Management of Patients with Pancreatic Disease

- Pancreatitis
- Parenteral Nutritional (PN) Support

Key Questions

- What clinical manifestation occurs because the pancreas lies retroperitoneally in the abdominal cavity?
- What is the sphincter of Oddi? What common pain medication causes spasms of this sphincter?
- Which digestive enzymes are secreted by the pancreas?
- What is the hallmark lab abnormality in pancreatitis?

Clinical Situation

JT is a 48 year old, divorced business executive brought to the emergency department by his buddies with a chief complaint of abdominal & back pain and vomiting for 2 days.

As you approach him you observe that he is trying to sit up, and is almost in continuous movement on the bed. He is alert and able to answer questions, but refuses to let anyone touch his abdomen or his back. He rates his pain at 10/10. His skin is hot, dry and flushed with ↓ turgor and he complains of extreme thirst.

VS: BP 100/60, T-100°F, P-120, R- 28 shallow, O₂ sats-90%
Sample question
Based on the information in the preceding situation, place the following interventions in priority?

1. Administer O2 @ 2L/nasal cannula
2. Administer pain medications
3. Complete the physical assessment
4. Initiate IV of Normal Saline at 125 ml/hour

Neuman Systems Model:
- Physiological
  - Pain 10/10
  - Skin-hot, dry, flushed
  - Abnormal VS, ↓ O2 sats
  - Nausea, vomiting
- Developmental
- Psychosocial

The Pancreas
- Gallstone lodges in duct blocking lumen and aggravating pancreas
- Gallstone in duct
- Inflamed pancreas
- Tail - shell for spleen to rest on
- Body - forms shell for stomach to rest upon
- Head - joins Common Duct at Ampulla of Vater

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Acute Pancreatitis - Pathophysiology

Premature Activation of Trypsin → Autodigestion of pancreatic tissue

**ACTIVATION OF INFLAMMATORY RESPONSE**

- Inflammatory mediators
  - Vasodilation
  - Shock
- Extravascular movement of serum albumin
  - 3rd spacing
  - Pancreatic edema
  - Shock
- ARDS MODS ATN

Acute Severe Pancreatitis

Pathophysiology

- Injury or disruption of pancreatic ducts → leakage of active pancreatic enzymes → autodigestion

- Breakdown of cell membranes → edema → vascular damage, hemorrhage, necrosis → inflammatory mediators → Shock, MODS, ....

JT (situation continued)

You overhear JT’s buddies expressing concern for their friend and one says, “He was doing so well; he’d been dry for 5 years. This tax thing really upset him. I just wish he had called us instead of hitting the bottle.”
**Assessment - Clinical Manifestations**

**Physiological Variable - abdominal pain**

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

**What is the mechanism for the patient’s pain?**

**Why does it radiate to the back?**
Clinical Situation
As you are assessing him, JT vomited 700 ml of dark green-brown fluid with no relief of his pain.

What is the significance of this clinical manifestation?

Physiological
- Pain 10/10
- Skin-hot, dry, flushed
- Abnormal VS, ↓ O2 sats
- Vomited 700 ml w/ no relief of pain

Developmental
Psychosocial

Does his emesis of 700 ml change your priority at this point?

Why?
Why not?

What is your next action?
What assessment GAPS do you need to fill in with JT at this point?

- PAIN Assessment - PORST
- Alcohol history/last drink/vomitus color
- Gall bladder history/last meal
- Recent travel/exposure to gi/liver infection

Assessment - Physiological Variable

**Clinical Manifestations**

- **O₂**
  - Flushed or cyanotic skin
  - Dyspnea, crackles, ↓ breath sounds
  - ↓ BP, ↑ HR

- **Nutrition**
  - N & V, ↓ or absent bowel sounds due to paralytic ileus; pain & distention → rigidity, guarding
  - ↑ WBC, low grade fever (< 101° F.)
  - Jaundice: green-yellow-brown discoloration
  - Ecchymosis: Grey-Turner & Cullen signs

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

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

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Ranson-Imrie Scale

On admission or dx
- Age >55 years
- WBC >16K/mm³
- 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
- PO2 < 60 mm Hg
- BUN > 5 mg/dl after IV’s
- Serum albumin < 3.2 gm/dl

Clinical Situation - JT

Lab studies on admission for JT demonstrate:
- ↓ Hb - 10 gm, normal Hct.- 49%, ↓ Plt.-130, ↑ WBC-17K
- ↓ Na-130, ↓ K-3.2, ↓ Ca-7.5, ↑ blood glucose- 300

What other labs do you need to fill in the assessment GAP?

