Pancreatitis

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1. What are the grading systems for Pancreatitis?
2. What is the role of surgery in acute pancreatitis?
3. What the principles of managing chronic pancreatitis?

Overview

- The Pancreas
- Pancreatitis
- Signs + Symptoms
- Investigations
- Grading Systems
- Role of Surgery
- Management of Chronic Pancreatitis
- Summary

Pancreas - Macroscopic

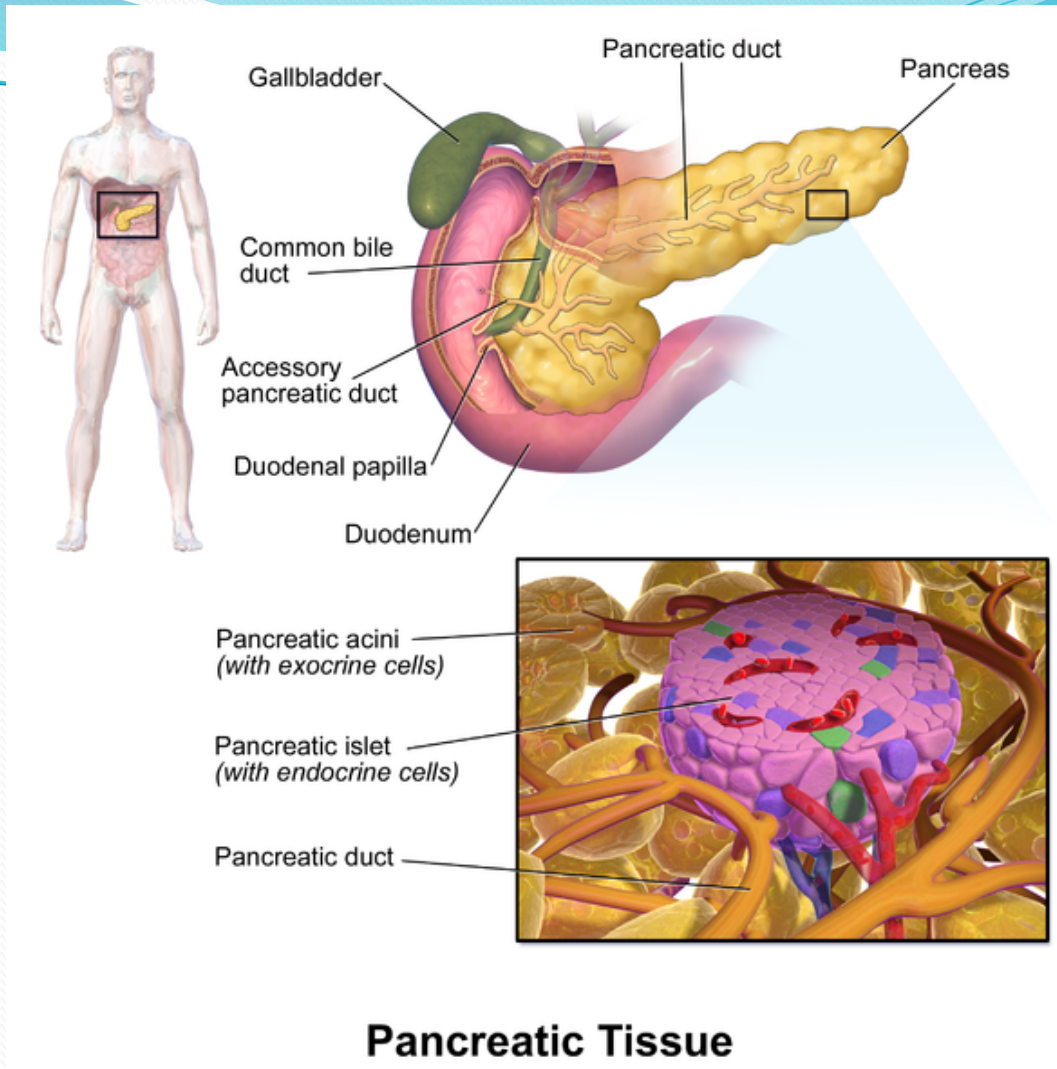
- 12-15cm long, J shaped organ
- Lies transversely retroperitoneal at level L1/2
- Embryology – two buds from endoderm of foregut
  - Ventral and dorsal bud forming uncinate and body
- Secretes 1.5-3L per day – alkaline fluid
- Exocrine - acinar cells – proteolytic, lipolitic, amiolytic
- Endocrine - islets of Langerhans
  - Insulin
  - Glucagon
  - Somatostatic
  - Pancreatic polypeptide

