Management of acute pancreatitis: Tips for non-gastroenterologists

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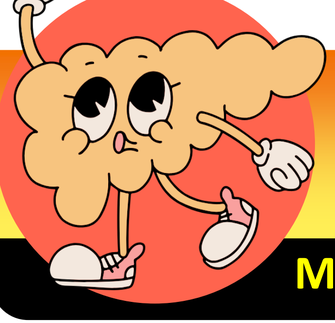
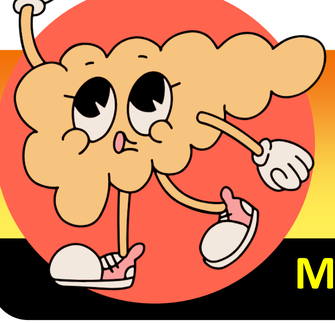


Outline

Management of acute pancreatitis: Tips for non-gastroenterologists

- Incidence and burden of disease
- Definition and severity assessment
- Etiology of acute pancreatitis
- Management



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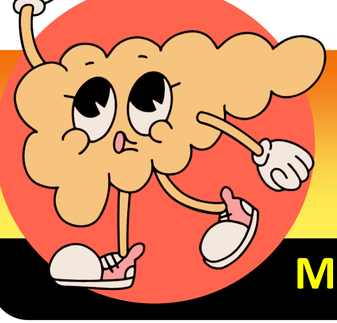
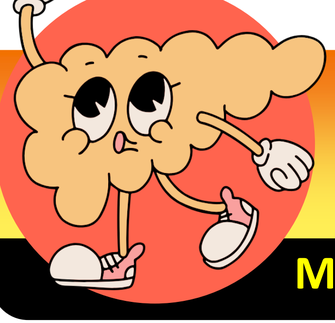


Incidence and burden of disease

- Acute pancreatitis (AP) is one of the most common diseases of the GI tract
- Incidence of AP has been increasing by 2%–5% per year
- 5,000–9,000 deaths reported annually
- Advancements in the management of AP over the past decade have been associated with a decrease in mortality

Am J Gastroenterol. 2024 Mar 1;119(3):419-437
Sleisinger and Fortran 11th edition.



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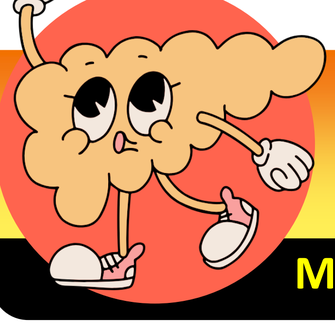

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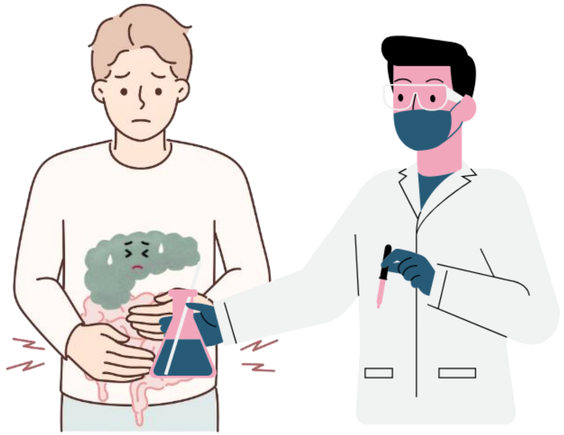


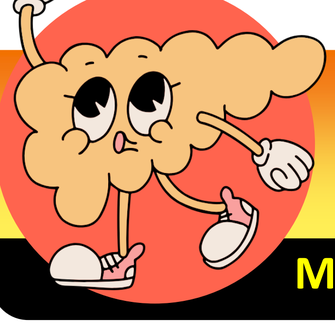
The diagnosis of AP most often is established by identification of 2 of the 3 following criteria

(i) Abdominal pain consistent with the disease

(ii) Serum amylase and/or lipase > 3x UNL

(iii) Characteristic findings from abdominal imaging

Gut. 2013;62(1):102–111



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- **Abdominal pain consistent with the disease**
  - **Location: Epigastric or left upper quadrant pain**
  - **Onset: rapid but not as abrupt as hollow viscous organ perforation**
  - **Steady, constant pain**
  - **Maximal intensity: 10 to 20 minutes.**
  - **Radiation to the back, chest or flank**
  - **Intensity of the pain is usually severe but can be variable**
  - **Not consistent with AP: Pain described as dull, colicky or located in the lower abdominal region**
  - **90% nausea and vomiting.**
  - **5-10% painless, mostly fatal**

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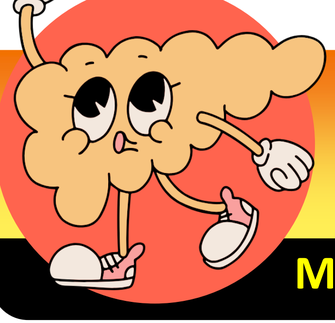
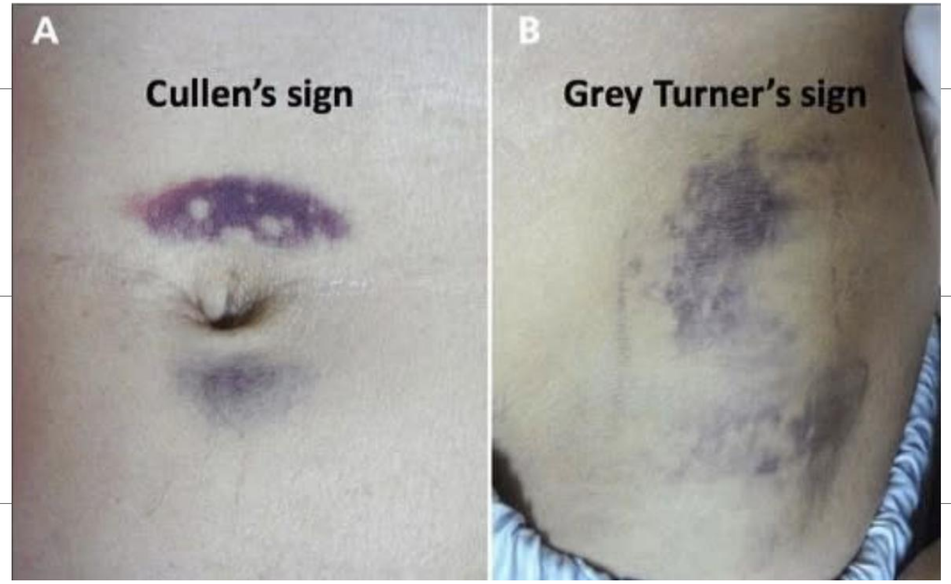


Definitions

- **Physical examination**

	Findings
Abdominal Findings	• Upper abdomen tenderness (elicited by shaking or percussion). • Localized guarding in upper abdomen
	• Abdominal distention due to ileus • Common in severe cases
	• Reduced or absent bowel sounds
Rare signs	• Ecchymosis (*Gray Turner sign*, *Cullen sign*) • Palpable epigastric mass (pseudocyst or inflammatory mass).



