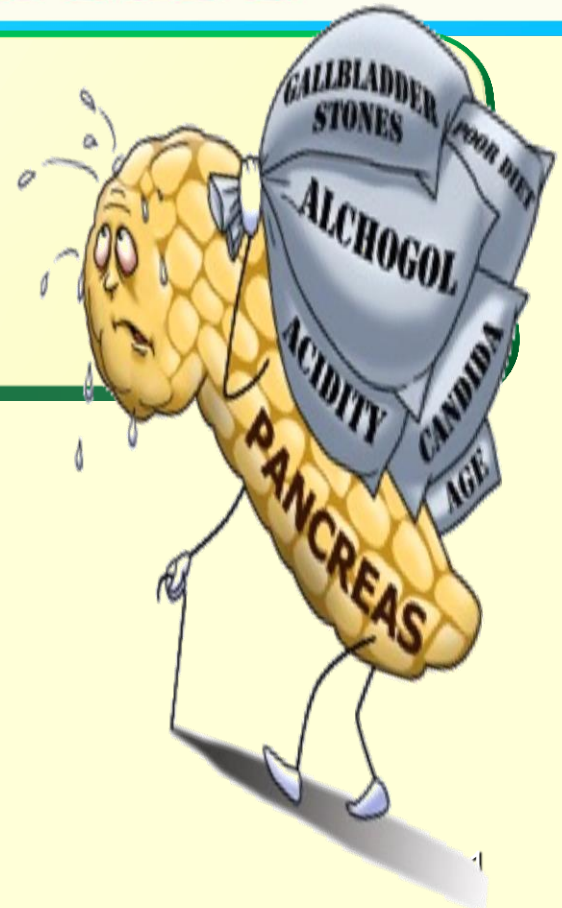


# Nursing Management of Patients with Pancreatic Disease

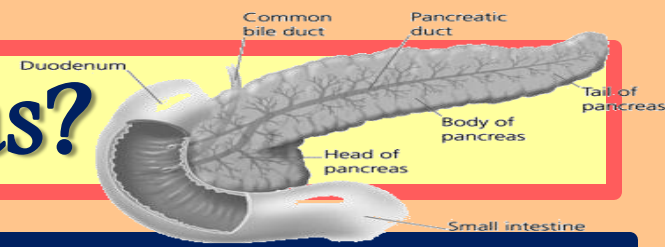
- Acute Pancreatitis
- Chronic Pancreatitis
- Pancreatic Cancer
- Parenteral Nutritional (PN) Support

Prepared By:

د. قاسم علي العمري



# What is the Pancreas?



The pancreas is a 6" organ located in the upper abdomen, and connected to the small intestine. It is posterior in the body, against the spine, and it is this deep location that at times makes diagnosis of the disease difficult. The pancreas is essential:

- Pancreatic enzymes that help digest protein, fat and carbohydrates before they can be absorbed through the intestine
- Pancreatic endocrine cells produce insulin which regulate the use and storage of the body's main energy source, glucose or sugar.

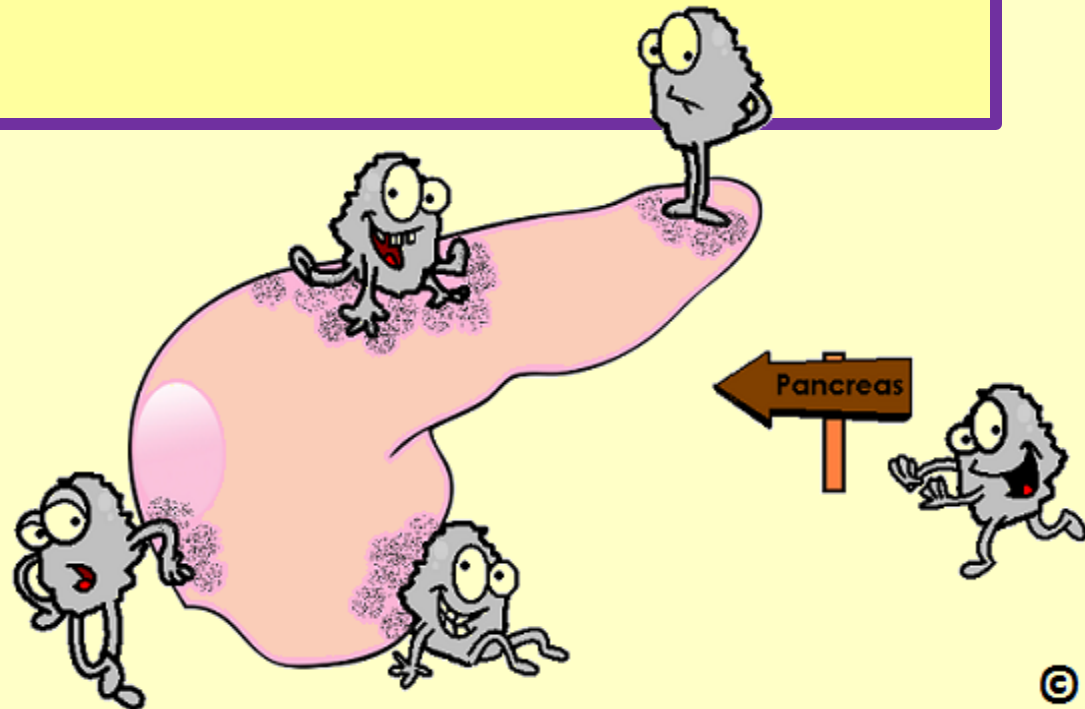


# Acute Pancreatitis



# Acute Pancreatitis

- ❑ An acute inflammatory process of the pancreas
- ❑ Degree of inflammation varies from mild edema to severe necrosis





- Most common in middle-aged men and women
- Severity of the disease varies according to the extent of pancreatic destruction
- Can be life-threatening
- African American rate three times higher than for whites

# Acute Pancreatitis

## Etiology and Pathophysiology

- Primary etiologic factors are
  - Biliary tract disease
    - **Most common: Gallbladder disease**
  - Alcoholism



# Acute Pancreatitis

## Etiology and Pathphysiology (Cont'd)

- **Less common causes**
  - Trauma (postsurgical, abdominal)
  - Viral infections (mumps, coxsackievirus HIV)
  - Penetrating duodenal ulcer
  - Cysts
  - Idiopathic

# Acute Pancreatitis

## Etiology and Pathophysiology

- **Less common causes (cont'd)**
  - Abscesses
  - Cystic fibrosis
  - Kaposi's sarcoma
  - Metabolic disorders
  - Vascular diseases
  - Postop GI surgery



# Acute Pancreatitis

## Etiology and Pathophysiology

- **Less common causes (cont'd)**
  - **Drugs**
    - Corticosteroids
    - Thiazide diuretics
    - Oral contraceptives
    - Sulfonamides
    - NSAIDs