Calculate the Ranson-Imrie Scale

Admission Labs
- Hb - 10 gm
- Hct - 49%-normal
- Plt – 130
- WBC - 17K
- Na - 130
- K – 3.2
- Ca – 7.8
- Glucose – 300
- LDH/AST normal

24 hours post admission
- Hb - 9.0 gm
- Hct - 38%
- WBC - 17K
- Ca - 7.5
- Glucose – 350
- Albumin – 2.8 gm/dl
- PO2 – 50 mm Hg
Diagnostic Tests & Procedures

- Abdominal and chest films
- CT scan
- Ultrasound
- Aspiration biopsy
- Peritoneal lavage
- Endoscopic Retrograde Cholangio-pancreatography (ERCP)

Psychosocial & Developmental Variables

- Binge drinking for 2 weeks after stress
- Recovering, dry for 5 weeks
- Repairing relationship with sons
- Sons supporting sobriety

Acute Pancreatitis - Secondary Prevention - Complications

- Pulmonary
- Cardiovascular
  - Coagulation
  - Renal
  - Immunological
Management of Patients with Pancreatic and Biliary Disorders

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Acute Pancreatitis - Secondary Prevention
Cardiovascular Complications

3rd spacing → ↓ BP, ↑ HR, vasoconstriction (compensatory mechanisms) d/t SNS activation

Recall: compensatory mechanisms work for only a short while before they begin to fail

Acute Pancreatitis - Secondary Prevention - Complications

Coagulopathy

Auto-digestion by Trypsin upon organ tissues:
activates prothrombin → clotting
activates plasminogen → lysing

This mechanism → Intravascular & pulmonary blood clots → DIC & pulmonary emboli

Acute Pancreatitis - Secondary Prevention - Complications

Renal

Hypovolemia → ↓ GFR, ↓ renal perfusion →
development of clots in renal circulation →
Acute tubular necrosis & Acute renal failure
Management of Patients with Pancreatic and Biliary Disorders

**Acute Pancreatitis**

- **Secondary Prevention - Complications**

  - Immunological
  - GI motility → movement of bacteria outside GI tract due to pancreatic abscess &/or necrosis → **INFECTION**

  "Peritonitis"

- **Collaborative Management - Pain**

  - **Nursing Diagnosis**: Acute Pain r/t inflammation of pancreas and surrounding tissue, obstruction of biliary tree & interruption of blood supply to pancreatic tissue

  - "Rest" the pancreas & GI tract
    - NPO
    - NG tube to suction
    - parenteral vs. enteral nutrition
    - drug therapy

  - Manage Pain
    - morphine
    - H₂ antagonists
    - PPI’s

- **Nutritional management**

  - When can the client resume eating?

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Collaborative Management

Hemodynamic stability

Nursing Diagnosis: Risk for fluid imbalance r/t vomiting & ↓ intake, fever & diaphoresis, fluid shifts, N/G suction

Fluid volume replacement
- crystalloid, colloid or blood products
- Hemodynamic monitoring (CVP or PA)
- Monitor peripheral circulation, UOP

Vasoactive drugs - dopamine
- ↑ BP via vasconstriction in high doses
- ↑ renal perfusion in lower doses

Respiratory Care

Nursing Diagnosis: Ineffective Breathing Pattern r/t abdominal distention, ascites, pain or respiratory compromise

- Supplemental O₂ @ 4L/NC (keep O₂ Sat > 91%)
- Positioning for adequate ventilation
- Cough, deep breathe, IS with pain control
- Monitor ABG’s, respiratory effort & breath sounds

Maintain Metabolic Balance

Nursing Diagnosis: Risk for Fluid Imbalance r/t (same as previous dx)

Monitor labs for alterations, report significant alterations.

- ↓ K, ↓ Ca → dysrhythmias
- ↓ Ca → neurologic changes
- ↑ FBS → hyperosmolar diuresis, electrolyte shifts
- ↑ BUN, Creatinine indicates renal damage from ↓ perfusion
- Amylase, lipase for return to normal
Collaborative Management - Alcohol Withdrawal Syndrome

Monitor for withdrawal from alcohol
- Clinical manifestations of hyperactive sympathetic nervous system
- ↑ body temperature & VS
- Diaphoresis
- Anxiety/Agitation
- Tremors/Shakiness

JT situation (continued)

JT becomes confused and agitated, trying to get out of bed, stating that he needs to go home. He complains of being cold and shivering, but keeps kicking his sheet off and is unaware of exposing himself. (His friends say he is very modest.)

What are the possible causes of this behavior?

JT situation (continued)

JT's vital signs are now:

BP 90/50, P. 130 (thready), R. 30 (shallow) T. 102° F.
His O₂ sats are 90% on 4Lt O₂. ABG's pending.

The physician tells his friends that his diagnosis is acute necrotizing hemorrhagic pancreatitis and that his family should be notified and asks if he has a DPAHC. The friends did not know and after the doctor left, said to the nurse "What does all that mean?"
 JT’s friends notify his former wife who refuses to come to the hospital, but agrees to let her sons go with the supportive friends.