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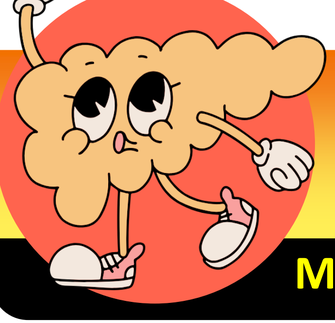
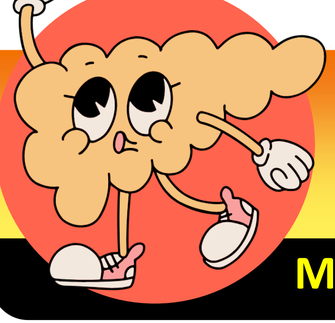


Definitions

- **Serum amylase and/or lipase greater than 3 times the UNL of normal**
  - **Serum amylase:** Less reliable for AP diagnosis due to low sensitivity/NPV
    - **Falsely low:** alcohol-induced AP and hypertriglyceridemia.
    - **Falsely elevated:** macroamylasemia, decreased GFR, salivary gland diseases, and other abdominal inflammatory diseases.
  - **Serum lipase:** Preferred for AP diagnosis due to higher specificity.
    - Remains elevated longer than amylase post-disease onset.
    - Can be elevated in non-pancreatic diseases, especially in diabetic patients.
  - Both tests should be interpreted in conjunction with clinical presentation and other diagnostic tests.
  - Lipase should replace amylase as the first-line for suspected AP

Clin Biochem. 2017 Dec;50(18):1275-1280



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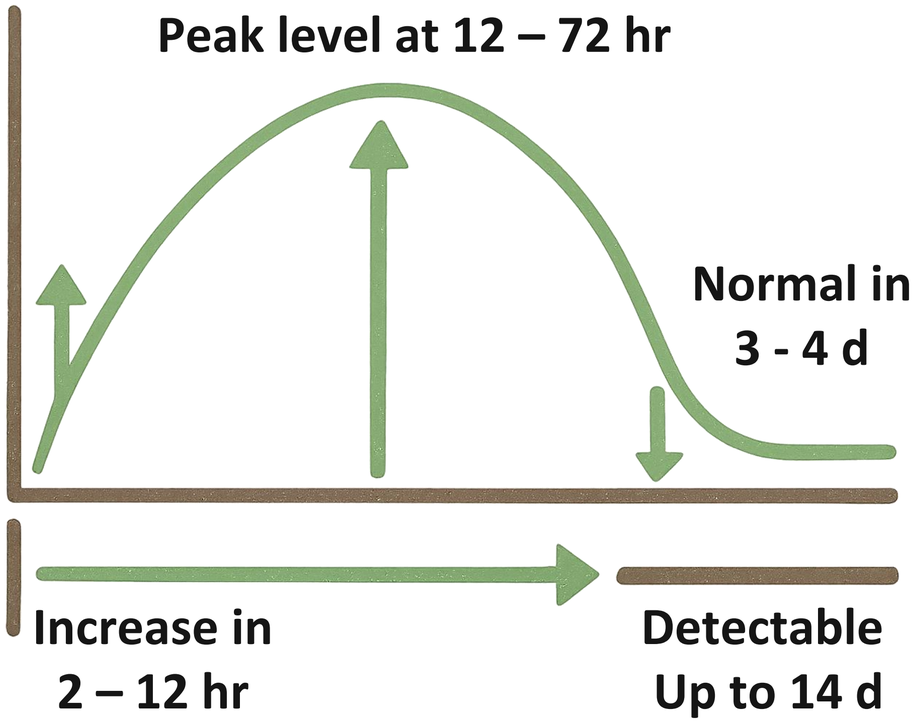
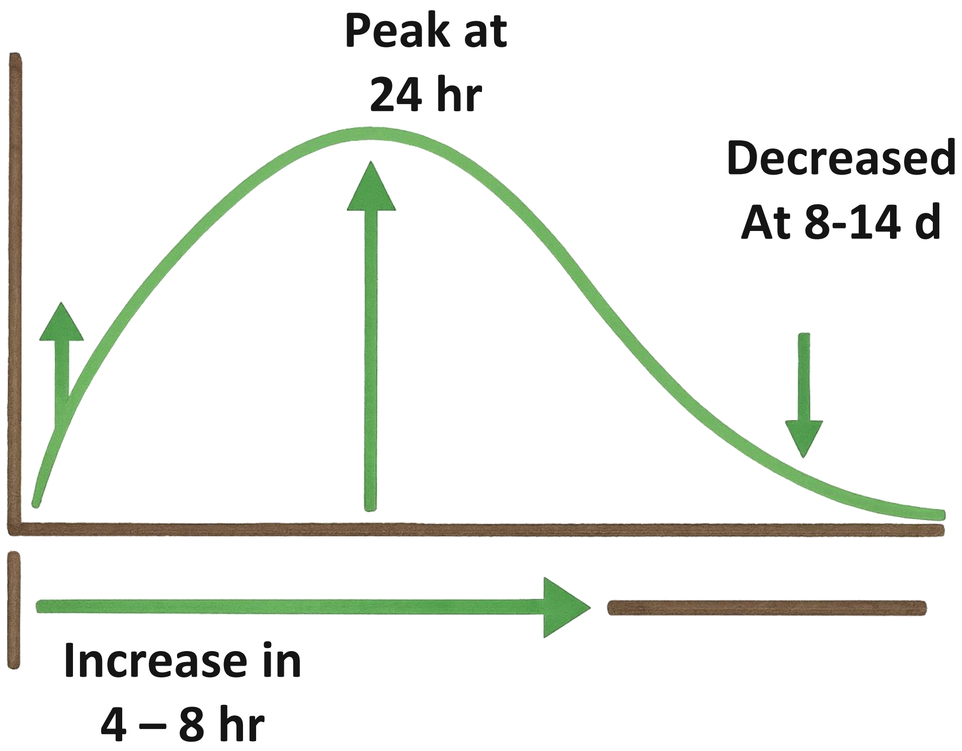
- **Serum amylase and/or lipase greater than 3 times the UNL of normal**

Amylase



Lipase



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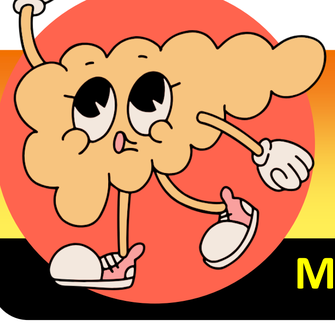