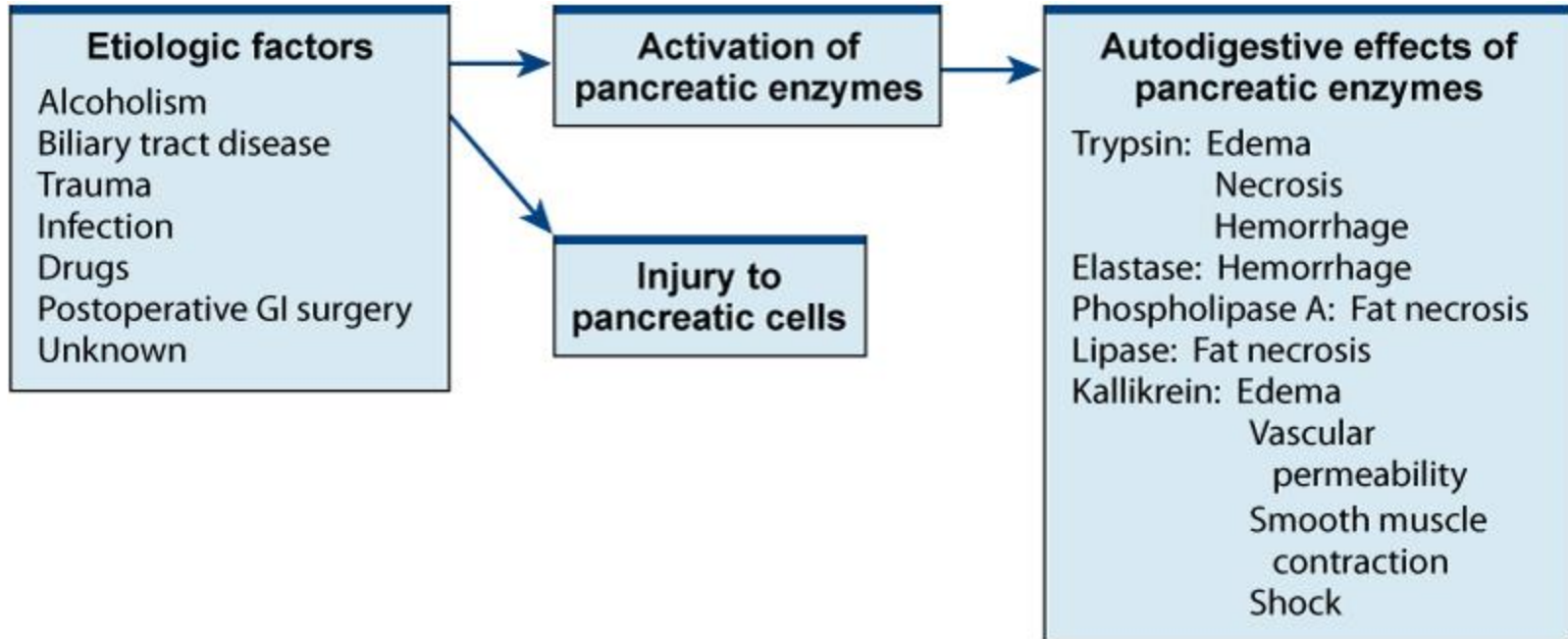


# Acute Pancreatitis

## Etiology and Pathophysiology

- Caused by autodigestion of pancreas
- Etiologic factors
  - Injury to pancreatic cells
  - Activate pancreatic enzymes

# Acute Pancreatitis



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**Fig. 44-14**

# Acute Pancreatitis

## Etiology and Pathophysiology

### ■ **Trypsinogen**

- Activated to trypsin by enterokinase
- Inhibitors usually inactivate trypsin
- Enzyme can digest the pancreas and can activate other proteolytic enzymes



# Pancreatitis

## Etiology and Pathophysiology

### ■ Elastase

#### ■ Activated by trypsin

❖ Plays a major role in autodigestion

❖ Causes hemorrhage by producing dissolution of the elastic fibers of blood vessels

# Acute Pancreatitis

## Etiology and Pathophysiology

- **Phospholipase A**
  - Plays a major role in autodigestion
  - Activated by trypsin and bile acids
  - Causes fat necrosis

# Acute Pancreatitis

## Etiology and Pathophysiology (Cont'd)

<b>Trypsin</b>	<b>Edema, necrosis, hemorrhage</b>
<b>Elastase</b>	<b>Hemorrhage</b>
<b>Phospholipase A</b>	<b>Fat necrosis</b>
<b>Kallikrein</b>	<b>Edema, vascular permeability, smooth muscle contraction, shock</b>
<b>Lipase</b>	<b>Fat necrosis</b>

# Acute Pancreatitis

## Etiology and Pathophysiology (Cont'd)

### ■ Alcohol

- May stimulate production of digestive enzymes
- Increases sensitivity to hormone cholecystokinin
  - **Stimulates production of pancreatic enzymes**

