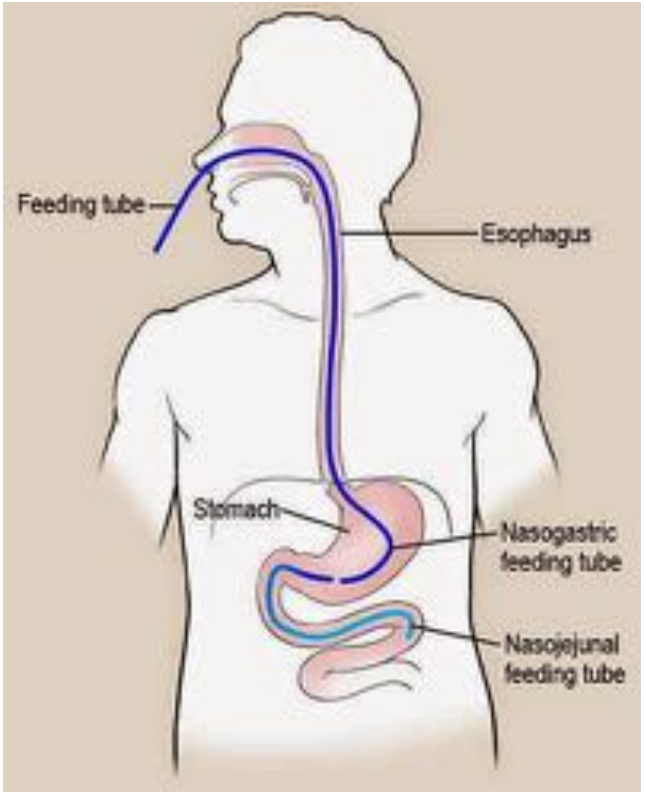
- *Patients who cannot tolerate oral intake in 48-72 hours require an alternate method of nutritional support*
- *12 RCTs compared Total parenteral nutrition (TPN) vs nasogastric (NG) or nasojejunal (NJ) tube*
- *NG / NJ has lower length of stay, organ failure, and pancreatic infection*
- *TPN is recommended only when enteral access is Not available or Not meeting calorie requirements*



Vege et al. Gastroenterology 2018
Vaughn VM et al. Ann Intern Med 2017

Nutrition – Nasogastric or Nasojejunal

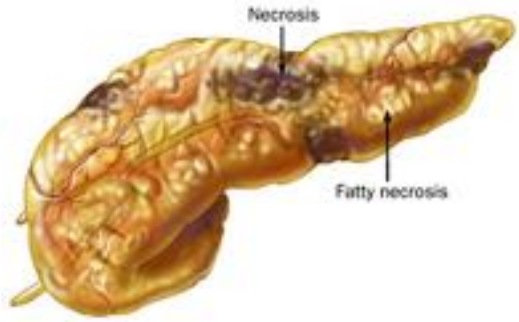
- *NJ was conventionally recommended over NG*
- *4 RCTs compared NG and NJ: no difference in mortality, infectious complications or length of hospital stay*
- *Aspiration precautions*
- *NG is easier to place, avoiding endoscopic or interventional radiology*



Zhu Y et al. Gastroenterology research and practice. 2016

Role of Prophylactic Antibiotics

- *Extra pancreatic infections such as UTI, pneumonia, blood stream infections are present in upto 20% of AP*
- *Two fold increase in mortality in patients with infected pancreatic necrosis compared to sterile necrosis*
- *A Cochrane review and meta-analysis of 10 RCTs showed no mortality benefit or reduction in rate of infected pancreatic necrosis with prophylactic antibiotics*



Besselink MG et al. Br J Surg 2009
Villatoro E et al. Cochrane dtabase 2017

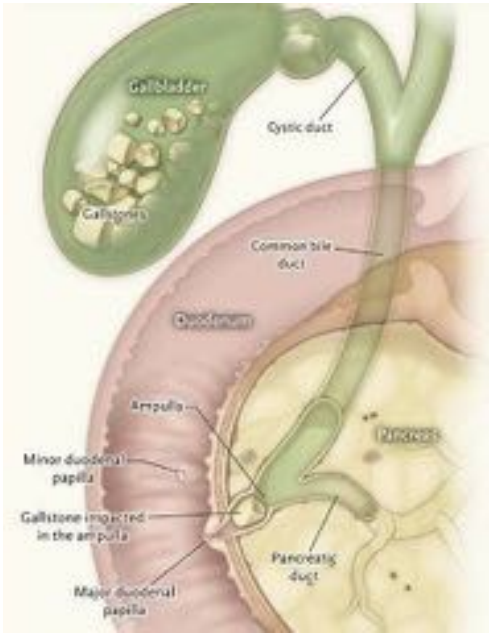
Role of Endoscopy in Biliary Acute Pancreatitis