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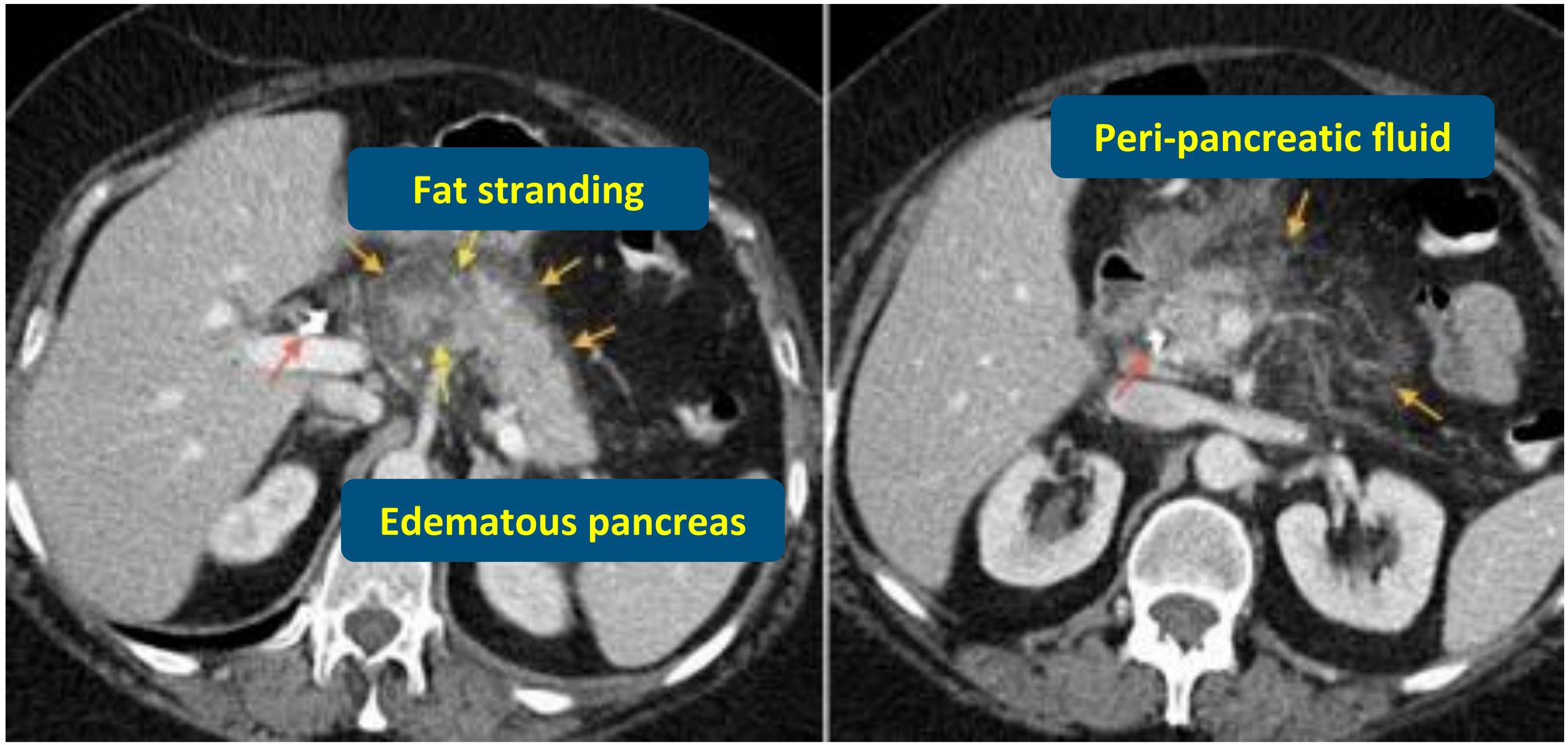
Characteristic findings from abdominal imaging

- CT: unclear diagnosis or failed to improve clinically at 48-72 hr



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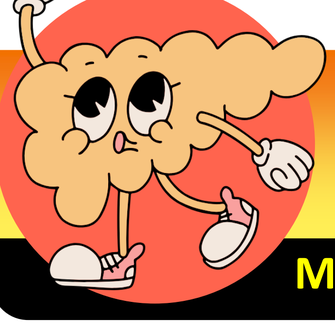


Severity Assessment

Management of acute pancreatitis: Tips for non-gastroenterologists

BOX 58.1 2012 Atlanta Classification Revision of Acute Pancreatitis[12]

MILD ACUTE PANCREATITIS

No organ failure
No local or systemic complications

MODERATELY SEVERE ACUTE PANCREATITIS

Transient organ failure (<48 hr) and/or
Local or systemic complications* without persistent organ failure

SEVERE ACUTE PANCREATITIS

Persistent organ failure (>48 hr)——single organ or multiorgan

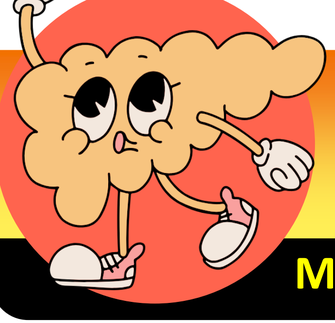
*Local complications are peripancreatic fluid collections, pancreatic necrosis and peripancreatic necrosis (sterile or infected), pseudocyst, and walled-off necrosis (sterile or infected).

- **Once the diagnosis of AP is established, patients are then classified based on disease severity. The Atlanta Criteria revision of 2012**

Complication

- **Local pancreatic complication: Acute pancreatic fluid collection (APFC), acute necrotic collection (ANC), pseudocyst, walled-off necrosis (WON)**
- **Other intraabdominal complication: abdominal compartment syndrome (ACS), splenic vein thrombosis, portal vein thrombosis, pseudoaneurysm**
- **Systemic complication**
- **Organ failure (RS failure, kidney failure, CVS dysfunction)**
- **Excarcerbation of pre-existing co-morbidity**

Gut. 2013;62(1):102–111



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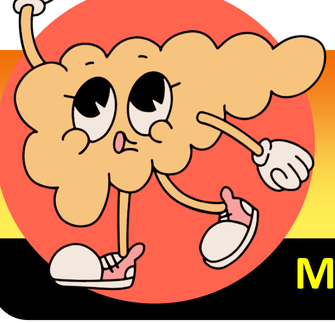
The Bedside Index for Severity in Acute Pancreatitis (BISAP) s

Blood urea nitrogen >25 (mg/dL)
Impaired mental status disorientation, lethargy somnolence, coma or stupor
SIRS (Systemic Inflammatory Response Syndrome)
Age > 60 years
Pleural effusion (on chest radiography or computed tomography)

- Each point on the BISAP score worth 1 point
Observed mortality risk with an increasing number of points: [30]

- 0 point: mortality rate of 0.1%
- 1 point: mortality rate of 0.4%
- 2 points: mortality rate of 1.6%
- 3 points: mortality rate of 3.6%
- 4 points: mortality rate of 7.4%
- 5 points: mortality rate of 9.5%

Gut. 2008 Dec;57(12):1698-703.



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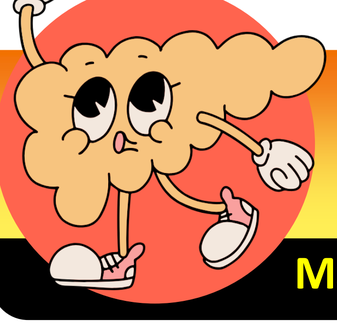
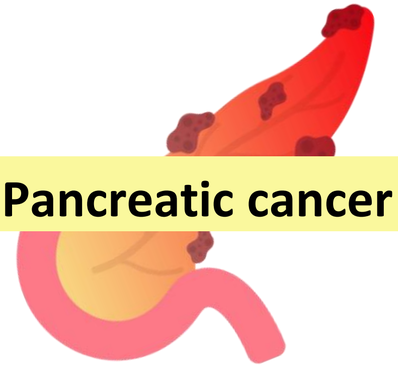