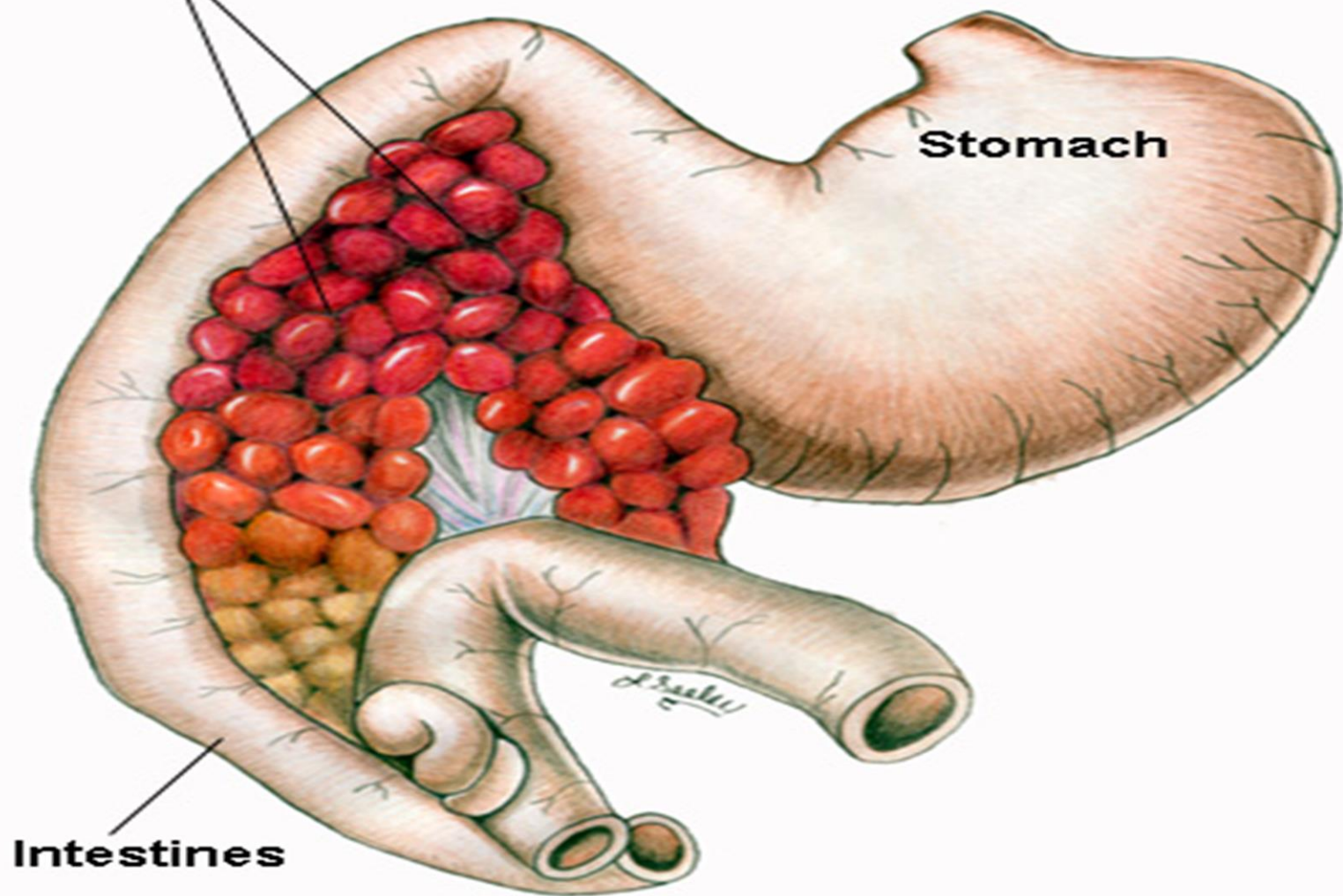


# Acute Pancreatitis

## Etiology and Pathophysiology (Cont'd)

- Edematous pancreatitis
  - ❖ Mild and self-limiting
- Necrotizing pancreatitis
  - ❖ Degree of necrosis correlates with severity of manifestations

# Pancreatitis

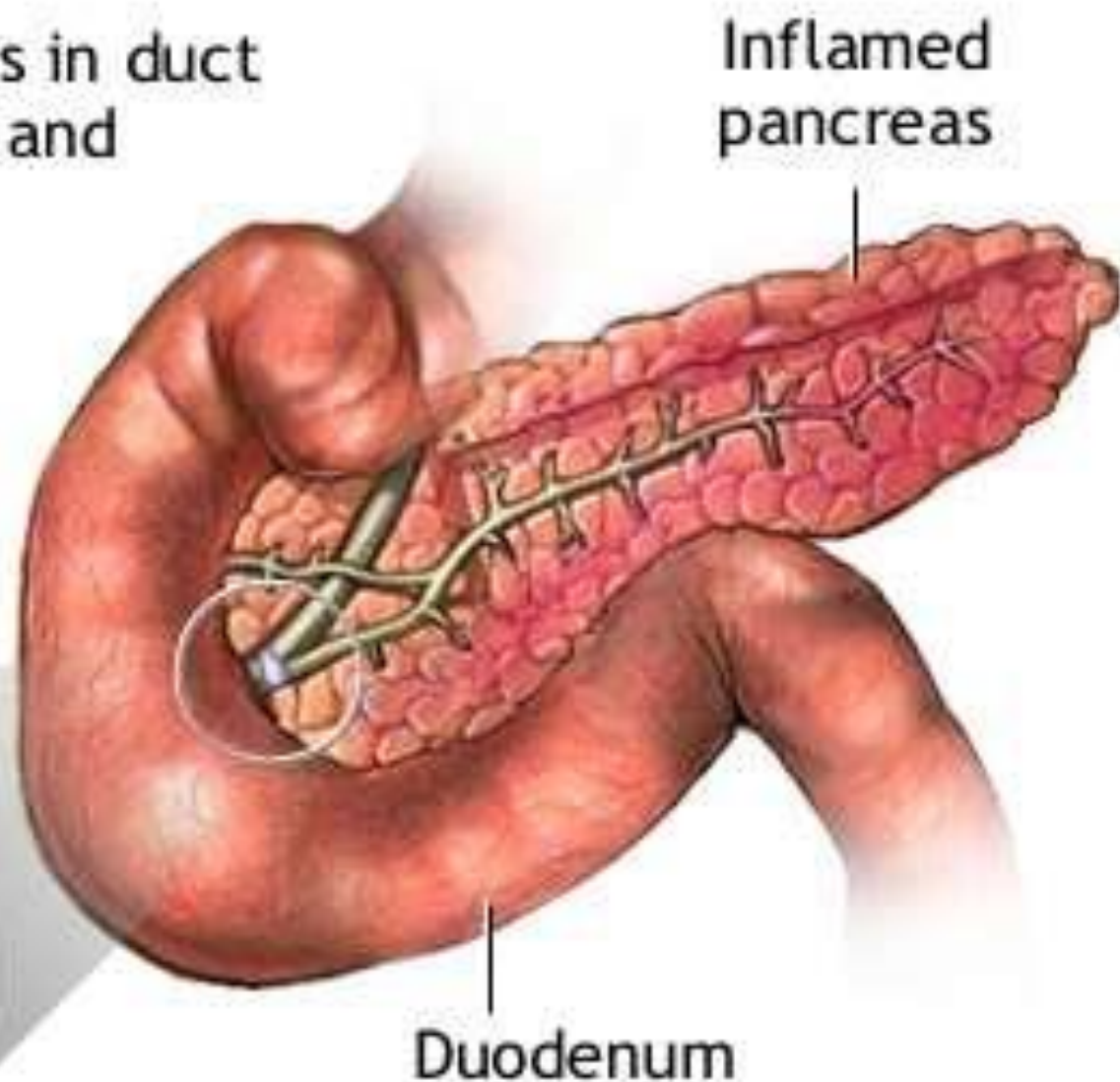
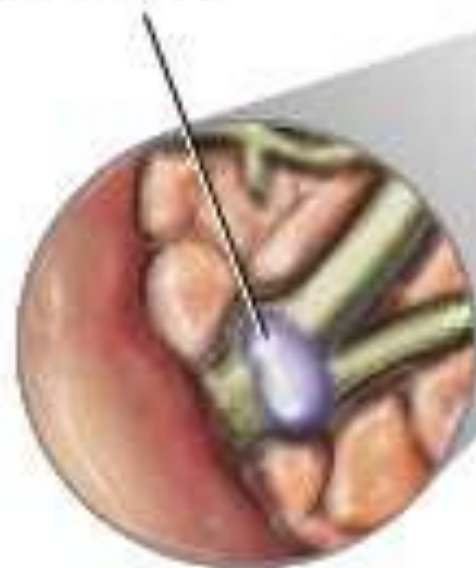


Gallstone lodges in duct  
blocking lumen and  
aggravating  
pancreas

Gallstone  
in duct

Inflamed  
pancreas

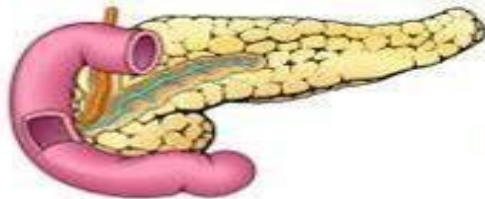
Duodenum



adam.com

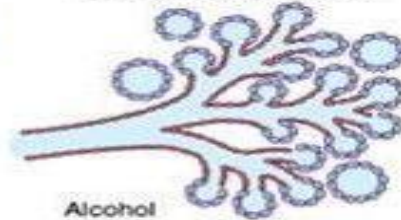
**CAUSES:**

**DUCT OBSTRUCTION**



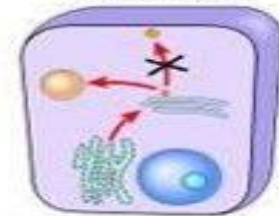
- Cholelithiasis
- Ampullary obstruction
- Chronic alcoholism
- Ductal concretions