- *Most gall stones pass spontaneously*
- *Cholestasis can also be due to ampullary edema from a previously passed stone*
- *8 RCTs compared early ERCP vs conservative management : No difference in clinical outcomes*
- *In gallstone pancreatitis and persistent obstruction without cholangitis, urgent ERCP (within 24 hours) is not indicated*

Vege et al. Gastroenterology 2018

Secondary Prevention in Gall Stone Pancreatitis

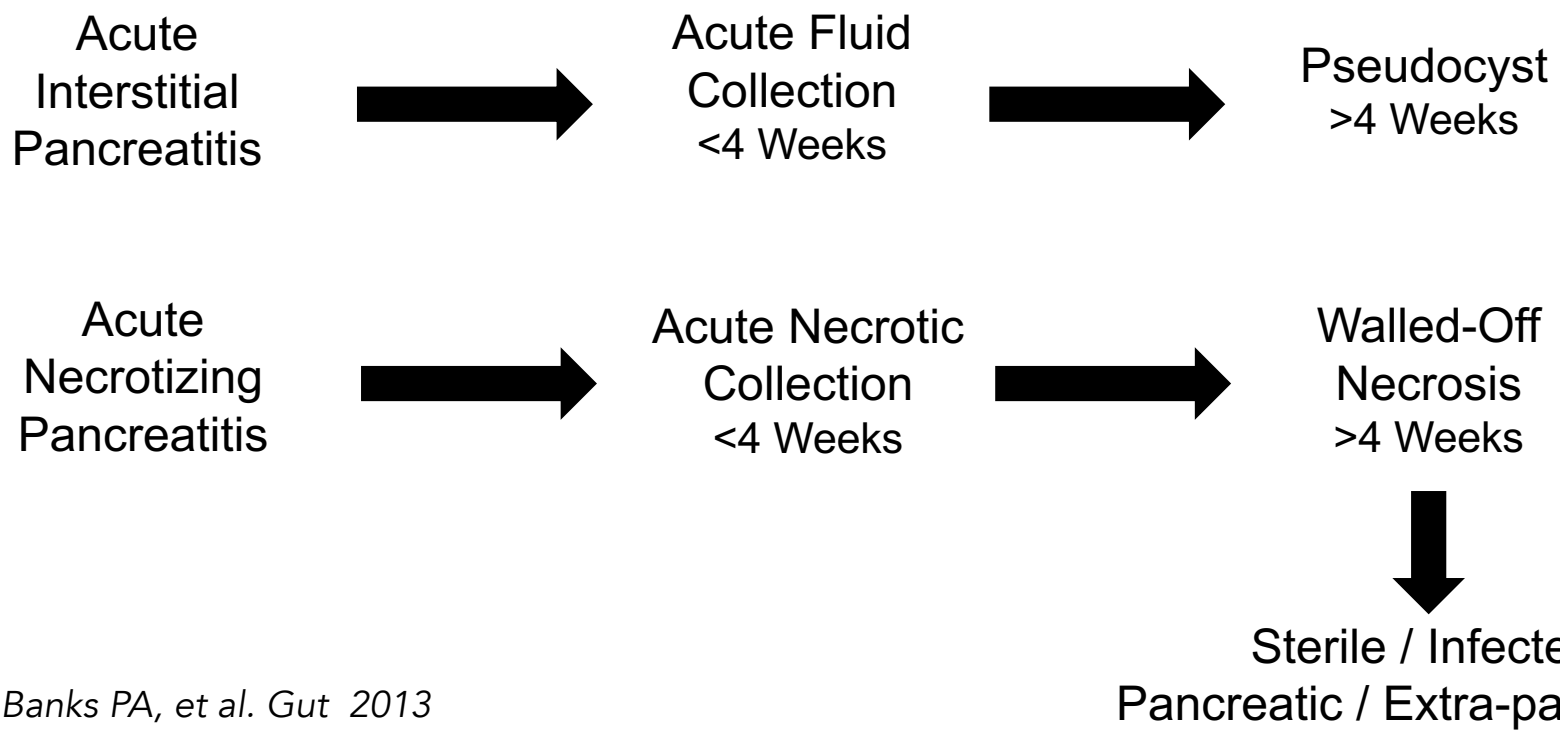
- *Cholecystectomy should be performed in all patients with gall stone pancreatitis*
- *Cholecystectomy can safely be performed during same admission in mild AP*
- *In necrotizing pancreatitis, cholecystectomy can be delayed till inflammation subsides*