How will you support the friends and sons?

Spiritual, Developmental & Psychosocial Variables

Collaborative Management (con’t)

- Surgery
  - Abscesses
  - Hemorrhagic necrosis
- Indications
  - Debride necrosis
  - Uncertain dx
  - Relief of pain
  - Correction of severe biliary obstruction
  - Progressive clinical deterioration

Complications of surgery

Ileus, abdominal distention, vomiting
- NG tube drainage
- Care of drains
- What, when to report abnormalities when tubes are used for decompression

ARDS (acute respiratory distress syndrome)
- Tachypnea, dyspnea, acc. muscle use, cyanosis
- Fever, dry cough
- Fine crackles
- Confusion, agitation
- PO₂ < 50 mm Hg
- Early - respiratory alkalosis
- Late – respiratory acidosis
Chronic Pancreatitis
Progressive, inflammatory, destructive → scarring/fibrosis
- Cause - usually alcoholism
- CM's -
  - pain, vomiting, constipation, fever, jaundice
  - GI - steatorrhea >90% pancreatic function lost
  - ? BS (1/3 develop Type 1 Diabetes Mellitus)
- Flares can last from a few days to 2 weeks
- Only relief comes from the upright position with knees flexed to chest
- Wt. loss due ↓ intake & ↓ panc. enzymes → malabsorption

Post-Hospitalization and Chronic Care
Nursing Diagnosis: Ineffective Therapeutic Regime Mgt.
- Pain management
- Dietary modifications
  - No alcohol
  - No caffeine
  - Fats, CHO, Pro bland
- Medications
  - Pancreatic enzymes
  - Bile salts
  - Antacids
  - Insulin therapy
- Lifestyle changes
  - No smoking
  - Reduce stress

Pancreatic Cancer
http://www.cancer.org/docroot/CRI/CRI_2_3x.asp?dt=34
These slides on Pancreatic Cancer are for your information only and will not be tested on this exam.
Management of Patients with Pancreatic and Biliary Disorders

Pancreatic Exocrine Cancer

**Incidence** - 37,680 Americans diagnosed so far during 2008

**Mortality** - 34,290 Americans died so far in 2008

**Survival** -
- 24% of patients with CA pancreas survive at least one year after diagnosis (5% five years after diagnosis).
- 20% long term survival with localized disease.

Pancreatic CA

**Risk factors:**
- Smoking/Etoh
- Diets high in fat, beef, pork & processed meats
- Diabetes
- Chemical exposure
- Chronic pancreatitis

**CM’s:**
- Abdominal pain,
- Anorexia, nausea,
- Jaundice, diarrhea
- Metastasis by time of diagnosis

**Diagnosis** -
- Tumor markers- CA19-9, CEA
- CT with biopsy, ERCP with biopsy
- Staging by TNM (Tumor, nodes, mets)

Treatment of Pancreatic CA according to stage

- Surgical resection possible in only 5-15% and may be followed by chemo and radiation
  - Procedures seen in Lewis, page 1095
  - Even in highly specific and experienced cancer centers, mortality rate post op - 2.5%
  - In less experienced hands, mortality rate 15% with 35-50% chance of complications
- Chemo and radiation for inoperable, locally advanced disease (chemo improves survival slightly)
- Chemo and supportive care for patients with metastasis
  - 5FU
  - Gemcitabine (Gemzar) better results
  - Multiple clinical trials occurring at present (see Website)
Pain Management
Developmental, Psychosocial, Spiritual Variables
- Cancer invasion of nerve plexuses causes neuropathic pain
  - opioids
  - surgical neurotomy
  - chemical neurolysis
  - radiation therapy
- Poor prognosis - psychological care & family support

Nutritional Support
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
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 (≥ 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 – (cont)

**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

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

**Patient Care**
- Oral care

**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

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Additional procedure related complications

- Air or Fat embolism
- Thrombosis of central vein, Hemorrhage
- Pneumothorax
- Catheter occlusion

Refeeding Syndrome (RFS)

http://www.nursingcenter.com/prodev/ca_article.asp?tid=759442

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 24-72h → Cardiac dysrhythmias, respiratory arrest, neurological disturbances

Electrolyte Shifts in Refeeding Syndrome

Glucose → Bloodstream 
  Ph, K, Ca, Mg
Pancreas → Insulin
  Transports glucose
Electrolytes shift with glucose → Cellular uptake
  Serum depletion
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
References

- Phillips, R. Acute Pancreatitis – inflammation gone wild.
- "Nursing Made Incredibly Easy! Sept/Oct 2006"
- www.nursingcenter.com/pdf.asp
- Saunders
- Mdcalc.com, retrieved 4/18/12