**ACINAR CELL INJURY**



- Alcohol
- Drugs
- Trauma
- Ischemia
- Viruses

**DEFECTIVE INTRACELLULAR TRANSPORT**



- Metabolic injury (experimental)
- Alcohol
- Duct obstruction

**MECHANISMS:**

- Interstitial edema
- Impaired blood flow
- Ischemia

- Release of intracellular proenzymes and lysosomal hydrolases
- Activation of enzymes (intra- or extracellular)

- Delivery of proenzymes to lysosomal compartment
- Intracellular activation of enzymes

Acinar cell injury

**ACTIVATED ENZYMES**

**LESIONS:**

- Interstitial inflammation and edema + Proteolysis (proteases) + Fat necrosis (lipase, phospholipase) + Hemorrhage (elastase)

**ACUTE PANCREATITIS**



# Acute Pancreatitis

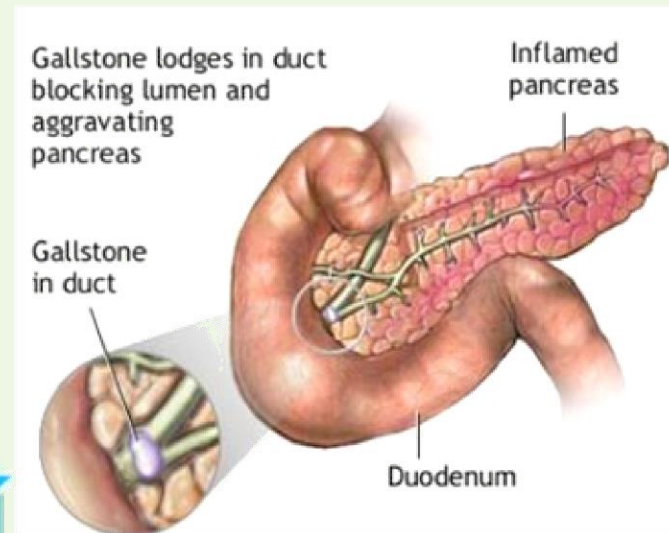
## *Etiology and Pathophysiology*

Pancreatic Ducts become obstructed

Hypersecretion of the exocrine enzymes of pancreas

These enzymes enter the bile duct, where they are activated and with bile back up into the pancreatic duct

**Pancreatitis**



# Pathogenesis of acute pancreatitis

## DUCT OBSTRUCTION

Gallstone  
Chronic alcoholism



Interstitial oedema



Impaired blood flow



Ischaemia

## ACINAR CELL INJURY

Alcohol, drugs  
trauma, ischaemia,  
viruses



Release of intracellular  
proenzymes and  
lysosomal hydrolases



Activation of enzymes



Acinar cell injury

## DEFECTIVE INTRACELLULAR TRANSPORT

Metabolic injury  
(experimental)  
Alcohol, duct obstruction



Delivery of proenzymes to  
lysosomal compartment



Intracellular activation of  
enzymes



ACTIVATED ENZYMES



Interstitial inflammation  
oedema



Proteolysis  
(proteases)



Fat necrosis  
(lipase, phospholipase)



Haemorrhage  
(elastase)

# Clinical Manifestations

- **Abdominal pain is predominant symptom**
  - Pain located in the left upper quadrant
  - Pain may be in the midepigastrium
  - Commonly radiates to the back
  - Sudden onset
  - Severe, deep, piercing, steady
  - Aggravated by eating
  - Not relieved by vomiting



# Assessment – Clinical Manifestations

## Physiological Variable – abdominal pain

<b>P</b>	None stated – comes on when recumbent
<b>Q</b>	Deep, piercing (knife-like), continuous, twisting LUQ or mid-epigastrium radiating to back Patient may flex spine to get relief Aggravated by eating & alcohol
<b>R</b>	Unrelieved by vomiting Aggravated by supine position or walking Relieved by sitting up & leaning forward
<b>S</b>	Severe *10*/10
<b>T</b>	Sudden onset



# Clinical Manifestations

- Flushing
- Cyanosis
- Dyspnea
- Edema
- Nausea/vomiting
- Bowel sounds decreased or absent

**Decreased serum calcium**

# Clinical Manifestations

- Low-grade fever
- Leukocytosis
- Hypotension
- Tachycardia
- Jaundice
- Abdominal tenderness
- Abdominal distention
- Abnormal lung sounds Crackles
- Discoloration of abdominal wall



# Assessment Physiological Variable

## Diagnostic tests

- Serum amylase (25–125 U/L)  
↑ >200 U/L for 24–72 hours  
starts to rise 2–6 hr after onset of pain  
Peaks @ 24 hours  
Return to normal @ 72 hr
- Serum lipase (3–19 U/dL)  
used with amylase; rises later than amylase (48 hours)  
return to normal 5–7 days

- ↑ WBC's
- ↑ glucose
- ↑ lipids
- ↓ calcium
- ↓ magnesium



# Ranson-Imrie Scale

## On admission or dx

- Age >55 years
- WBC >16K/mm<sup>3</sup>
- BG >200 mg/dl
- LDH >400 IU/L
- AST >250 IU/L

## During first 48 hours

- ↓ in HCT by 10%
- IV Fluid needed > 6000 ml
- Ca < 8 mg/dl
- PO<sub>2</sub> < 60 mm Hg
- BUN > 5 mg/dl after IV's
- Serum albumin < 3.2 gm/dl

# Diagnostic Tests & Procedures

- Abdominal and chest films
- CT scan
- Ultrasound
- Aspiration biopsy
- Peritoneal lavage