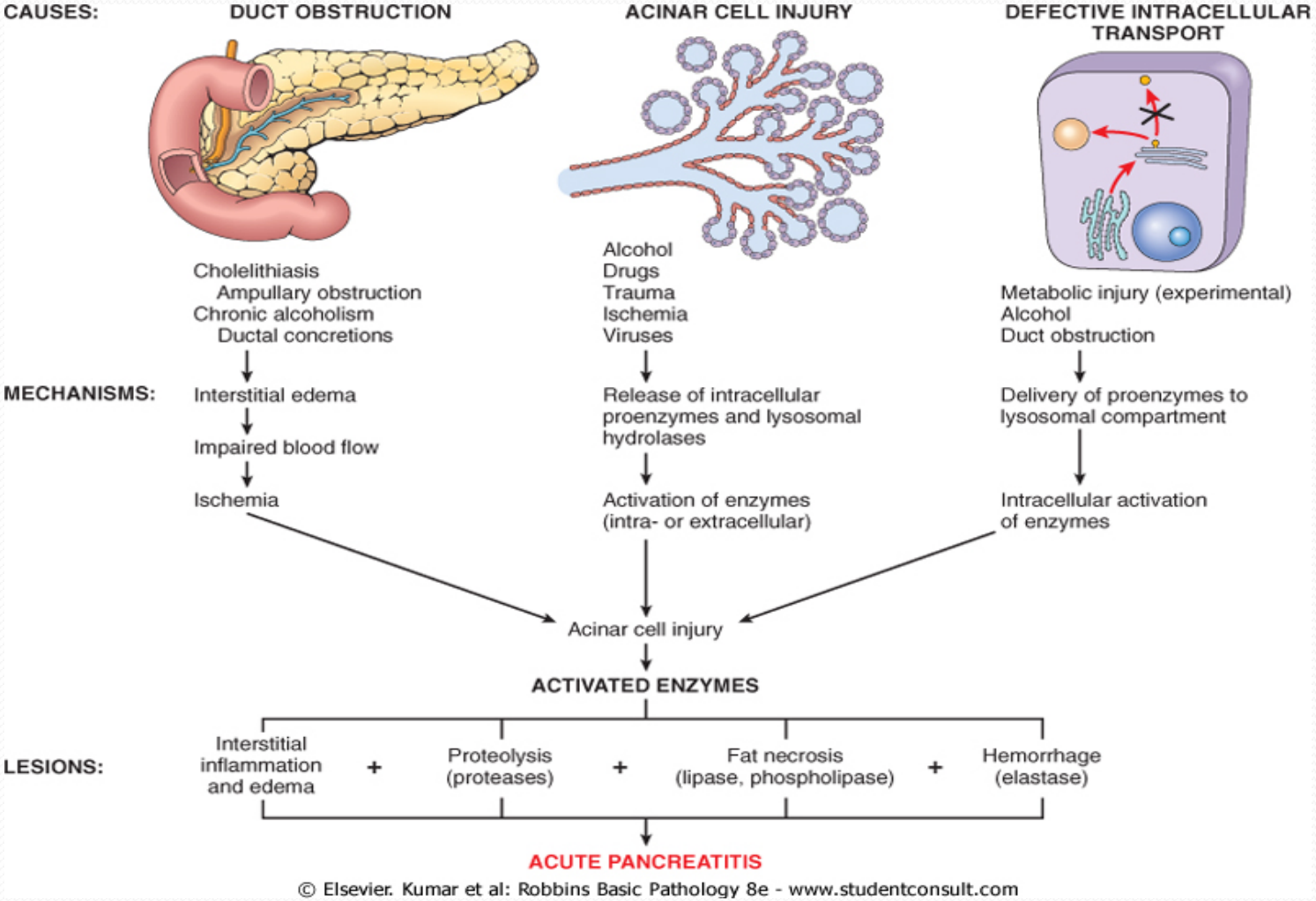
Islets of Langehans

- α - glucagon
- β - insulin
- Δ - somatostatin
- PP
- ε - ghrehlin

Acinar Cells

- Zymogen granules





Aetiology

- Ideopathic
- **Gallstones / Mechanical Obstruction – 38%**
  - Congenital malformations, cancer
  - Size of Gallstone - 5mm
- **Ethanol – 35%**
- **Trauma – 1.5%**
- **S**teroids
- **M**umps / Metabolic
  - CF, hereditary pancreatitis
- **A**utoimmune
  - Sjogrens
- **S**corpions
- **Hypertriglyceridaemia 3%**
  - Trigs >10
- **ERCP – 5%** + emboli
- **D**rugs 2-5%
  - Sulphonamides, azathioprine, thiazides, frusemide, oestrogens, valproic acid, 6-mecaptopurine, tetracylines, ART

Pancreatitis Workup

History / Aetiology

Gallstones
Ethanol
Trauma
Steroids
Mumps / **M**etabolic
Autoimmune
Scorpions
Hyperlipidaemia, Hyperthermia
ERCP + emboli
Drugs

Investigations

- FBC
- UEC + CMP
- LFTs
- Amylase
- Lipase

- Ca 19.9, fasting lipids
- US
- CT - timing
- MRCP / CT cholangiogram
- ERCP
- EUS