Same-admission versus interval cholecystectomy for mild gallstone pancreatitis (PONCHO): a multicentre randomised controlled trial *da Costa et al. Lancet 2015*

MANAGEMENT OF COMPLICATIONS

Revised Atlanta Classification



Banks PA, et al. Gut 2013

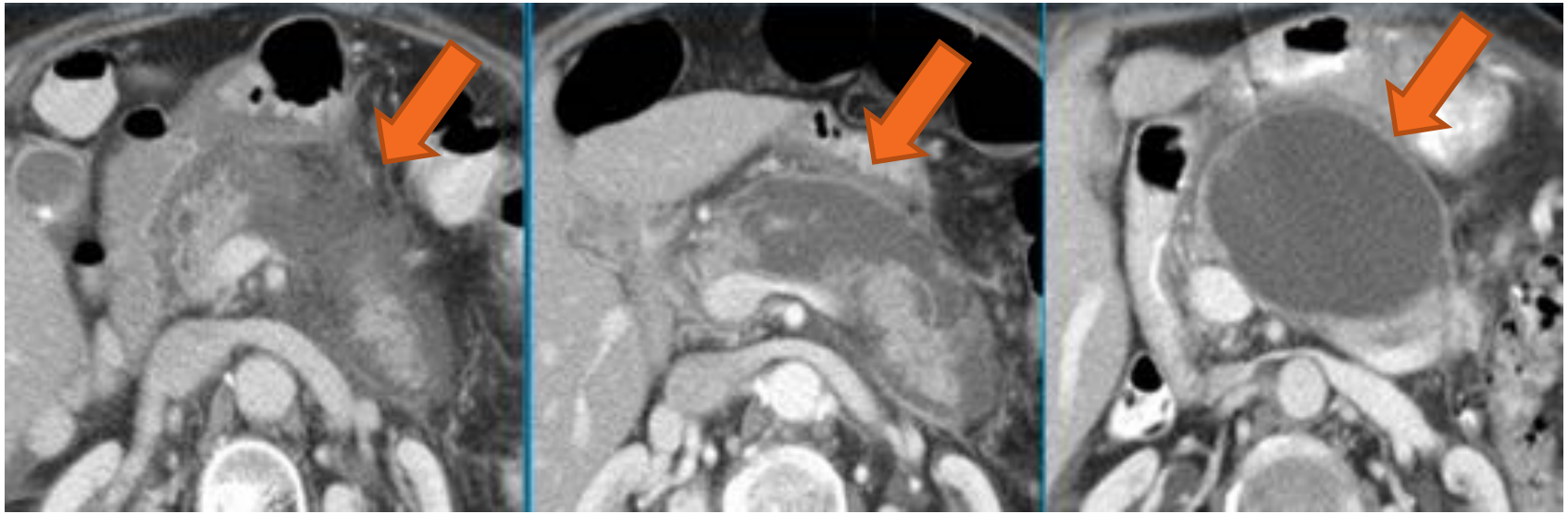
Pancreatic Pseudocyst

- *An encapsulated collection of fluid with a well defined inflammatory wall with minimal or no necrosis*

- *5% to 16% patients with acute pancreatitis develop pseudocysts of which 57% spontaneously resolve*