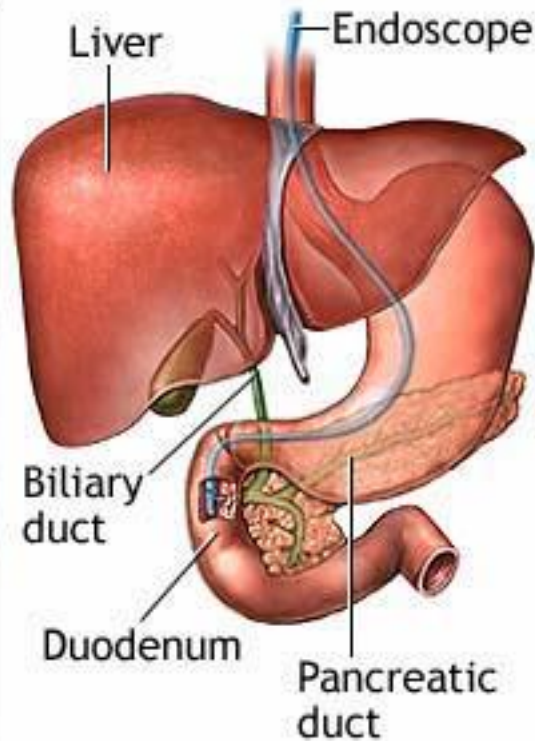
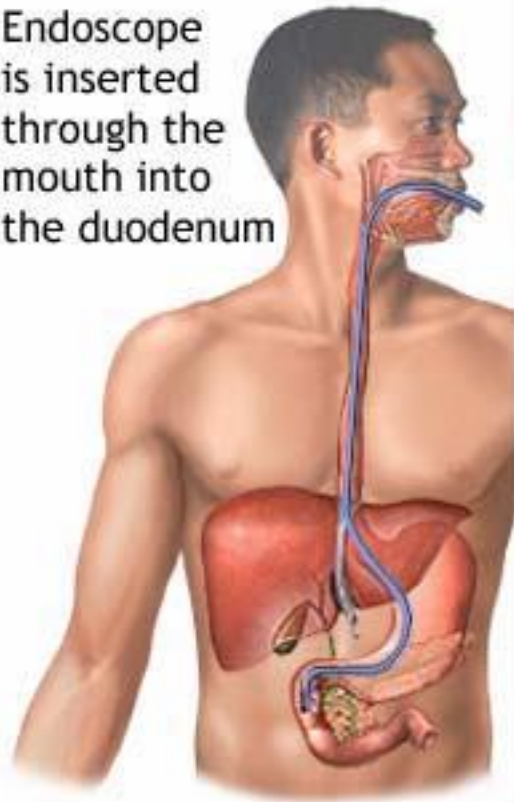
- Endoscopic Retrograde Cholangio-pancreatography (ERCP)

# Diagnostic Tests & Procedures

- ❑ **Abdominal films** will determine free air in the abdomen
- ❑ **Chest films** will indicate pleural effusions and areas of atelectasis
- ❑ **CT scan** will identify pancreatic inflammation and edema
- ❑ **Ultrasound** will r/o other causes if Gall stones or gastric problems are suspected
- ❑ **Aspiration biopsy** is extremely rare, but may be done if pancreatic cancer is suspected
- ❑ **Peritoneal lavage** if hemorrhage and any question of something else bleeding.
- ❑ **ERCP's** are done frequently for both diagnostic and treatment reasons, especially with gall stones as the culprit can create additional problems with manipulation and trauma

# Endoscopic Retrograde Cholangiopancreatography (ERCP)

Endoscope is inserted through the mouth into the duodenum



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# Complications

- Two significant local complications
  - Pseudocyst
  - Abscess



# Acute Pancreatitis

## Complications

### ■ Pseudocyst

- Cavity surrounding outside of pancreas filled with necrotic products and liquid secretions
- Abdominal pain
- Palpable epigastric mass
- Nausea, vomiting, and anorexia
- Elevated serum amylase
- May resolve spontaneously within a few weeks or may perforate, causing peritonitis
- Treatment: Internal drainage procedure

# Acute Pancreatitis

## Complications

### ■ Pancreatic abscess

- A large fluid-containing cavity within pancreas
- Results from extensive necrosis in the pancreas
- Upper abdominal pain
- Abdominal mass
- High fever
- Leukocytosis
- Requires surgical drainage



# Acute Pancreatitis

## Complications

- **Main systemic complications**
  - **Pulmonary**
    - Pleural effusion
    - Atelectasis
    - Pneumonia
  - **Cardiovascular**
    - Hypotension
  - **Tetany (caused by hypocalcemia)**



# Acute Pancreatitis

## Collaborative Care

- **Objectives include**
  - Relief of pain
  - Prevention or alleviation of shock
  - ↓ of pancreatic secretions
  - Fluid/electrolyte balance
  - Removal of the precipitating cause

# Acute Pancreatitis

## Collaborative Care (cont'd)

- **Conservative therapy**
  - Supportive care
    - Aggressive hydration
    - Pain management
      - **IV morphine**
      - **Combined with antispasmodic agent**
  - Management of metabolic complications
  - Minimizing stimulation

# Acute Pancreatitis

## Collaborative Care (cont'd)

- **Conservative therapy (cont'd)**
  - **Shock**
    - **Plasma or plasma volume expanders (dextran or albumin)**
  - **Fluid/electrolyte imbalance**
    - **Lactated Ringer's solution**
  - **Ongoing hypotension**
    - **Vasoactive drugs: Dopamine (Intropin)**
      - ↑ Systemic vascular resistance

# Acute Pancreatitis

## Collaborative Care

- **Conservative therapy (cont'd)**
  - Suppression of pancreatic enzymes
    - **NPO**
    - **NG suction**
  - Prevent infections
  - Peritoneal lavage or dialysis
    - **Remove kinin and phospholipase A exudate**

# Acute Pancreatitis

## Collaborative Care



- **Surgical therapy indicated** if
  - Presence of gallstones
  - Uncertain diagnosis
  - Unresponsive to conservative therapy
  - Abscess, pseudocyst, or severe peritonitis

# **Acute Pancreatitis**

## **Collaborative Care**

- **Surgical therapy (cont'd)**
  - **ERCP**
  - **Endoscopic sphincterotomy**
  - **Laparoscopic cholecystectomy**

# **Acute Pancreatitis**

## **Collaborative Care**

- **Drug therapy**
  - IV morphine
  - Nitroglycerin or papaverine
  - Antispasmodics
  - Carbonic anhydrase inhibitor
  - Antacids
  - Histamine (H<sub>2</sub>) receptor

# **Acute Pancreatitis**

## **Collaborative Care**

- **Nutritional therapy**
  - NPO status initially to reduce pancreatic secretion
  - IV lipids
  - Monitor triglycerides
  - Small, frequent feedings
  - High-carbohydrate, low-fat, high-protein diet
  - Bland diet



# **Acute Pancreatitis**

## **Collaborative Care**

- **Nutritional therapy (cont'd)**
  - Supplemental fat-soluble vitamins
  - Supplemental commercial liquid preparations
  - Parenteral nutrition
  - No caffeine or alcohol



Pancreatitis

**Nurse Care Plan**

# Acute Pancreatitis

## Nursing Assessment

- **Health history**
  - Biliary tract disease
  - Alcohol use
  - Abdominal trauma
  - Duodenal ulcers
  - Infection
  - Metabolic disorders



# Acute Pancreatitis

## Nursing Assessment (Cont'd)

- Medication usage

**Thiazides, estrogens, corticosteroids, NSAIDs**

- Surgical procedures
- Nausea/vomiting
- Dyspnea
- Severe pain

# Acute Pancreatitis

## Nursing Assessment (Cont'd)

- **Physical examination findings**
  - **Fever**
  - **Jaundice**
  - **Discoloration of abdomen/flank**
  - **Tachycardia**
  - **Hypotension**
  - **Abdominal distention/tenderness**

# Acute Pancreatitis

## Nursing Assessment (Cont'd)

- **Abnormal laboratory findings**
  - ↑ Serum amylase/lipase
  - Leukocytosis
  - Hyperglycemia
  - Hyperlipidemia
  - Hypocalcemia
  - Abnormal ultrasound/ CT/ ERCP

# Acute Pancreatitis

## Nursing Diagnoses

- Acute pain
- Deficient fluid volume
- Imbalanced nutrition: Less than body requirements
- Ineffective therapeutic regimen management