Pancreatitis - Signs and Symptoms

- Epigastric pain – constant, classically radiating to back
- Tachycardia, fever, jaundice
- Nausea, vomiting, abdomin
- SOB + Hypoxia
- Flank bruising – Grey-turne
- Periumbilical bruising – Cu

Perforated
Viscous
AAA
Cholecystitis
Cardiac
Gastritis
Ischaemic bowel

What is your differential Diagnosis?DDx

Diagnosis

2 of 3

1. History of pancreatic abdominal pain
2. Lipase / amylase 3x upper limit normal
3. CT / imaging findings pancreatitis

Ranson's

11 parameter's (both at admission and at 48hrs)

Admission

–Age>55, WCC >16, LDH >600, Glucose >10, AST >120

48 hrs

–Haemotcrit fall >10%,

- BUN >1.8mmol/L despite fluids,
- Serum calcium < 2mmol/L,
- PaO2 <60mmHg,
- Base deficit > 4mEq/L,
- Fluid Sequestration of >6L

Score-

<3 mild (mortality is <1%),

3-5 (15% mortality,

> 5 (mortality 40%)

>6 (mortality >90%)

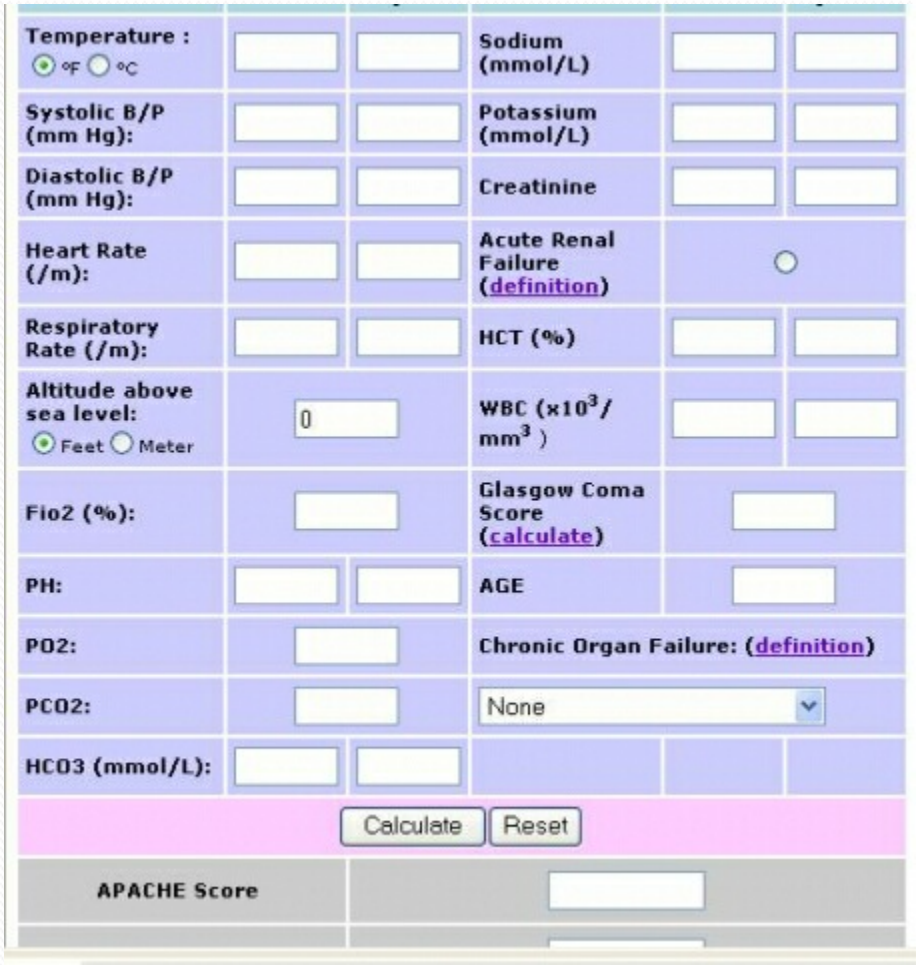
But this score is a poor predictor of severity, other limitation only used once and in 48 hrs and only in alcoholic

What are the grading systems for Pancreatitis?