Akshintala VS, et al. Gastrointest Endosc 2014

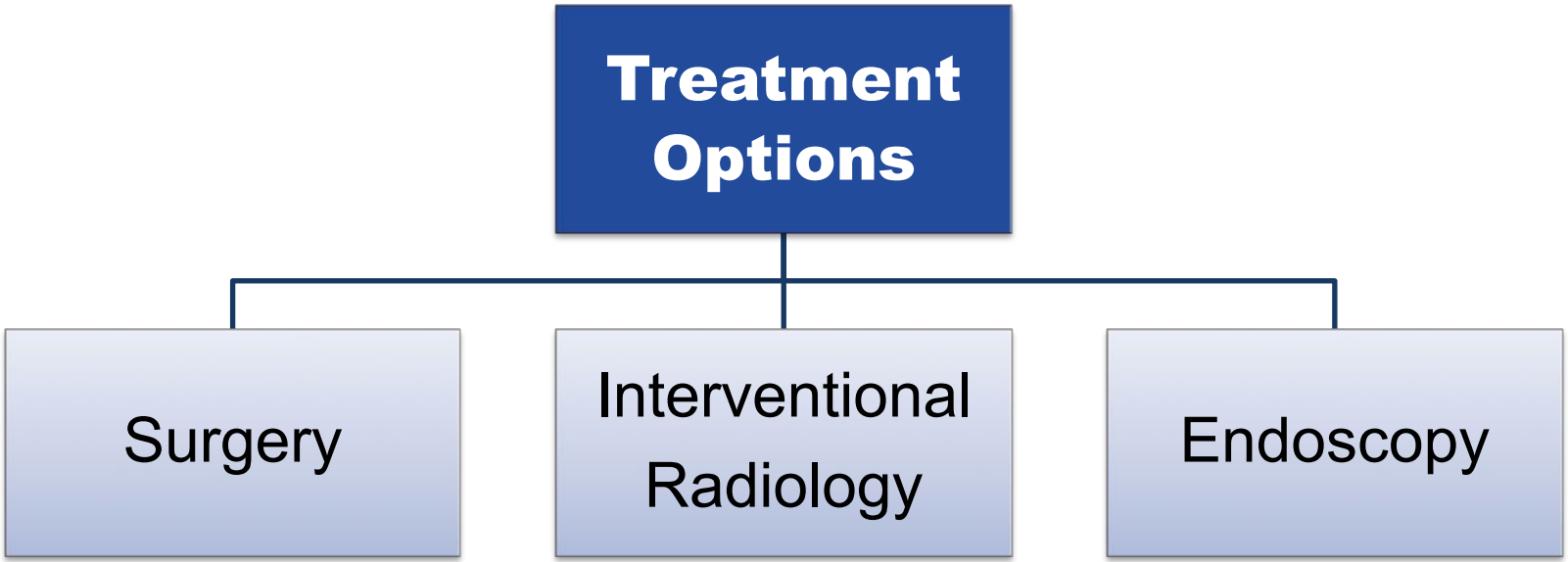
Evolution of Organized Pancreatic Necrosis



Day 3-4 | Day 7-14 | > Day 28

Banks PA, et al. Gut 2013

Management of Pseudocysts and Necrosis



Pseudocysts: Endoscopy vs Surgery vs Interventional Radiology

- *No significant difference - technical success or clinical success 95%-100%*
  - complications

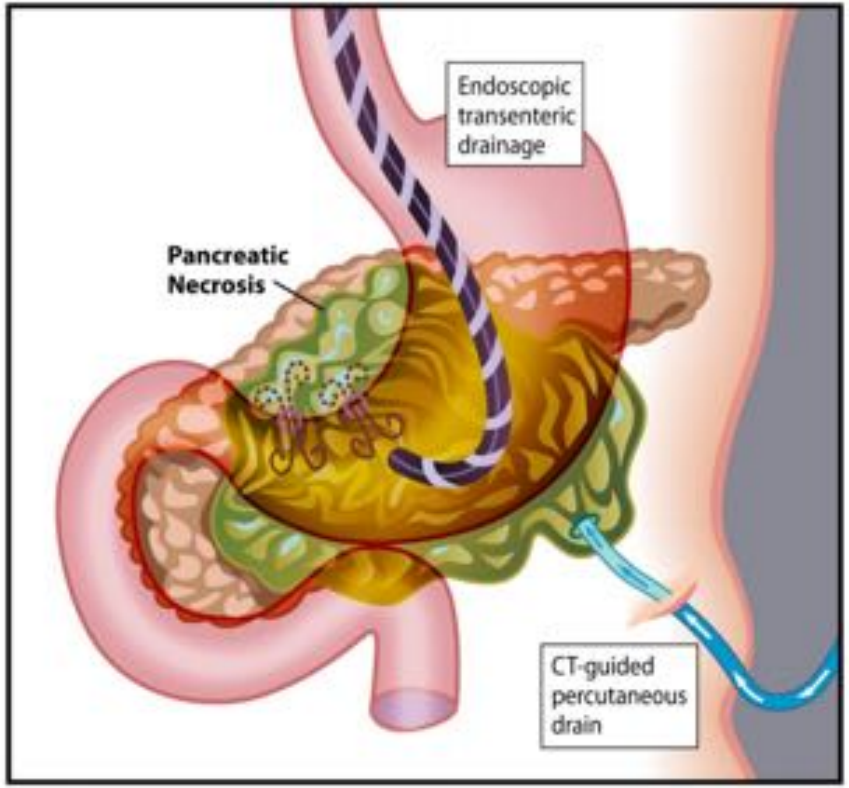
	Endoscopy	Surgery	p- value
LOS – Median days	2	6	<0.001
Cost US$	7011	15,052	0.003