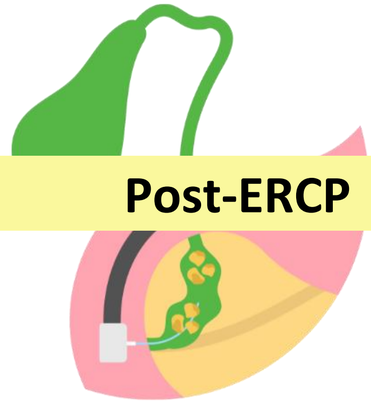
Etiology

Management of acute pancreatitis: Tips for non-gastroenterologists

Gallbladder stone

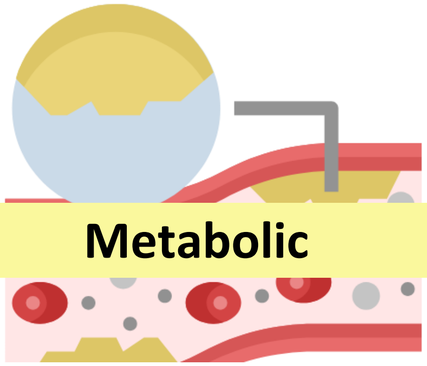


Pancreatic cancer



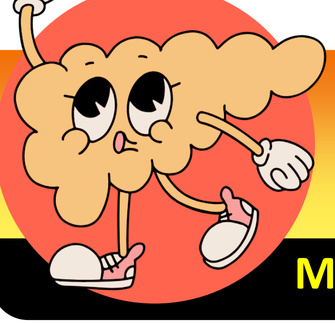
Post-ERCP

Alcohol



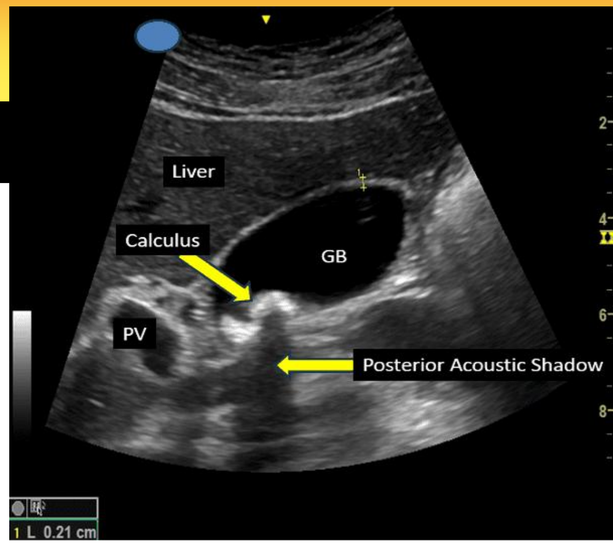
Metabolic

Drug-induced



Etiology

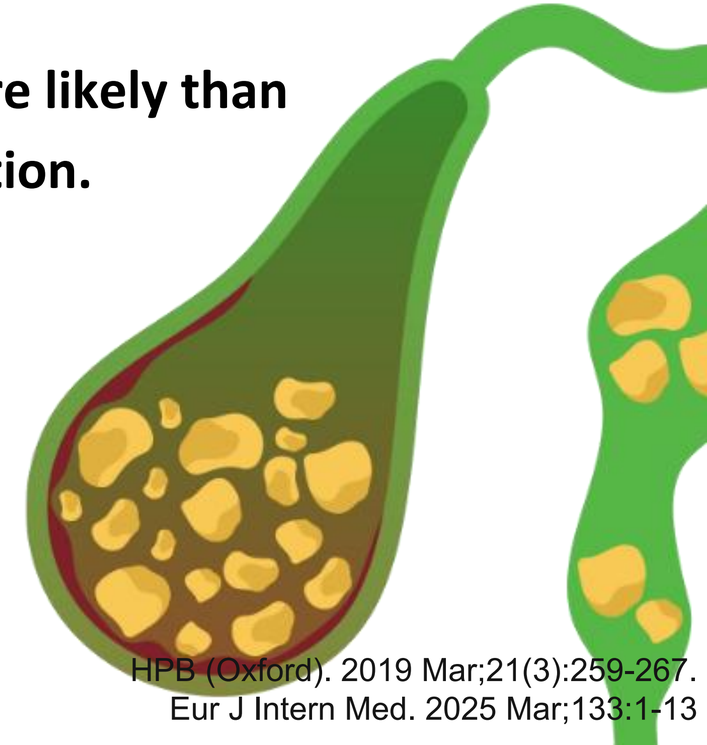
Management of acute pancreatitis: Tips for non-gastroenterologists



- **Gallstone, Biliary sludge and Microlithiasis**

Gallbladder stone

- 3% to 7% of patients with gallstones develop pancreatitis.
- AP occurs more frequently with **stones size < 5 mm:** small stones are more likely than large stones to pass through the cystic duct and cause ampullary obstruction.
- **USG upper abdomen** to evaluate for cholelithiasis should be performed on all patients with AP

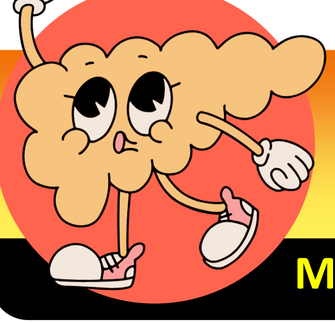


Ultrasound

- A mobile, low-amplitude echo without acoustic shadow

- EUS in idiopathic pancreatitis: 40% of the cases had sludge, or microlithiasis

HPB (Oxford). 2019 Mar;21(3):259-267.
Eur J Intern Med. 2025 Mar;133:1-13



Etiology

• Ethyl Alcohol and Other Toxins

Ethyl Alcohol

- Second most common cause of AP (30%)
- Prolonged alcohol consumption (≥ 5 drinks per day for at least 5 years)
- Direct metabolic-toxic effect on acinar cell, oxidative stress
- Leads to chronic pancreatitis through the “necrosis-fibrosis hypothesis.”

Other toxin

- Methyl alcohol
- Organophosphate, and Venom of the Trinidad scorpion
  - via Hyper-stimulation of the pancreas.
- Cigarette smoking: independent risk factor for AP.

HPB (Oxford). 2019 Mar;21(3):259-267.
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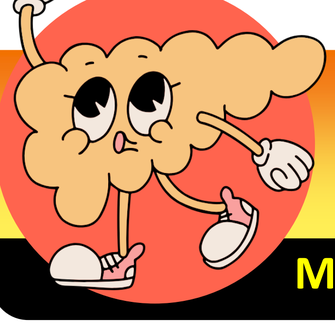


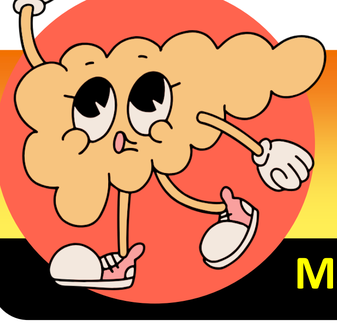
Etiology

Management of acute pancreatitis: Tips for non-gastroenterologists

- How to distinguish between alcoholic AP vs. Gallstone AP

Aspect	Alcoholic Pancreatitis	Gallstone Pancreatitis
Demographic	More common in men, Age < 40	More common in women, Age > 40
Cause	Chronic heavy alcohol consumption (5–10 years)	Gallstones in the gallbladder or bile duct
Recurrence	Suggestive of alcohol etiology	Recurrence common if gallstones are not addressed (30–50% recurrence after discharge without surgery)
Laboratory Tests	High serum lipase-to-amylase ratio	ALT >150 IU/L high specificity (96%)/PPV (95%), low sensitivity (48%)
Imaging	Abdominal ultrasound less relevant	Abdominal ultrasound recommended
Management	Avoidance of alcohol	Cholecystectomy during the same hospital admission