- Ranson's
- Apache II – acute physiology and chronic health evaluation
- Modified Glasgow
- Organ Failure
- Balthazar - CT criteria
- Sarr Classification

Apache II

1. Age
2. Temperature (rectal)
3. Mean arterial pressure
4. pH arterial
5. Heart rate
6. Respiratory rate
7. Sodium (serum)
8. Potassium (serum)
9. Creatinine
10. Hematocrit
11. White blood cell count
12. Glasgow Coma Scale



Modified Glasgow

PaO2 <80 mmHg
Age >55
Neutrophils – WCC >15
Calcium <2mM
Renal Fn – urea >16mM
Enzymes – LDH >600, AST > 200
Albumin <32
Sugar >10mM

3 or more suggest severe pancreatitis and should be managed in ICU

Validated for Alcohol and Gallstone pancreatitis

Organ Failure

Organ Failure

- SBP < 90mmHg
- Pa02 <60mmHg
- Creatinine >180 uM
- GI bleeding

SIRS

- Temp >38, <36
- Pulse >90
- Tachypnnoea >24
- WCC >12

Bedside index of severity in acute pancreatitis (BISAP)

- BUN >8
- Impaired mental status
- SIRS 2/4
- Age >60
- Pleural Effusion

Multi organ system score (MOSS)

CRP >150

CT

Balthazar Grade	Appearance on CT	CT Grade Points
Grade A	Normal CT	0 points
Grade B	Focal or diffuse enlargement of the pancreas	1 point
Grade C	Pancreatic gland abnormalities and peripancreatic inflammation	2 points
Grade D	Fluid collection in a single location	3 points
Grade E	Two or more fluid collections and / or gas bubbles in or adjacent to pancreas	4 points

Necrosis Score

Necrosis Percentage	Points
No necrosis	0 points
0 to 30% necrosis	2 points
30 to 50% necrosis	4 points
Over 50% necrosis	6 points

Mortality

0-3 = 3%

4-6 = 6%

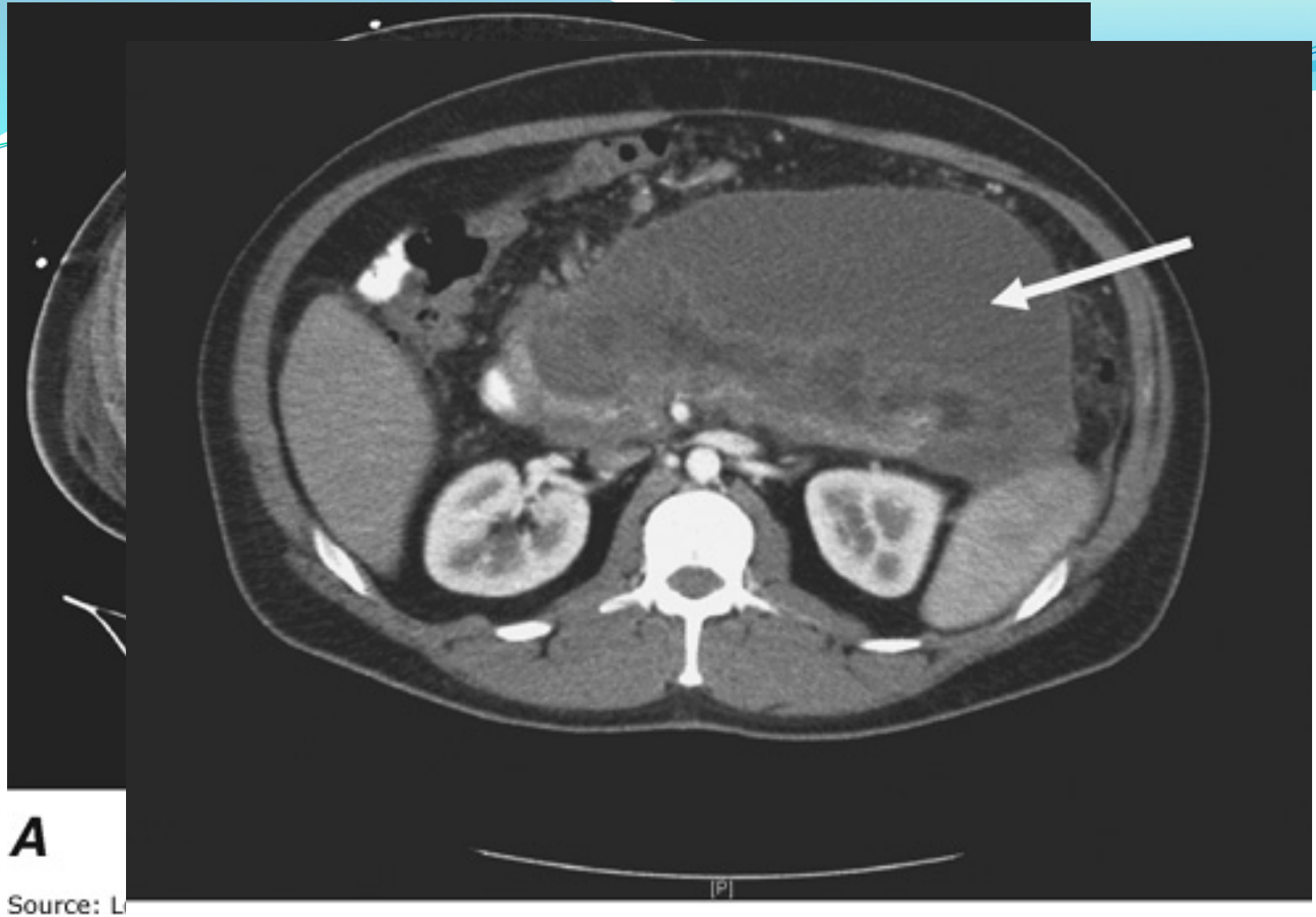
7-10 = 17%

What are the grading systems for Pancreatitis?