	Endoscopy	Percutaneous	p- value
LOS - mean	6.5	14.8	0.001
Reintervention rate	4	17	0.001

Varadarajulu S. et al. Gastroenterology 2013
Akshintala V. et al. Gastrointest Endosc 2014

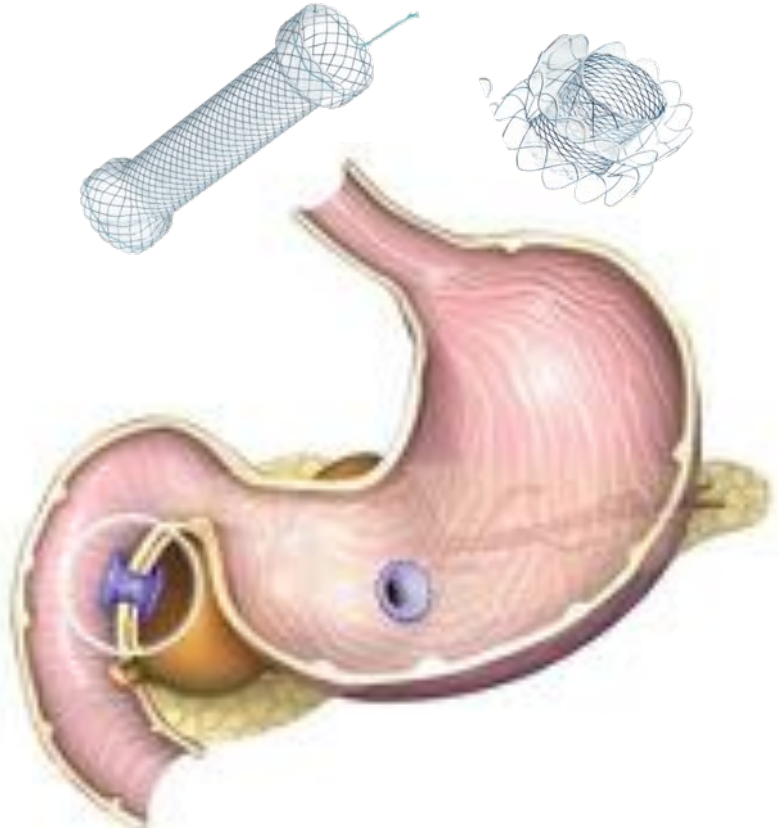
Management of Pancreatic Necrosis

- *Endoscopic trans-enteric and CT-guided percutaneous drain for large collections*