# Acute Pancreatitis

## Planning

- **Overall goals**
  - Relief of pain
  - Normal fluid and electrolyte balance
  - Minimal to no complications
  - No recurrent attacks

# Acute Pancreatitis

## Nursing Implementation

### ■ Health Promotion

- Assessment of predisposing factors
- Early diagnosis/treatment of cholelithiasis
- Eliminate alcohol intake

# Acute Pancreatitis

## Nursing Implementation (Cont'd)

- **Acute Intervention**
  - Monitor vital signs
  - IV fluids
  - Observe for side effects of medications
  - Assess respiratory function
  - Pain assessment and management
  - Frequent position changes
    - Side-lying with HOB elevated 45 degrees
    - Knees up to abdomen

# Acute Pancreatitis

## Nursing Implementation

- **Acute Intervention (cont'd)**
  - Fluid/electrolyte balance
  - Blood glucose monitoring
  - Monitor for signs of hypocalcemia
    - Tetany (jerking, irritability, twitching)
    - Numbness around lips/fingers
    - Positive Chvostek or Trousseau sign
  - Monitor for hypomagnesemia

# Acute Pancreatitis

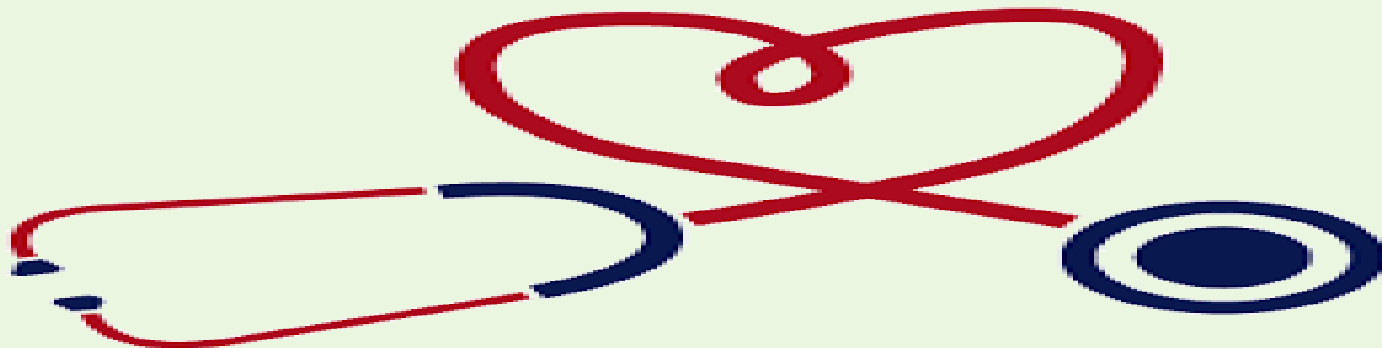
## Nursing Implementation

- **Acute Intervention (cont'd)**
  - NG tube care
  - Frequent oral/nasal care
  - Observe for signs of infection
  - Wound care
  - Observe for paralytic ileus, renal failure, mental changes

# Acute Pancreatitis

## Nursing Implementation

- **Ambulatory and Home Care**
  - Physical therapy
  - Counseling regarding abstinence from alcohol, caffeine, and smoking
  - Assessment of narcotic addiction



# Acute Pancreatitis

## Nursing Implementation

- **Ambulatory and Home Care (cont'd)**
  - Dietary teaching
    - **High-carbohydrate, low-fat diet**
  - Patient/family teaching
    - **Signs of infection, high blood glucose, steatorrhea**
    - **Medications/diet**



# Acute Pancreatitis

## Nursing Implementation

- **Expected outcomes**
  - Maintains adequate fluid volume
  - Maintains weight appropriate for height
  - Food and fluid intake adequate to meet nutritional needs

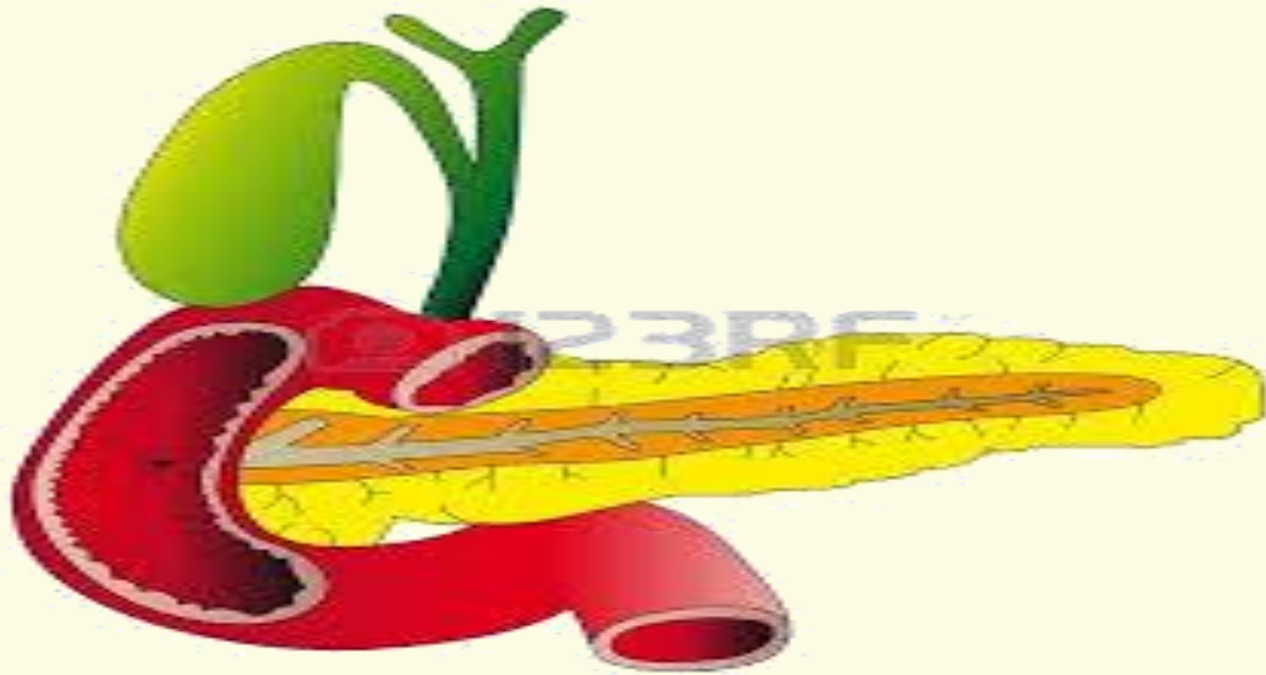
# Acute Pancreatitis

## Nursing Implementation

- **Expected outcomes (cont'd)**
  - Describes therapeutic regimen
  - Expresses commitment to lifestyle changes



# Chronic Pancreatitis



# Pancreatic Cancer

Pancreatic cancer is the fifth leading cause of cancer death around the world. Its incidence cuts across all racial and socio-economic barriers and is nearly always fatal.

**90% die within the 1st yr of diagnosis**



**HUMAN PANCREAS**  
Endocrine system



VIEW FROM BELOW (FEET FIRST)



# SYMPTOMS DEPEND ON THE LOCATION AND SIZE OF THE Pancreatic TUMOR

Usually very ill!!