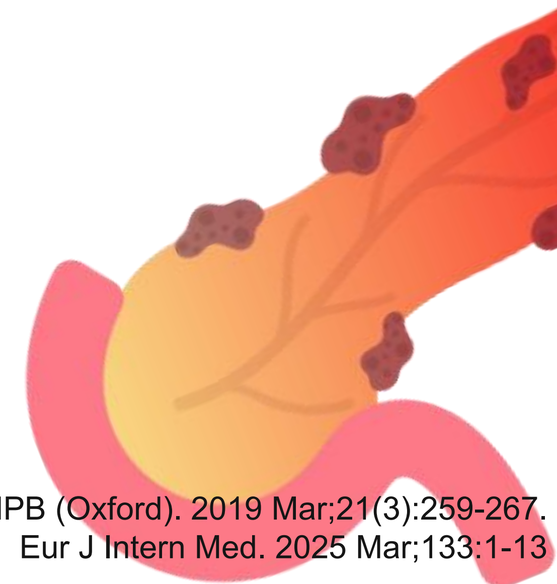
BMC Gastroenterol. 2015 Jul 25;15:87



Etiology

- **Pancreatic Tumor and etc.**

Pancreatic cancer	• Infrequently cause acute and recurrent AP (1.4%) • Age > 40, AP also increases the risk of subsequent pancreatic cancers. • AP and CP associated with a significantly increased risk of pancreatic cancer • Most common tumor: IPMN (both side branch and main duct) • Pancreatic metastases (lung, breast)



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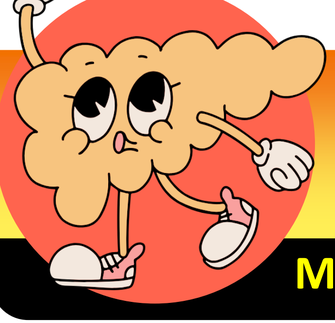
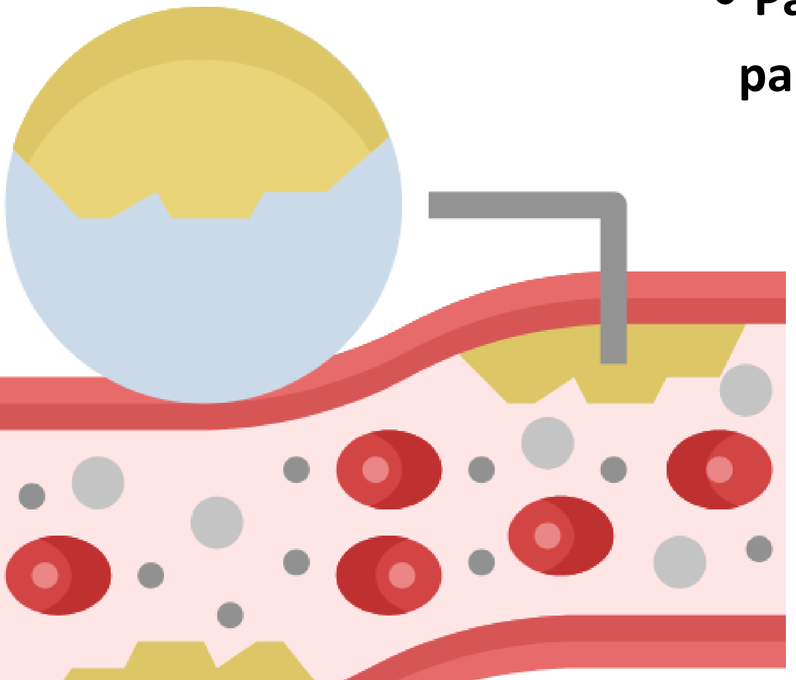


Etiology

- **Metabolic disorder**

Hypertriglyceridemia

- 3rd most common cause of pancreatitis (9-20%)
- > 50% of gestational pancreatitis.
- Serum TG > 1000 mg/dL precipitate attacks of AP.
- Pathogenesis: Local release of free fatty acids by pancreatic lipase -> damage pancreatic acinar cells



Secondary cause of hyperTG

- Alcohol abuse
- Obesity
- Diabetes mellitus
- Hypothyroidism
- Cushing syndrome
- Pregnancy
- Nephrotic syndrome
- Drug-induced
  - Estrogen or tamoxifen, steroid, HCTZ, Beta-block

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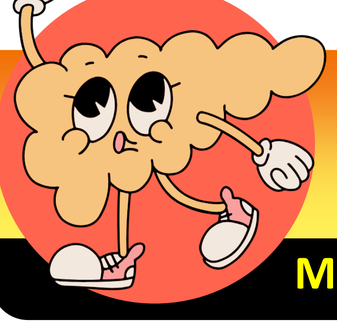
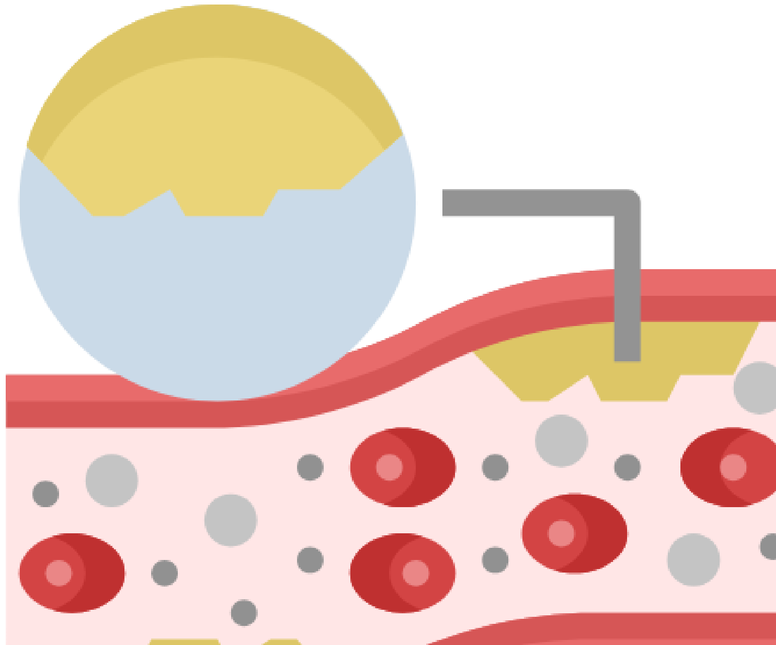


Etiology

- **Metabolic disorder**

Hypercalcemia

- Rarely associated with AP.
- Deposition of calcium salts in the PD lumen and calcium activation of trypsinogen to trypsin within the pancreatic parenchyma
- Primary hyperparathyroidism < 0.5% of AP
- Rarely, pancreatitis occurs with other causes of hypercalcemia



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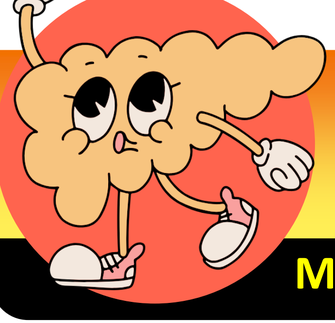


Etiology

- **Vascular/Trauma**

Post-ERCP pancreatitis

BOX 58.5 Factors That Increase the Risk of Post-ERCP Pancreatitis

PATIENT-RELATED

Young age, female gender, suspected SOD, history of recurrent pancreatitis, history of post-ERCP pancreatitis, normal serum bilirubin level

PROCEDURE-RELATED

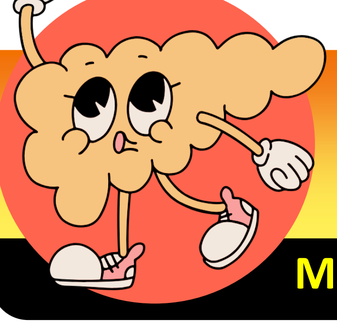
Pancreatic duct injection, difficult cannulation, pancreatic sphincterotomy, precut access, balloon dilation

OPERATOR OR TECHNIQUE-RELATED

Trainee (fellow) participation, nonuse of a guidewire for cannulation, failure to use a pancreatic duct stent in a high-risk procedure

- **AP is the most common complication of ERCP**
- **35-70% Asymptomatic hyperamylasemia**
- **5% of diagnostic ERCPs, 7% of therapeutic ERCPs**
- **Multifactorial**
- **The 3 major modalities shown to reduce the risk**
  - **Prophylactic pancreatic stents**
  - **Pre-procedural intravenous fluids**
  - **Rectal administration of NSAIDs.**

Gastrointest Endosc. 2023 Feb;97(2):153-162



Etiology

Management of acute pancreatitis: Tips for non-gastroenterologists

• Drug-associated pancreatic injury (DAPI)

Table 1. Drug classification system for assessment of association with DIP.