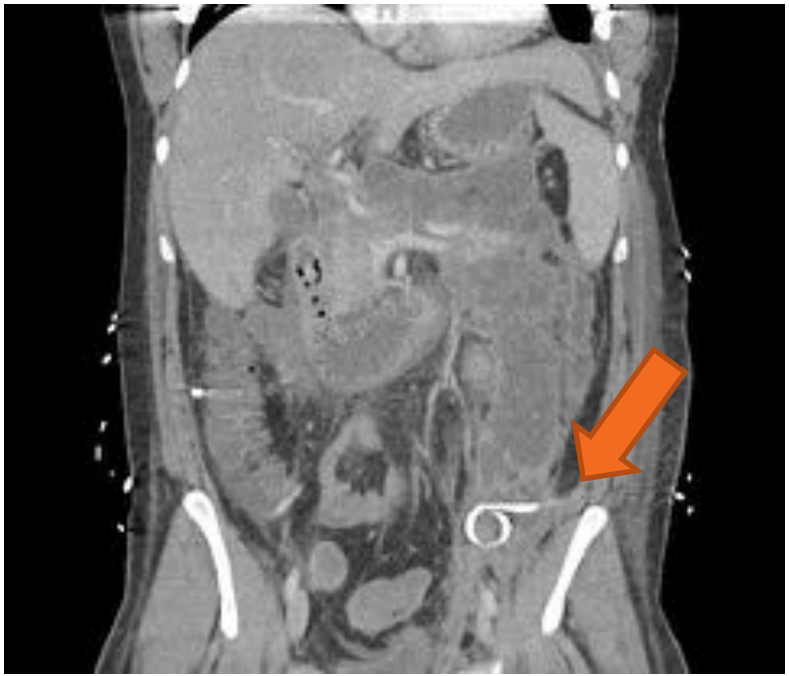
Management of Pancreatic Necrosis

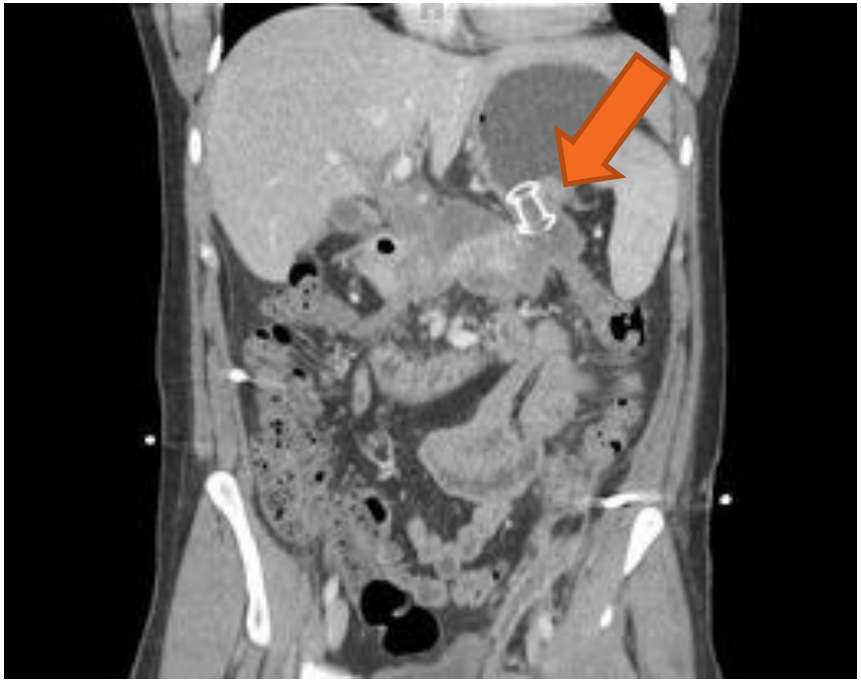
- ***Lumen Apposing Metal Stent (LAMS)***
- *Compared plastic stent, LAMS have similar treatment success rates but shorter procedure time 15 min vs 40 min*
- *Higher cost US$12,155 vs 6,609*
- *Increased risk of bleeding complications if left for a prolonged duration 32% vs 7%*



Bang JY et al. Gut 2018

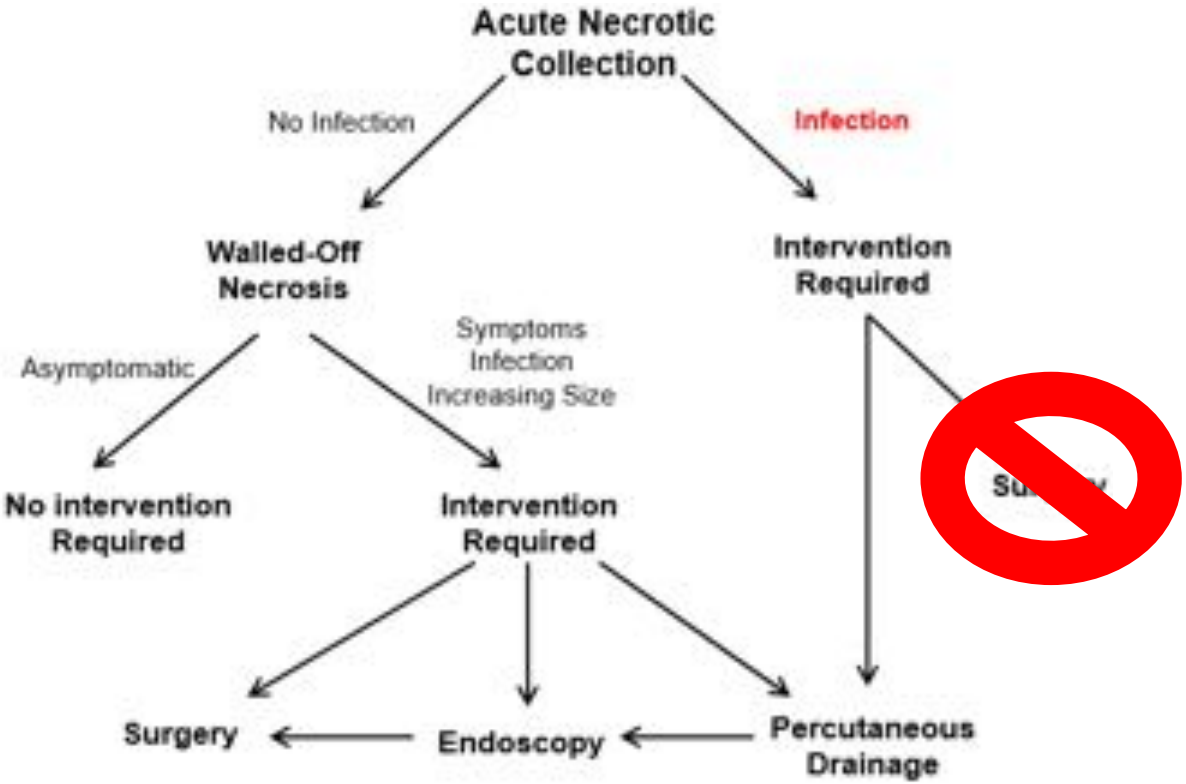
Large Collections: Dual Modality Drainage





