Chronic Pancreatitis

Chronic inflammation of the pancreas leading to irreversible damage to the pancreas. Characterized by changes in pancreatic structure and by persistence of dysfunction even after the precipitating cause has been corrected. Chronic pancreatitis can be subdivided into calcifying pancreatitis (more common) and obstructive pancreatitis. Many patients have intermittent flares of acute pancreatitis.

ANESTHETIC CONSIDERATIONS:

- Possibility of hemodynamic instability:
  - May present with significant fluid deficits
- Considerations of Co-existing diseases
  - EtOH use
  - Malnourishment and Malabsorption
  - Diabetes Mellitus
  - Hyperparathyroidism
  - Cystic Fibrosis
  - Autoimmune diseases
- Coagulopathy:
  - Possible Bleeding risk – Vitamin K deficiency, erosion of vasculature surrounding pancreas
- Decreased respiratory reserve and dyspnea
  - pleural effusions or ascites
  - Risk of ARDS if acute on chronic
- Perioperative pain control
- Possible Acute on Chronic Pancreatitis (Considerations for acute pancreatitis should be acknowledged)
- Altered pharmacokinetics:
  - Decreased albumin resulting in an increased free fraction of albumin bound drugs

ANESTHETIC GOALS:

- Preoperative optimization:
  - Correct electrolyte disturbances and fluid deficits
  - Correction of malabsorption with adequate enzyme replacement.
- Multimodal Pain Management with possible neuraxial or regional technique as patients are often not opioid naïve.
- Treatment of co-existing diseases as present: Chronic EtOH, CF, DM

PATHOPHYSIOLOGY AND EPIDEMIOLOGY

- Most often due to chronic alcohol abuse - 80% to 90% of affected patients.
- Diets high in protein seem to predispose alcoholic patients to the development of chronic pancreatitis.
- Idiopathic chronic pancreatitis is the second most common form of this disease.
- Chronic pancreatitis occasionally occurs in association with cystic fibrosis or hyperparathyroidism (hypercalcemia) or as a hereditary disease transmitted by an autosomal dominant gene.
- Gallstones do not cause chronic pancreatitis.
- Malnutrition-induced (tropical) pancreatitis is the most prevalent form of chronic pancreatitis in developing Asian and African countries.
- 4 to 6% of patients with chronic pancreatitis have *autoimmune pancreatitis* associated with hypergammaglobulinemia, histologic evidence of lymphoplasmacytic infiltration, frequent coexistence of other autoimmune diseases, and a favorable response to steroid therapy.
  - Diabetes is common in patients with autoimmune pancreatitis (42 to 76%). Up to 50% of patients may have other autoimmune diseases such as Sjögren's syndrome, primary sclerosing cholangitis, inflammatory bowel disease, and retroperitoneal fibrosis

HISTORY

- Diagnosis of chronic pancreatitis may be based on the history of chronic alcohol abuse and demonstration of pancreatic calcifications.
- Abdominal pain is the major symptom of chronic pancreatitis, occurs in about 80% of patients. Pain may be intermittent or chronic, and it may continue, diminish, or disappear completely over time.
- Diarrhea and steatorrhea secondary to inadequate digestion of fats occur when pancreatic lipase is reduced to less than 10% of normal levels,
- Amylase deficiency results in diminished carbohydrate digestion and leads to osmotic diarrhea.

PHYSICAL

- **General** :Often thin and appear emaciated due to malnourishment and malabsorbtion. May also have physical findings consistant with acute pancreatitis
- **Airway**: Laryngeal stridor secondary to hypocalcemia
- **Respiratory:** Potential for decreased respiratory function and ARDS
- **CVS:** Hypotension secondary to decreased SVR, fluid deficit, sepsis, and or hypotension. Dysrhythmias and decreased cardiac contractility secondary to electrolyte disturbances (hypocalcemia).
- **GI:** Evidence of liver disease secondary to EtOH use
- **Heme**: Possible evidence of coagulopathy secondary to DIC or Vitamin K deficiency. Possible evidence of hemorrhage with large ecchymoses at flanks (Grey Turner's sign) or at umbilical area (Cullen's sign)
- **MSK**: Check for signs of hypocalcemia – laryngeal stridor, Trousseau's sign (carpopedal spasm), Chvostek's sign (masseter spasm), seizures, cardiac irritability with arrthythmias, decreased cardiac contractility

INVESTIGATIONS

- **Laboratory**: CBC, Electrolytes, Creatinine, Urea, Calcium, LDH, LFT's, Lipase, Glucose, PT/PTT, serum amylase concentration (usually normal). serum triglyceride, Fibrinogen if DIC suspected
- **ABG:** Evaluate acidosis and respiratory status
- **CXR:** Look for ARDS, pleural effusions
- **ECG:** Check for cardiac disturbances secondary to hypocalcemia (prolonged QT, arrhythmias)
- **CT:** primary modality for evaluating the extent and local complications of pancreatitis
- **AXR** - demonstration of pancreatic calcifications.
- **Ultrasonography**: Useful for documenting the presence of an enlarged pancreas or identifying a fluid-filled pseudocyst
- **ERCP**: Most sensitive imaging test for detecting early changes in the pancreatic ducts caused by chronic pancreatitis.