Sarr – Acute pancreatitis

- Early and late phases of disease
- Two Types
  - Interstitial oedematous pancreatitis
  - Necrotising pancreatitis
    - With / without infection
- Three grading levels
  - Mild – no organ failure
  - Moderately severe – organ failure resolves by 48hrs
  - Severe – persistent organ failure

- CT findings



A

Source: L
Principles

Copyright **C**

Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

Adjuncts to grading

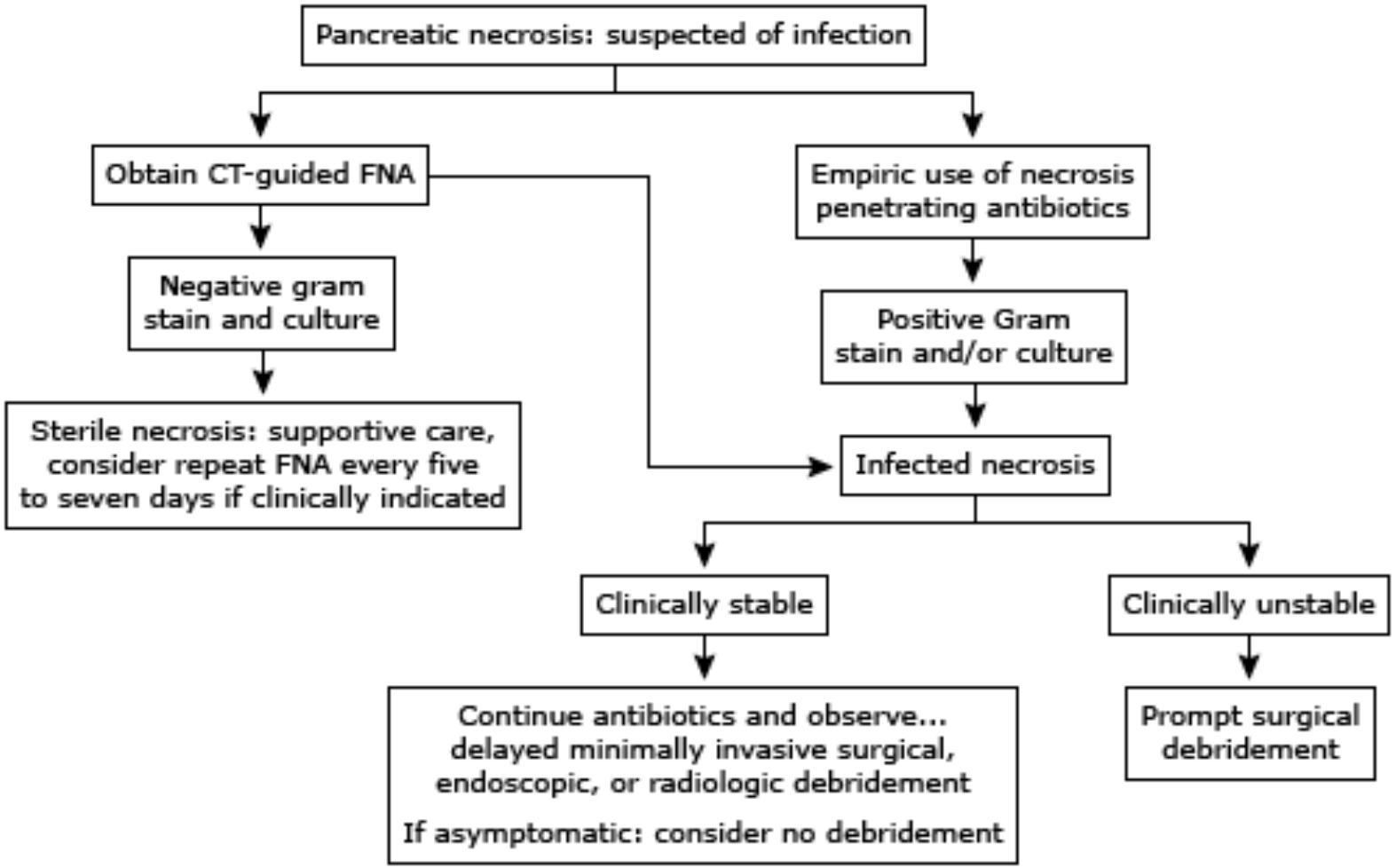
- Local Complications – describe site, contents and wall
  - Acute peripancreatic fluid collection
  - → Pancreatic pseudocyst
  - Acute necrotic collection
  - → Walled off necrosis

What is the role of surgery in acute pancreatitis?