Endoscopic Pancreatic Necrosectomy

A Step-up Approach or Open Necrosectomy for Necrotizing Pancreatitis



Van Santvoort HC et al. NEJM 2010

Management of Pancreatic Necrosis

- *Percutaneous drainage alone sufficient in 35-40% of patients where WON is predominantly filled with liquid / minimal solid debris*

DEFINE

DELAY

DRAIN

DEBRIDE

Efficacy of Conservative Treatment, Without Necrosectomy, for Infected Pancreatic Necrosis: A Systematic Review and Meta-analysis

VENIGALLA PRATAP MOULI,[1] VISHNUBHATLA SREENIVAS,[2] and PRAMOD KUMAR GARG[1]

[1]*Department of Gastroenterology and* [2]*Biostatistics, All India Institute of Medical Sciences, New Delhi, India*

Van Santvoort HC et al. NEJM 2010
Mouli VP et al. Gastroenterology 2013

Disconnected Pancreatic Duct syndrome

- *Complication of ductal necrosis*
- *Lack of ductal continuity between viable secreting pancreatic tissue and the gastrointestinal tract*

Larsen et al. Curr Treat Options Gastroenterol. 2016

Disconnected Pancreatic Duct syndrome

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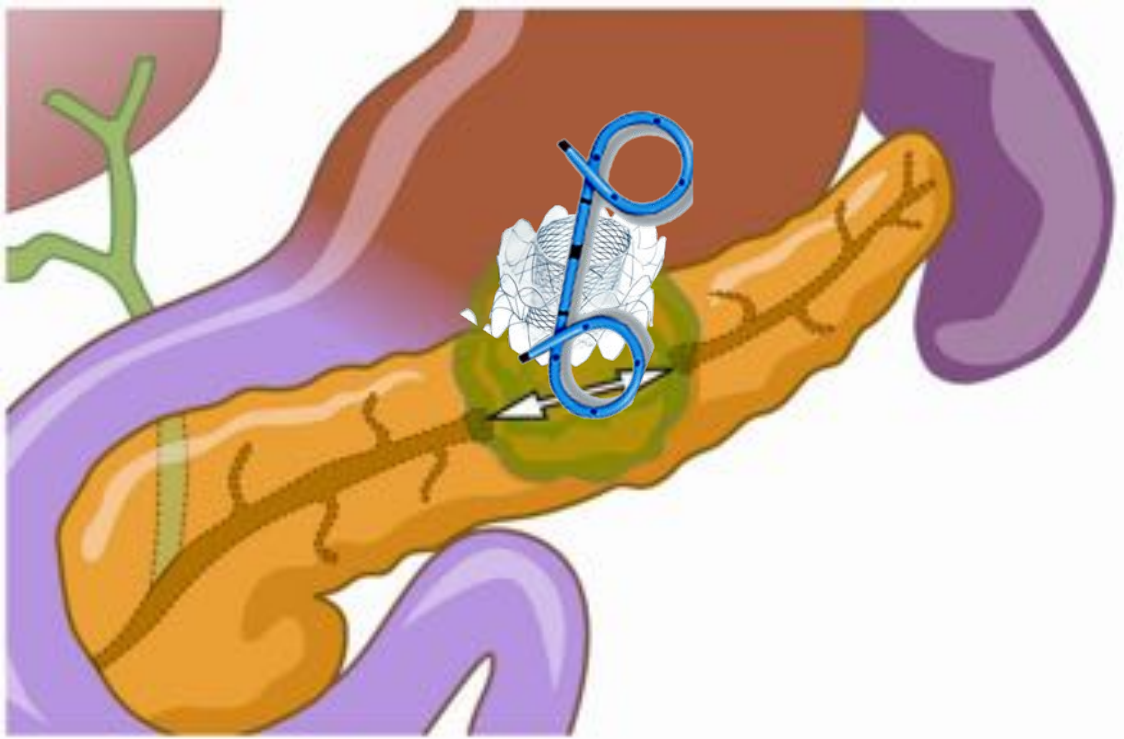
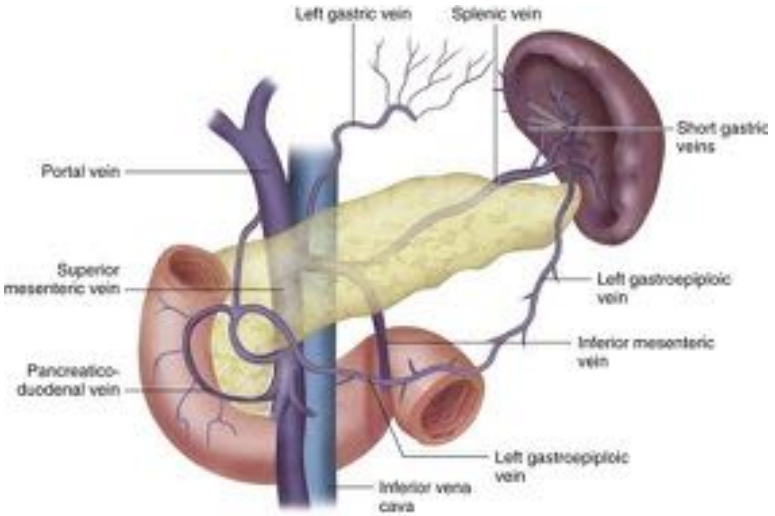


Larsen et al. Curr Treat Options Gastroenterol. 2016

Peripancreatic Vascular Complications

Splanchnic Vein Thrombosis

- *splenic, portal, superior mesenteric vein thrombosis seen in 1-24%, most resolve with treatment of AP*
- *Anticoagulant used if clot extends to portal vein or SMV or compromise perfusion*



Pseudoaneurysm

- *Present in up to 10% of pancreatic fluid collections*