PRE-OPERATIVE TREATMENT AND OPTIMIZATION

- Treatment of chronic pancreatitis includes management of pain, malabsorption, and diabetes mellitus.
- Opioids often required for adequate pain control, celiac plexus block may be considered.
- Enzyme supplement (lipase) is administered to permit fat digestion.
- Correct fluid deficits and electrolyte imbalances
- Nasogastric suction is needed only to treat persistent vomiting or ileus
- Prophylactic antibiotic therapy may be instituted in patients with necrotizing pancreatitis. (see complications)
- Contemporary practice is to begin enteral nutrition early (within 48-72 hours) in the course of the disease. (A meta-analysis of seven trials showed that compared with TPN, enteral nutrition is associated with less infectious morbidity, shorter hospital lengths of stay, and less organ failure, with no effect on mortality)
- Consider treatment for EtOH withdrawal pre-operatively

SURGICAL TREATMENT OF PANCREATITIS

- **Operative Drainage for Pancreatitis** - indicated for drainage or debridement of infected peripancreatic tissue or pancreatic necrosis
- **Internal drainage of a pancreatic pseudocyst** - may be accomplished by anastomosing the cyst to the stomach, duodenum, or other small bowel via a Roux-en-Y loop of jejunum.
- **Pancreaticojejunostomy** - longitudinal opening of the pancreatic duct is then anastomosed to a Roux-en-Y loop of jejunum. Ensures adequate drainage of a duct with multiple strictures and dilatations.
- **Whipple resection (pancreaticoduodenectomy) -** alternative surgical treatment for chronic pancreatitis confined to the head of the gland.
- **Subtotal pancreatectomy** - Resect the pancreas from the mesenteric vessels distally, leaving the head and uncinate process intact. This procedure may be performed for tumor or chronic pancreatitis.

ANESTHETIC OPTIONS

- Anesthetic options are more dependant on the surgery to be performed rather than pancreatitis.
- Epidurals should be considered if the surgery is to be thoracic or upper abdominal in nature to assist in pain management and respiratory function (may already have decreased respiratory function)

ANESTHETIC SETUP

- **MONITERS –** STANDARD CAS MONITORS, URINE OUTPUT, +/- ARTERIAL LINE, +/- CVP (BASED ON PROPOSED PROCEDURE, LABORATORY RESULTS AND PATIENT STABILITY)
- **VASCULAR ACCESS –** 2 LARGE BORE IV'S +/- CENTRAL LINE (BASED ON PROPOSED PROCEDURE, LABORATORY RESULTS AND PATIENT STABILITY)
- **POSITIONING -** Based on procedure – most pancreatic procedures are done in a supine position
- **FLUIDS –** PATIENT CROSSMATCHED, BLOOD AVAILABLE BASED ON PROCEDURE AND PATIENT STABILITY

MANAGEMENT OF ANESTHESIA

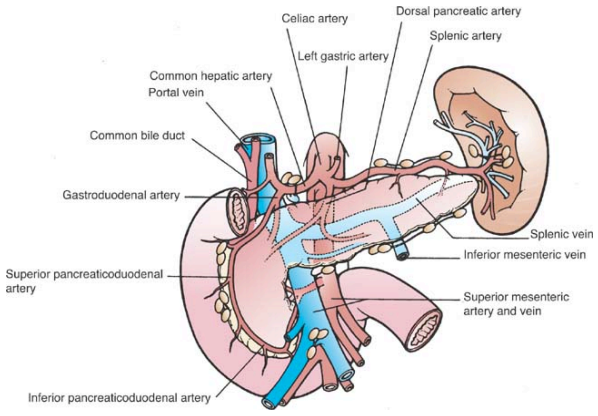
- **Induction –** RSI with hemodynamically stable agents may be required (ex. Etomidate 0.2–0.4 mg/kg iv or ketamine 1–2 mg/kg iv)
- **Maintenance –** Based patient stability, no contraindication to any particular anesthetic, prolonged propofol infusion may worsen pancreatitis.
- **Emergence –** Patients not to go to ICU should be awakened when stable, reversed and electrolyte imbalances corrected

POSTOPERATIVE CONSIDERATIONS

- ICU admission maybe required for:
  - Postop mechanical ventilation (ARDS),
  - Hemodynamic instability (sepsis, fluid deficit)
  - Renal Failure
- Possible challenging post-operative pain management

COMPLICATIONS

- Fat Malabsorption:
  - Once exocrine secretions are decreased to the point that enzymes entering the duodenum are 10% to 20% of normal; maldigestion of proteins and fats is evident.
  - The most clinically significant problem concerns maldigestion of fat and fat-soluble vitamins (A, D, E, and K).
- Fistulization into adjacent organs, particularly the transverse colon, is common.
- Pancreatic pseudocysts that have been present for more than 6 weeks and are larger than 5 cm in diameter usually require treatment.
  - Arterial hemorrhage occurs when a pseudocyst erodes into a pancreatic artery and transforms the pseudocyst cavity into a pseudoaneurysm
- Infected pancreatic necrosis
  - The demonstration of polymorphonuclear cells and bacteria is highly suggestive of infected pancreatic necrosis and should lead to urgent surgical intervention because the mortality in conservatively treated patients with infected pancreatic necrosis is greater than 60%.
  - Antibiotic therapy should be initiated or continued to cover gram-negative enteric and anaerobic organisms. Antibiotics with high penetration into pancreatic tissue include imipenem-cilastatin, fluoroquinolones, and metronidazole.



REFERENCES

- Stoelting's Anesthesia and Co-Existing Disease 5th ed.
- Miller 7th ed.
- Barash 6th ed.
- Morgan, Mikhail, and Murray 4th ed.
- Anesthesiologist's Manual of Surgical Procedures 4th ed. Chapter 7.8 - Pancreatic Surgery
- Goldman: Cecil Medicine. 23rd ed