- Correct Diagnosis
- ERCP
- Step up approach - Percutaneous drainage
- Partial pancreatectomy / necrosectomy

Diagnosis

- Severity
- CT
  - Dynamic CT 5-7 days predicts severity + degree of necrosis
  - Interstitial vs necrotic
  - Sterile vs. infected necrosis
    - Need cultures day 7-10
    - Empirical antibiotics for fever not indicated unless cultures positive
  - Walled off necrosis / Pseudocysts


Pancreatic necrosis: suspected of infection
Obtain CT-guided FNA
Empiric use of necrosis penetrating antibiotics
Negative gram stain and culture
Positive Gram stain and/or culture
Sterile necrosis: supportive care, consider repeat FNA every five to seven days if clinically indicated
Infected necrosis
Clinically stable
Clinically unstable
Continue antibiotics and observe... delayed minimally invasive surgical, endoscopic, or radiologic debridement
If asymptomatic: consider no debridement
Prompt surgical debridement

Endoscopic surgery - ERCP

Pts severe gallstone pancreatitis are candidates suitable for ERCP

- Should be offered in first 72 hrs
- Done urgently with known or suspected ongoing obstruction and organ failure
- Cocharane review suggest only indicated in severe cases or obstructive LFTs and clinical concern.

- Balloon + Sphincterotomy

Necrosectomy

- Step up approach
  - Percutaneous drainage
  - Laparoscopic
  - Laparotomy

Necrotising pancreatitis is associated with 8-39% mortality

- Secondary infection resulting in sepsis and MOF results in 100% mortality if untreated