- Severe abdominal pain
- Pressure in the abdomen
- If the tumor blocks **the common bile duct** so that bile cannot pass into the intestines,
  - the skin and whites of the eyes may become **jaundiced**,
  - urine may become **dark**
- pain often develops in the upper abdomen and back
- nausea
- loss of appetite
- loss and weakness may occur
- Cullen's sign (bruising around umbilicus)**





# Case Study





# Case Study

- 63-year-old female enters the emergency department with nausea, vomiting, epigastric pain, left upper quadrant pain
- She claims the pain is severe, sharp, and boring and radiates through to her mid-back
- Pain began 24 hours ago
- She is divorced, retired, and smokes a half-pack of cigarettes a day

# Case Study(Cont'd)

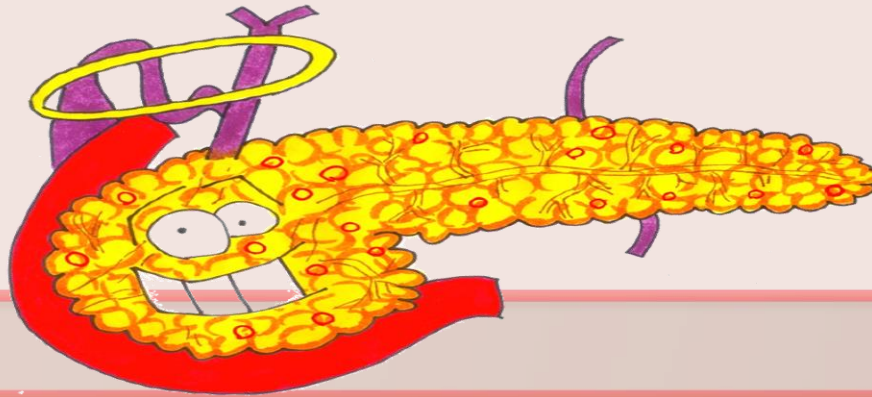
## Vital signs

- Blood pressure 100/70 mm Hg
- Heart rate 97 beats/min
- Respiratory rate 30 breaths/min
- Temperature 100.2°F
- She is diagnosed with acute pancreatitis and admitted to the medical-surgical unit

# Discussion Questions

1. What are the possible causes of pancreatitis?
2. What is her priority of care?
3. What labs are the most important to monitor in acute pancreatitis?
4. What patient teaching should you do with her





# Care of patients with actual or risk for malnutrition

# Common Parenteral Nutrition (PN) Preparations

- Water
  - Dextrose (20 – 50%)
  - Protein (amino acids) (3–15%) *1.5–2 g/kg/day* Avg. wt of Male: 80 kg = 120–160 g/day
  - Recommended total intake of 25–35 cal/kg/day
  - Electrolytes (Na, K, Ca, Cl, Ph, Mg)
  - Trace elements (chr, cop, mang, zinc)
  - Multivitamins (fat and water soluble)
  - Lipids – *10–30% of calories*
  - Other meds: heparin, insulin, H2 blockers, albumin
- individualized*

# Lipid or IV Fat Therapy

- **Purpose**
  - to supply additional calories
  - to treat signs of fatty acid deficiency
- **Supplied in 10% or 20% solutions**
- **Composed of soy, safflower oils, egg yolk**
- **Isotonic**
- **Often added to PN (tri-mix or three-in-one)**
- **May come with own tubing**
- **IV Piggy back below PN filter**

# Route of Administration

**PN requires central venous catheter access due to the hypertonicity of solution 900 mOsm/liter ( $\geq 20\%$  dextrose)**

**Peripheral parenteral nutrition (PPN) or Augmented parenteral nutrition (APN) through a peripheral or midline catheter because it is less concentrated than PN**



# Initiating TPN

## Components of PN Order Sheet

- **Solution & rate of administration**
- **Additives (trace elements, vitamins, insulin)**
- **Lab work (baseline and ongoing)**

## Nursing responsibilities

- **Obtain the solution mixed by pharmacy**
- **Check contents with order/changes**
- **Inspect bag & tubing for dates as bag & tubing changed Q 24 hours**
- **MVI or trace elements**

# Initiating PN – (con't)

## *Supplies*

- Correct solution, bag #
- Tubing &/or Filter
- Infusion pump
- Order sheet for rate
  - *start slow and gradually increase -"ramping"*

## **Shared responsibilities**

- Protocols for rate
- Check orders for changes
- Hang correct bag #
- Monitor lab work *& report*
- *FSBG protocols*
- Insulin coverage

# Nursing Responsibilities –(review)

## Nutrition

- **Daily Weight**
- **Calorie Count**
- **Monitoring Labs**
  - **FSBG & coverage**
  - **Reporting abnormal labs**

## Patient Care

- **Oral care**

## PN Administration

- **Accurate I&O**
- **Monitor infusion rate, start slowly**
- **Never catch up if administration runs behind**
- **Bag & tubing changes per protocol**

## IV site care

- **Dressing changes per protocol**
- **No blood draws, IVPB, IVP meds through same port as PN**
- **No CVP readings**

# Potential Complications of PN

## Infection

- **Fever & Chills**
- **Glucose intolerance**
- **+ blood/site cultures**  
(Gm + & - bacteria, fungi)