Drug class	Definition
Class Ia	• At least 1 case report in humans, with positive re-challenge
	• All other causes, such as alcohol, hypertriglyceridemia (and hyperlipidemia), gallstones, and other drugs are ruled out
Class Ib	• At least 1 case report in humans, with positive re-challenge
	• Other causes, such as alcohol, hypertriglyceridemia, gallstones, and other drugs were not ruled out
Class Ic	• At least 1 case report in humans, without a positive re-challenge (i.e., no re-challenge or a negative re-challenge)
	• Other causes, such as alcohol, hypertriglyceridemia, gallstones, and other drugs are ruled out
Class II	• At least 2 cases in humans reported in the literature, without a positive re-challenge (i.e., no re-challenge or a negative re-challenge)
	• Other causes, such as alcohol, hypertriglyceridemia, gallstones, and other drugs were not ruled out
	• Consistent latency*
Class III	• At least 2 cases in humans reported the literature, without a positive re-challenge (i.e., no re-challenge or a negative re-challenge)
	• Other causes, such as alcohol, hypertriglyceridemia, gallstones, and other drugs were not ruled out
	• Inconsistent latency*
Class IV	• At least 1 case in humans reported the literature
	• Drugs not fitting into the earlier-described classes

* "Consistent latency" defined as >75% of cases falling into the same latency category

• Category 1: <24h.

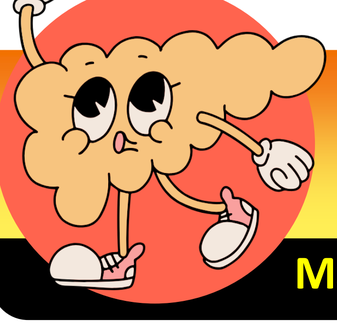
• Category 2: 1–30 days.

• Category 3: >30 days.

https://doi.org/10.1371/journal.pone.0231883.t001

- 5-acetylsalicylic acid (mesalamine)
- 6-mercaptopurine (6-MP)
- Acetaminophen
- All-trans retinoic acid
- Azathioprine
- Bezafibrate
- Captopril
- Carbimazole
- Cimetidine
- Codeine
- Dapsone
- Erythromycin
- Fluvastatin
- Furosemide
- Interferon-alpha
- Isoniazid
- L-asparaginase
- Lisinopril
- Metformin
- Metronidazole
- Methimazole
- Methylprednisolone
- MTZ
- Nitrofurantoin
- Orlistat
- Piroxicam
- Pravastatin
- Procainamide
- Ranitidine
- Rosuvastatin/Simvastatin
- Sorafenib
- Sulindac
- Tamoxifen
- Tetracycline
- Tigecycline
- Thalidomide
- Trimethoprim-sulfamethoxazole
- Valproic acid

PLoS One. 2020 Apr 17;15(4):e0231883.

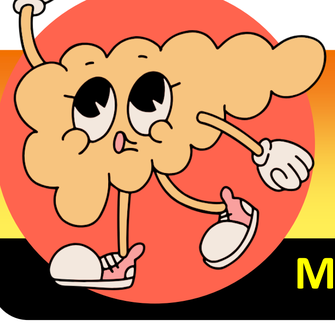


Etiology

Management of acute pancreatitis: Tips for non-gastroenterologists

Class Ib		Class Ic		Class II	Class IV
Amiodarone	Mirtazapine	Amoxi-clav	Irbesartan	Ceftriaxone	Alendronate
Ampicillin	Octreotide	Artesunate	Itraconazole	Clofibrate	Calcium carbonate
CBZ	Omeprazole	Atorvastatin	Ketorolac	Exenatide	Capecitabine
Ciprofloxacin	Paclitaxel	Bortezomib	Lanreotide	Isotretinoin	Cisplatin
Clozapine	Paromomycin	Canagliflozin	Lenvatinib	Levetiracetam	Ertapenem
Cytarabine	Pentamidine	Candesartan	Liraglutide	Sitagliptin	Gemfibrozil
Enalapril	Prednisolone	Celecoxib	Minocycline	**Class III**	Lamotrigine
Everolimus	Propofol	Clarithromycin	Naltrexone	ASA	Linagliptin
GH	Quetiapine	Danazol	Naproxen	Gold	Linezolid
HCTZ	Rifampicin	Diclofenac	Nilotinib	Nivolumab	Loperamide
Hydrocortisone	Risperidone	Doxycycline	Olanzapine	Ondansetron	Micafungin
Lamivudine	Saxagliptin	Ezetimibe	Pantoprazole	Tacrolimus	Montelukast
Losartan	Sulfasalazine	Finasteride	Phenytoin		Mycophenolate mofetil
Mefenamic acid	Valsartan	Gadolinium	PTU		Norfloxacin
Methyldopa	Voriconazole	Glicazide	Sirolimus		Pazopanib
		Glimepiride	Theophylline		PEG bowel preparation
		Ibuprofen	Vedolizumab		Pregabalin
		Indomethacin	Vildagliptin		Rasburicase
					Rifampin
					Ritonavir
					Roxithromycin
					Sunitinib
					Tocilizumab
					Ursodeoxycholic acid
					Venlafaxine
					Zidovudine

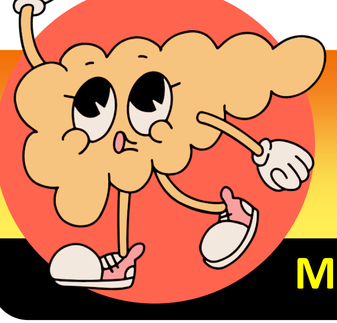
PLoS One. 2020 Apr 17;15(4):e0231883.



Outline

Management of acute pancreatitis: Tips for non-gastroenterologists

- Incidence and burden of disease
- Definition and severity assessment
- Etiology of acute pancreatitis
- **Management**



Management

Management of acute pancreatitis: Tips for non-gastroenterologists

Diagnosis of Acute Pancreatitis

The diagnosis of AP most often is established by identification of 2 of the 3 following criteria

(i) Abdominal pain consistent with the disease
(ii) Serum amylase and/or lipase > 3x UNL
(iii) Characteristic findings from abdominal imaging

Severity Assessment/Scoring

BOX 58.1 2012 Atlanta Classification Revision of Acute Pancreatitis[12]

MILD ACUTE PANCREATITIS

No organ failure
No local or systemic complications

MODERATELY SEVERE ACUTE PANCREATITIS

Transient organ failure (<48 hr) and/or
Local or systemic complications* without persistent organ failure

SEVERE ACUTE PANCREATITIS

Persistent organ failure (>48 hr)——single organ or multiorgan

*Local complications are peripancreatic fluid collections, pancreatic necrosis and peripancreatic necrosis (sterile or infected), pseudocyst, and walled-off necrosis (sterile or infected).