Open necrosectomy is the traditional approach

- Associated with high complication (34-95%) and mortality (11-39%) risk

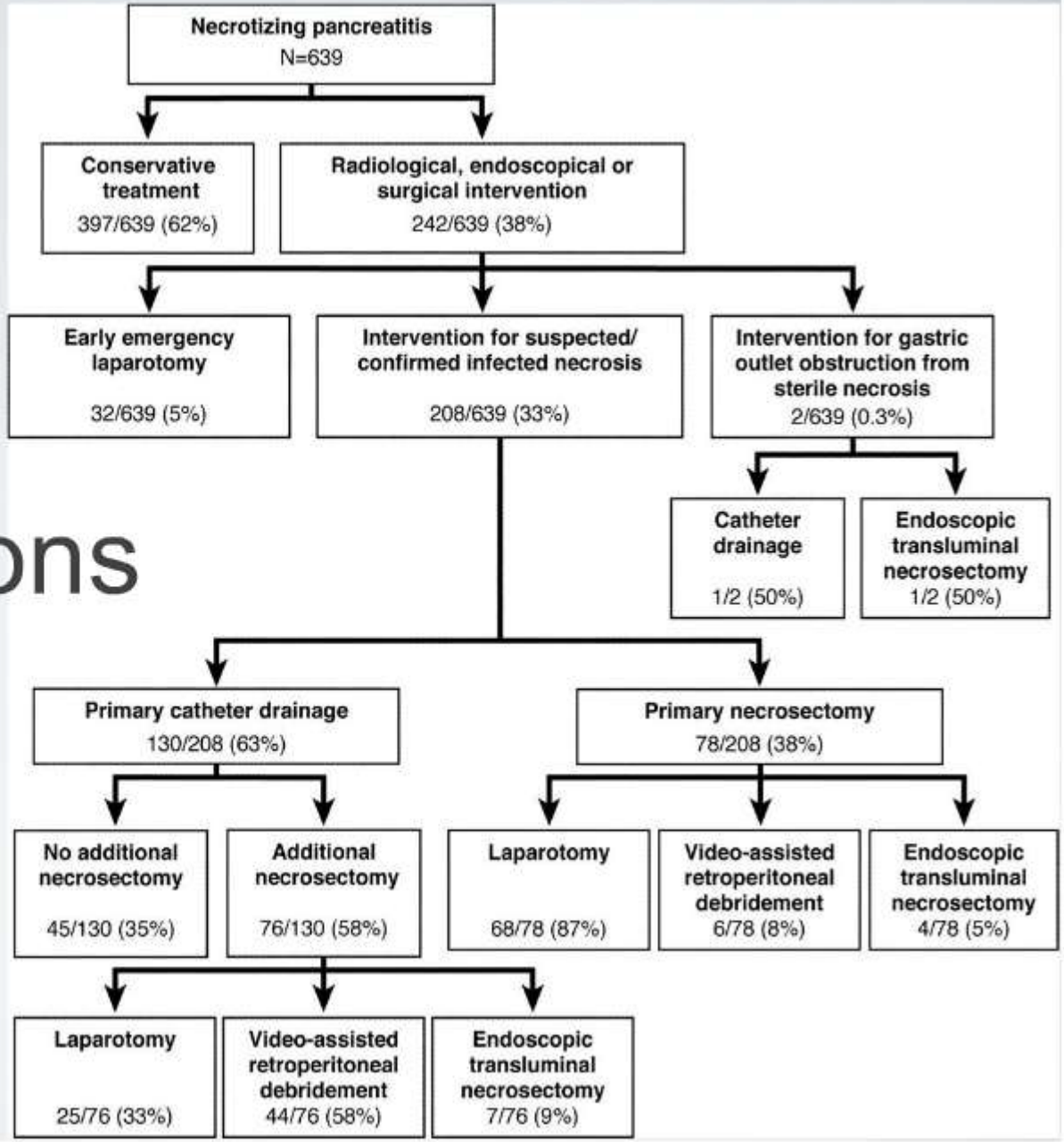
Necrosectomy

- Disclaimer
- Open – midline laparotomy
  - Allows inspection of the abdomen
  - Gastrocolic ligament divided to enter lesser sac
  - Blunt debridement
  - Can pack the cavity, staged repeat laparotomy, continuous lavage, suction
- Laparoscopic
  - Transperitoneal – hepatogastric, gastrocolic, transverse mesocolon approach
  - Retroperitoneal
- Endoscopic
  - Transgastric
  - Gardner et al Gastrointest Endosc 2011 – 104 patients, 91% success, 14% complication, 5 deaths, 3 open

Better outcomes with delayed surgery until necrosis has organised approx 3-4 weeks post presentation/onset of symptoms.

Better demarcation, less bleeding

Other interventions



H. van Santvoort et al. A conservative and minimally invasive approach to necrotizing pancreatitis improves outcome. ***Gastroenterology 2011.*** 141: 1254 - 63,.

What the principles of managing chronic pancreatitis?

- Diagnosis
- Prevention
- Pain
- Nutritional deficits and Pancreatic insufficiency
- Management of complications with Surgery

Background

- 25% of Patients develop recurrent attacks
- Gallstones and ETOH adults
- *CFTR* gene in kids
- Histological – Chronic inflammation, fibrosis, destruction exocrine and endocrine tissue

Diagnosis

- Signs and symptoms
  - Epigastric pain
  - Steatorrhoea
  - Wt loss
  - DM
- Serology – endo and exocrine fn
- Imaging
  - CT, MRCP, EUS, ERCP

Prevention is better than cure

- Ceasing ETOH
  - Counselling
  - AA
  - Disulfiram
- Cholecystectomy
  - Stone size
  - Cholangiogram
- Medications

Pain

- Treat on a PRN basis not regular for ‘flares’
- Short term burst of NSAID, Amitriptyline and Opioid beneficial
- Chronic pain clinic
- Psychologist

Pancreatic insufficiency

- Food fear
- Impaired glucose tolerance
- Enzyme supplementation – Creon
  - Data suggests need 80,000-100,000 units lipase per meal.

Formulation	Lipase	Protease	Amylase
Creon 6	6,000	19,000	30,000
Creon 12	12,000	38,000	60,000
Creon 24	24,000	76,000	120,000