- **Abnormal Blood sugar**
- **FSBG q6h with insulin coverage**

## Fluid & Electrolyte Imbalance

- **Monitor & report**
- **Replace in separate line**

## Fatty intolerance

- **↑ LFT's, bilirubin**
- **Jaundice**
- **Upper abdominal pain**

# Additional procedure related complications

- **Air or Fat embolism**

- **Thrombosis of central vein, Hemorrhage**

- **Pneumothorax**

- **Catheter occlusion**

# Refeeding Syndrome (RFS)

Electrolyte imbalance

→ Monitor electrolytes

→ Correct prior to refeeding

BP, P, I & O

→ Careful volume and Na replacement

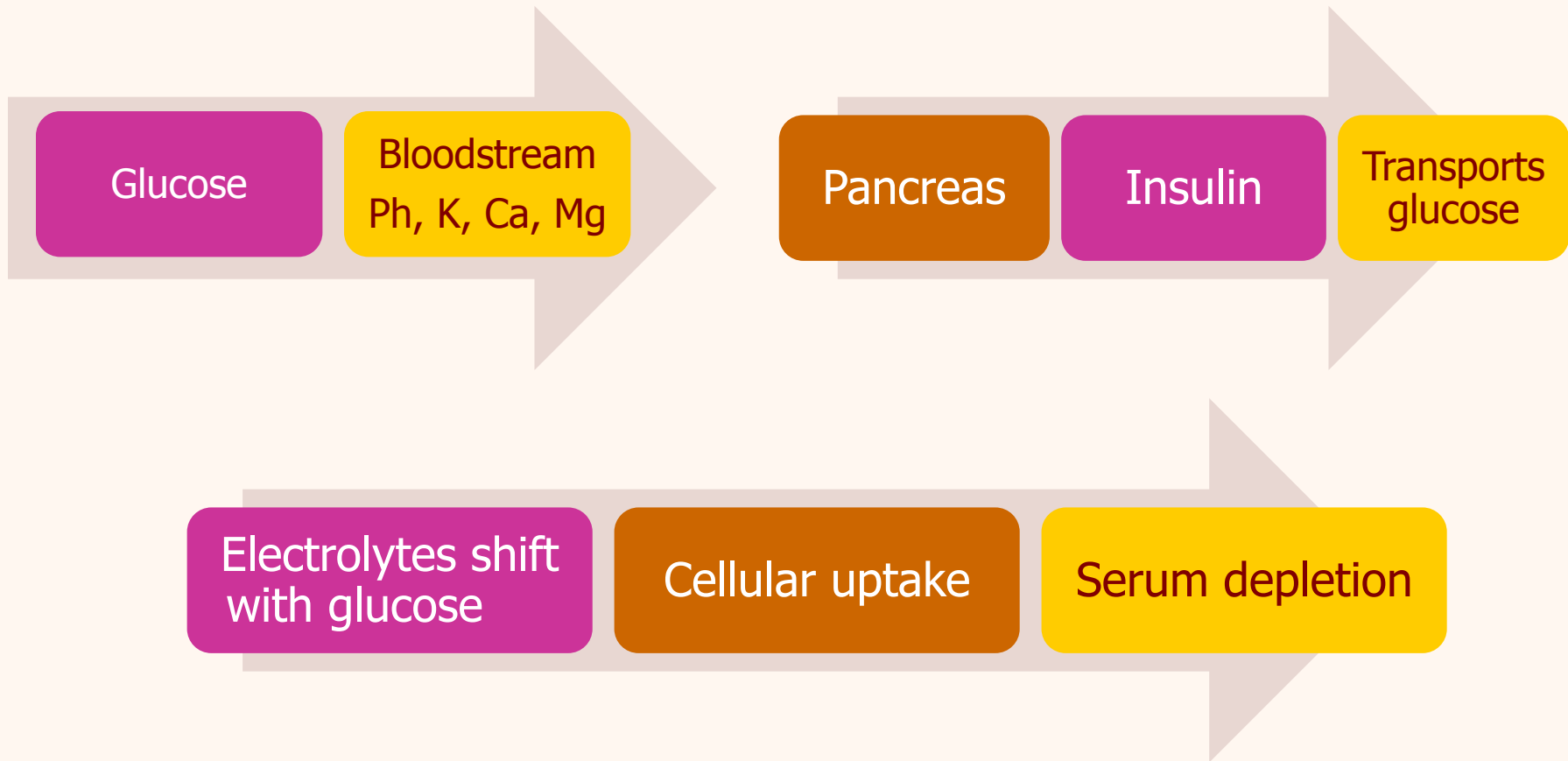
Monitor refeeding rate

→ Start slowly @ 15-20kcal/kg/day

Monitor ph, mg, K for 24-72°

→ Cardiac dysrhythmias, respiratory arrest, neurological disturbances

# Electrolyte Shifts in Refeeding Syndrome



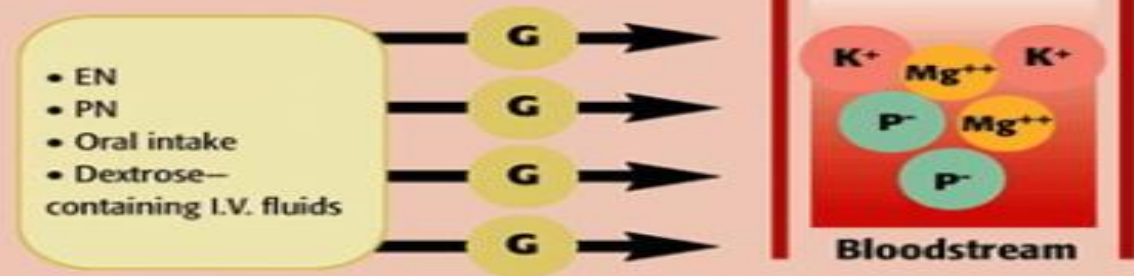


## How electrolyte levels change in RFS

Here's what happens once a malnourished patient begins aggressive nutritional support:

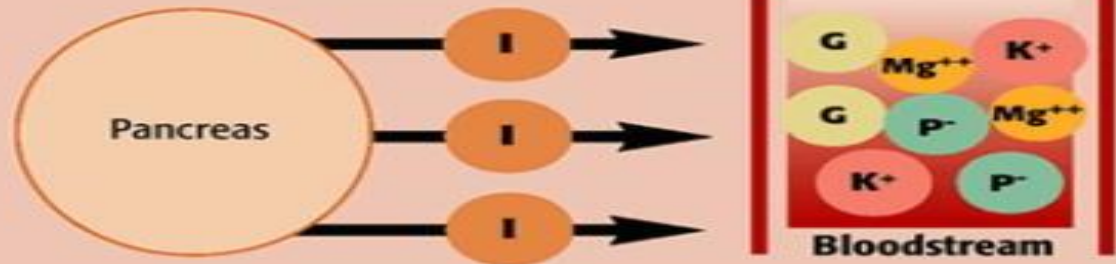
### Step 1

Glucose (G) enters bloodstream by enteral, parenteral, oral, or I.V. route.



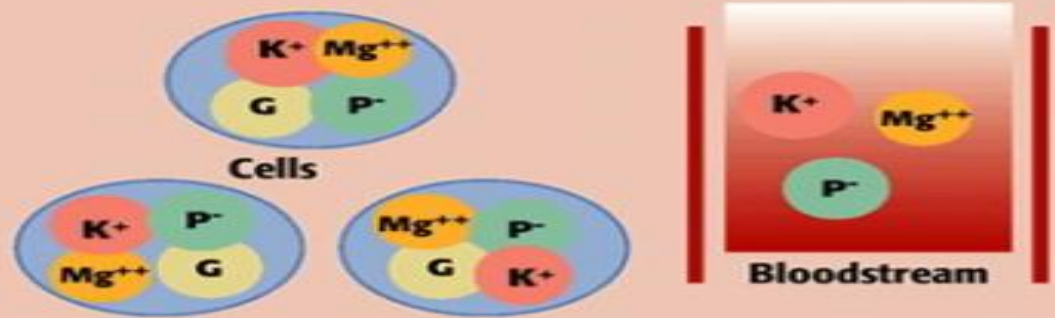
### Step 2

Pancreas secretes insulin (I) in response to increase in serum glucose.



### Step 3

Insulin promotes cellular uptake of glucose, potassium (K<sup>+</sup>), magnesium (Mg<sup>++</sup>), and phosphorus (P<sup>-</sup>). Low serum electrolyte levels for potassium, phosphorus, and magnesium result.



# Who Is at Risk for RFS?

- **Chronic Alcoholics**
- **Chronic Malnourished**
- **Prolonged Vomiting and Diarrhea**
- **Chemotherapy**
- **Major Surgery**

# Prevention of RFS

- ❑ Begin feeding at low dose, slowly increasing rate of PN, avoid too rapid an infusion initially
- ❑ Carefully monitor Phosphate Levels–
- ❑ low serum level is hallmark of RFS
- ❑ Patient Education: low carb high protein diet, signs & symptoms of RFS