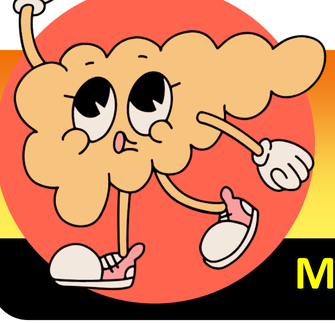
The Bedside Index for Severity in Acute Pancreatitis (BISAP) s

Blood urea nitrogen >25 (mg/dL)
Impaired mental status disorientation, lethargy somnolence, coma or stupor
SIRS (Systemic Inflammatory Response Syndrome)
Age > 60 years
Pleural effusion (on chest radiography or computed tomography)

- Each point on the BISAP score worth 1 point
Observed mortality risk with an increasing number of points: [30]

- 0 point: mortality rate of 0.1%
- 1 point: mortality rate of 0.4%
- 2 points: mortality rate of 1.6%
- 3 points: mortality rate of 3.6%
- 4 points: mortality rate of 7.4%
- 5 points: mortality rate of 9.5%

Am J Gastroenterol. 2024 Mar 1;119(3):419-437.
Eur J Intern Med. 2025 Mar;133:1-13



Management

Management of acute pancreatitis: Tips for non-gastroenterologists

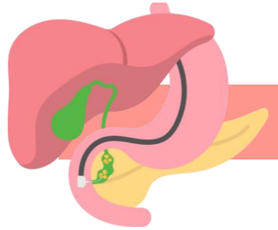
Diagnosis of Acute Pancreatitis

Severity Assessment/Scoring

Revised Atlanta 2012 classification, BISAP, APACHE II

Etiology search

- Gallstone, Biliary sludge, Microlithiasis (LFT, USG)
- Alcohol (> 50 gm/5 yr)
- hyperTG, hypercalcemia
- Medication
- Other
- Consider CT (age > 50), EUS (before diagnosis of IAP)



Management

- IV fluid resuscitation
- Respiratory and cardiovascular care
- ERCP and biliary monitoring
- IV antibiotic
- Nutrition
- Interventional treatment (Cholecystectomy)

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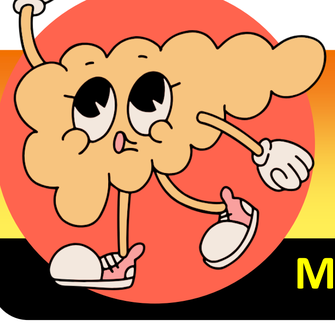
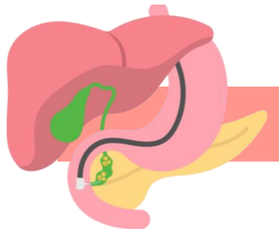


Management

Management of acute pancreatitis: Tips for non-gastroenterologists



Management

- IV fluid resuscitation: Rate -> Moderately aggressive fluid resuscitation

Acute pancreatitis

Mild acute pancreatitis

- LRS 10 mg/kg in 2 hr (in case of hypovolemia)
- LRS 1.5 mL/kg/hr

N Engl J Med. 2022 Sep 15;387(11):989-1000.

Severe acute pancreatitis

- Still limited data
- LRS 10-20 mL/kg in 2-4 hours
- LRS 3-5 mL/kg/hr

Ann Intensive Care. 2022 Oct 17;12(1):98.

Monitoring

Goal directed therapy

- PR < 120/min, MAP > 65 mmHg, urine > 0.5 mL/kg/hr, Hct 35-44%
- Frequently assess within 6 hours and BUN with in 24-48 hours

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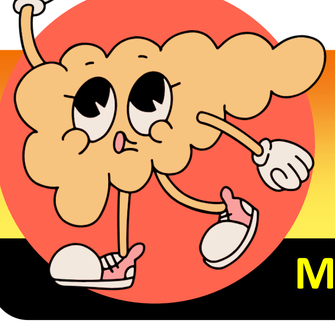
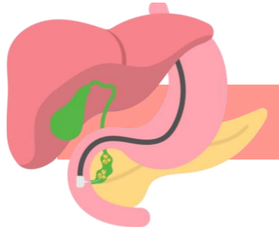


Management

Management of acute pancreatitis: Tips for non-gastroenterologists



Management

- IV fluid resuscitation
- **Respiratory and cardiovascular care**
- ERCP and biliary monitoring
- IV antibiotic
- Nutrition
- Interventional treatment (Cholecystectomy)

Respiratory care

- Supplemental oxygen: to maintain O2 sat > 90%.
- ARDS: 2nd - 7th day of illness
  - Treatment: ETT with positive end-expiratory pressure ventilation, with low tidal volumes strategy
- No specific treatment will prevent or resolve ARDS

Cardiovascular Care

- Complication: CHF, MI, arrhythmia, and cardiogenic shock
- If hypotension persists even with appropriate fluid resuscitation, IV vasopressors may be required.

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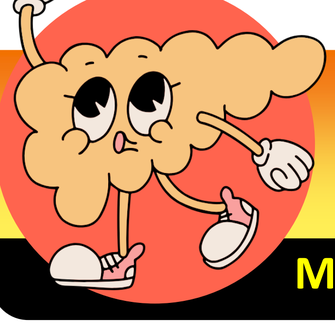
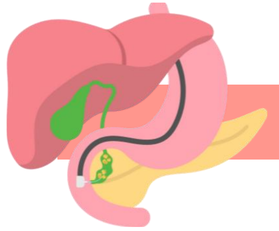


Management

Management of acute pancreatitis: Tips for non-gastroenterologists



Management

- IV fluid resuscitation
- Respiratory and cardiovascular care
- **ERCP and biliary monitoring**
- **IV antibiotic**
- Nutrition
- Interventional treatment (Cholecystectomy)

ERCP and biliary monitoring

- **Needed biliary monitoring**
- **Early ERCP (within 24 hr) in patient with acute cholangitis**
- **No role of diagnostic ERCP**

IV ATB

- **No role of antibiotic prophylaxis, should not be used in sterile necrosis**
- **Role of antibiotic: infected necrosis, complicated with acute cholangitis**

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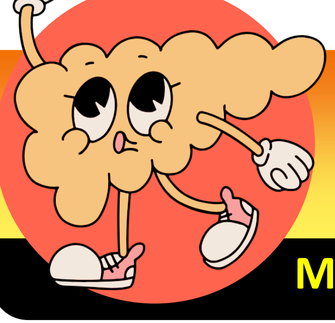
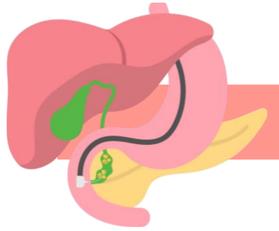


Management

Management of acute pancreatitis: Tips for non-gastroenterologists



Management

- IV fluid resuscitation
- Respiratory and cardiovascular care
- **ERCP and biliary monitoring**
- **IV antibiotic**
- Nutrition
- Interventional treatment (Cholecystectomy)

- **Infected pancreatic necrosis (IPN) can be suspected in**
  - **Persistent organ failure and/or lack of clinical improvement (i.e., fever, leukocytosis or persistent increase of inflammatory markers), despite optimal medical therapy.**
  - **Presence of radiological signs of infection**