Surgery

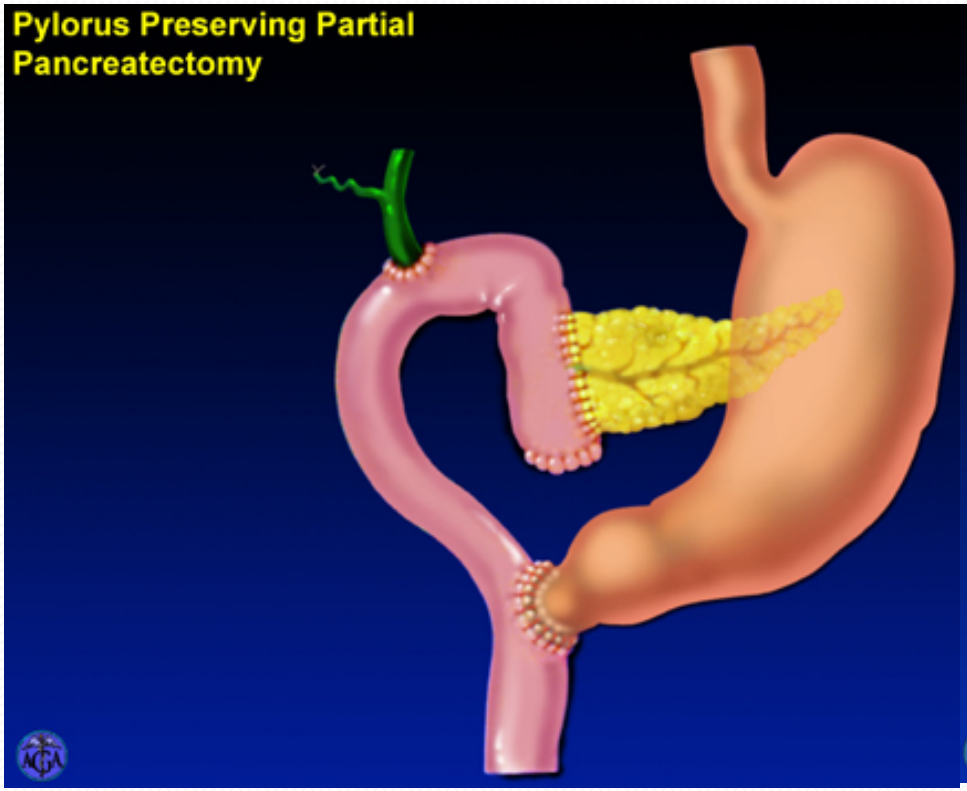
Decompression
Denervation

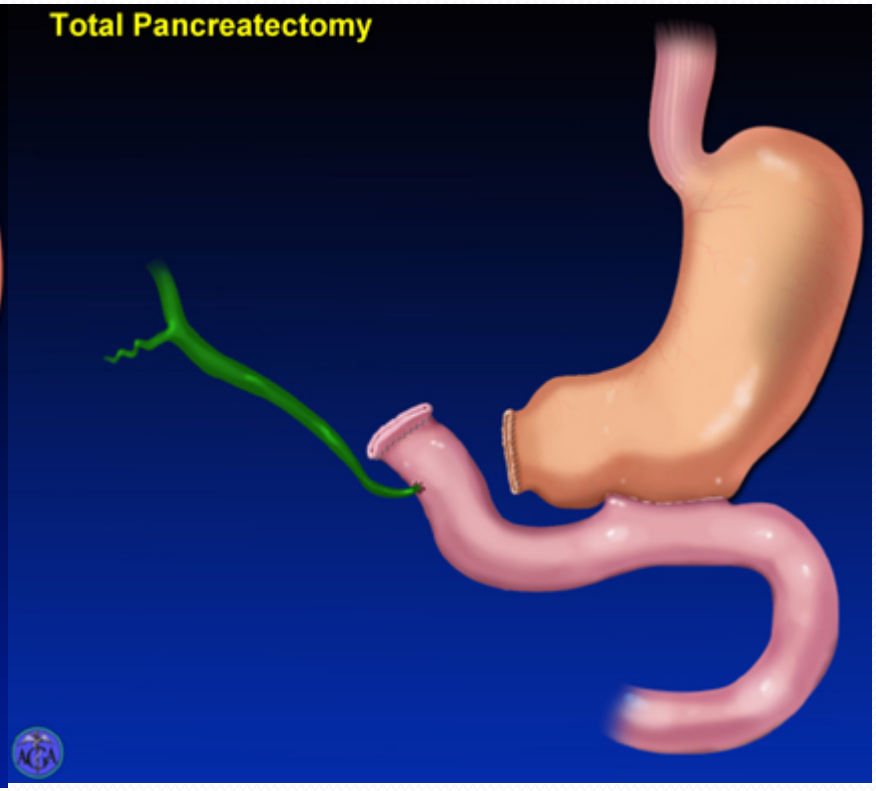
- ERCP – stenting, sphincterotomy
- pancreatico-jejunostomy (Puestow) -if pancreatic duct is distended / head involved
- ESWL *

- Thoracoscopic denervation needs further studies to validate

Resection

- subtotal panceatectomy -if duct is not distended / tail involved
- Whipples
- Frey's Procedure – cores out head


Pylorus Preserving Partial
Pancreatectomy


Total Pancreatectomy

Other Complications

- Narcotic addiction
- Gastroparesis
- B12 malabsorption
- GI bleeding
- Jaundice
- Cholangitis
- Pseudocysts
- bile duct or duodenal obstruction
- pancreatic ascites
- splenic vein thrombosis
- pseudoaneurysms

Summary - pancreatitis

- Pancreatitis – life threatening
- Transfer to specialist unit if unwell
  - ICU / ERCP requirement
  - Use simple classification system – organ failure with imaging - CT at 5-7 days
  - Interstitial vs necrotic, sterile vs infected necrosis.
- Not for prophylactic antibiotics unless indicated
- High morbidity with necrosectomy – benefit of percutaneous drainage once organised

Summary

- Chronic pancreatitis is associated with high morbidity.
- Prevent recurrence
- Investigate thoroughly- Treat patient holistically – vitamins, pain, nutrition.
- Surgery as last resort?

Future

- ED with Refined rapid panel investigations with algorithmic diagnoses – to SAU within 2 hrs!
- More minimally invasive techniques – robotic single port pancreatectomies via satelite communication
- EUS / ERCP combined procedure
- Minimally invasive jejenostomy with small bowel endoscopic surgery

Questions

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