- *Absolute contraindication to drain the collection till arterial embolization*

Summary

- *Fluid resuscitation: use lactated Ringer's in all patients, can be "aggressive" with goal directed therapy*
- *Enteral nutrition, route of administration does not matter, earlier the better particularly in severe acute pancreatitis. Solid low fat, low residue is better than liquid diet to start.*
- *Do not discharge patients on anything less than a SOLID diet*
- *No role for prophylactic antibiotics*
- *Consider non-opioid analgesics*

Summary

- *No role of urgent ERCP in the absence of cholangitis*
- *Cholecystectomy during same hospital admission for mild acute gallstone pancreatitis*
- *Percutaneous drain is first step for suspected infected necrosis that is not organized NOT surgery with “step-up” therapy as needed*
- *In setting of splanchnic vein thrombosis, anti coagulants are indicted only when the clot extends to portal vein or SMV or compromise visceral perfusion*

2018 CAPER PANCREAS ACADEMY

THANK YOU

Additional Resources

Akshintala et al. Management of uncomplicated acute pancreatitis. ***Gastrointestinal Clinics North America. 2018***

Vege SS et al. Initial Medical Treatment of Acute Pancreatitis: American Gastroenterological Association Institute Technical Review. ***Gastroenterology. 2018***

IAP/APA evidence-based guidelines for the management of acute pancreatitis. ***Pancreatology. 2013***

Tenner S et al. American College of Gastroenterology guideline: management of acute pancreatitis. ***Am J Gastroenterol. 2013***