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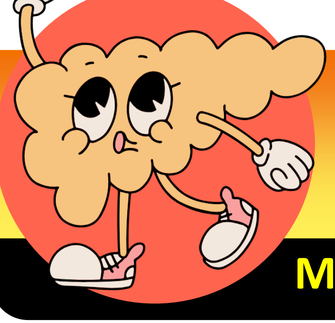
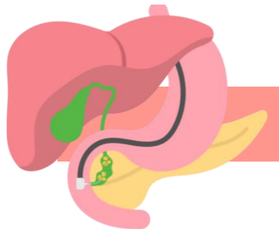


Management

Management of acute pancreatitis: Tips for non-gastroenterologists

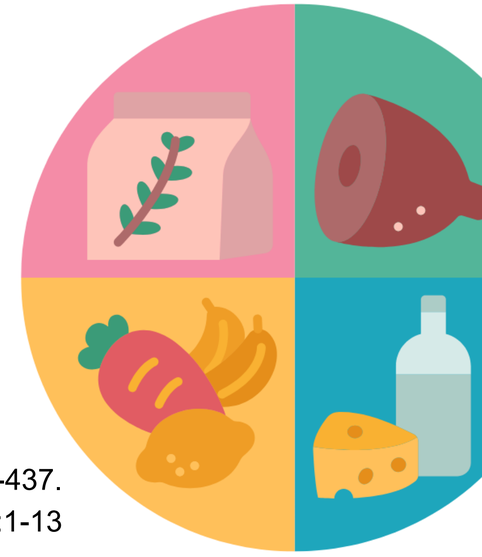


Management

- IV fluid resuscitation
- Respiratory and cardiovascular care
- ERCP and biliary monitoring
- IV antibiotic
- **Nutrition**
- Interventional treatment (Cholecystectomy)

Nutritional management

- **Enteral nutrition: benefit in prevent infectious complication**
- **Early oral feeding (within 24 – 48 hr) as tolerated by patient**
- **Low fat solid diet**
- **NG > NJ feeding (comparable safety and efficacy)**



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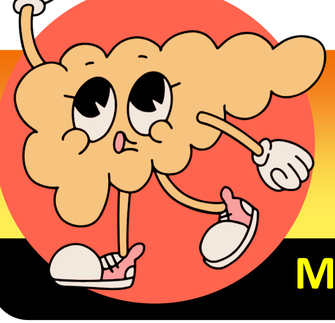
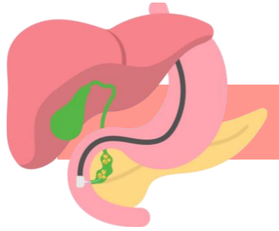


Management

Management of acute pancreatitis: Tips for non-gastroenterologists



Management

- IV fluid resuscitation
- Respiratory and cardiovascular care
- ERCP and biliary monitoring
- IV antibiotic
- Nutrition
- **Interventional treatment (Cholecystectomy)**

Interventional treatment (Cholecystectomy)

- **Mild acute biliary pancreatitis should undergo early cholecystectomy before discharge**

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Summary of Management

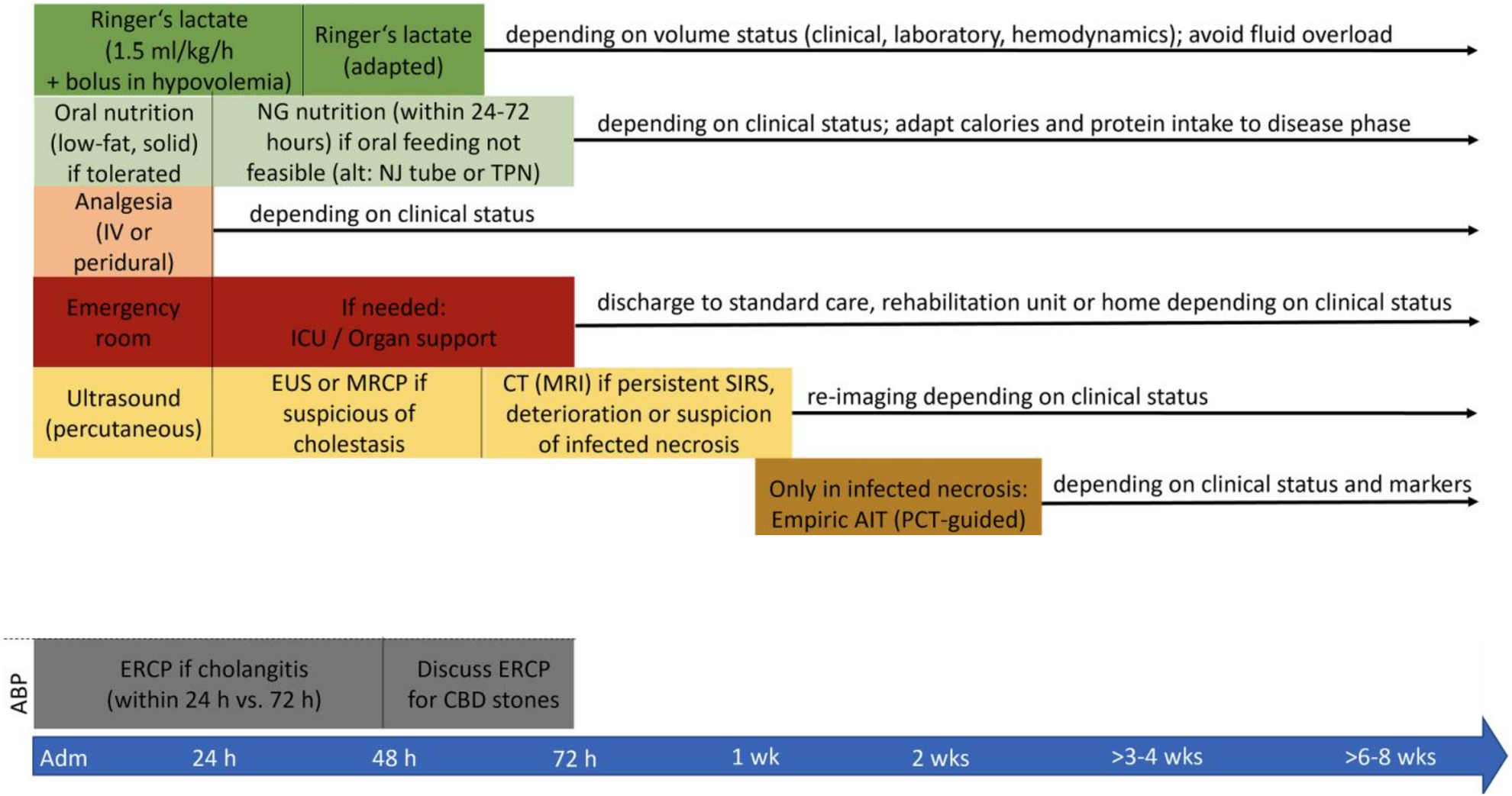
Management of acute pancreatitis: Tips for non-gastroenterologists

Ringer's lactate (1.5 ml/kg/h + bolus in hypovolemia)	Ringer's lactate (adapted)	depending on volume status (clinical, laboratory, hemodynamics); avoid fluid overload →

Adapted from Eur J Intern Med. 2025 Mar;133:1-13

Summary of Management

Management of acute pancreatitis: Tips for non-gastroenterologists



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Thank you for your attention

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