AN UNCOMMON USE FOR INSULIN

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HPI

• A 60-year-old man with history of remote MI, abdominal aortic aneurysm, hypertension, mixed hyperlipidemia, and GERD presented to the emergency department with 4 days of worsening abdominal pain now radiating to his back and two episodes of nausea and vomiting
  ▪ Denies sick contacts, diarrhea, melena, heavy or recent alcohol use
  ▪ Meds: Clopidogrel, aspirin, levothyroxine, losartan, magnesium oxide, metoprolol succinate, nitroglycerin, ranitidine, rosuvastatin, lorazepam
OBJECTIVE

• Initial vital signs: T 36.6, P 69, BP 97/66, RR 20, and SpO2 99%

• Physical Exam:
  • GEN: well developed, moderate distress d/t pain
  • Cardiac: HRRR, no murmurs or gallop
  • Pulm: CTAB, no wheeze or rhonchi
  • ABD: Soft, diffusely tender with guarding present in RLQ, bowel sounds x 4, no organomegaly appreciated although exam limited due to pain
  • Extremities: warm, well perfused
**Labs**

| Lactic acid: 3 | Alk Phos: 157 | AST: 442 |
| ALT: 167       | Lipase: 828   | Total Chol: 823 |
| Triglycerides: >8500 |            |            |
HOSPITAL COURSE

• Patient was admitted to the ICU and managed for acute pancreatitis (Liberal IV fluids, pain medications, NPO)
• Gastroenterology and Endocrinology consulted to assist with management
• Patient placed on concurrent IV insulin and dextrose infusions to address hypertriglycerideridemia
• After resolution of hypertriglycerideridemia, Pt was started on fenofibrate and extensive nutrition counseling was performed
TRIGLYCERIDE LEVEL OVER TIME

Triglyceride Serum Level (mg/dL)

Day 1  Day 3  Day 4  Day 5  Day 6

NPO  Insulin Started  Insulin Discontinued  PO Diet Resumed

8500  2492  1913  900  666
Hypertriglycerideridemia – Induced Pancreatitis
EPIDEMIOLOGY

• Prevalence

• A 1982-1994 U.S. study demonstrated hypertriglyceridemia as the cause of acute pancreatitis in 1.3-3.8% of hospitalized patients.

• A 2005 Jiangxi, China study demonstrated hypertriglyceridemia as the cause of acute pancreatitis in 14.3% of hospitalized patients.

CAUSES OF HYPERTRIGLYCERIDEMIA

• Primary
  • Type I Dyslipidemia – familial chylomicronemia
  • Type IV Dyslipidemia – familial hypertriglyceridemia or familial combined hyperlipidemia
  • Type V – primary mixed hyperlipidemia
CAUSES OF HYPERTRIGLYCERIDEMIA

• Secondary
  • Diabetes mellitus – Types I and II
  • Medications – HRT (estrogen), SERMs, protease inhibitors, antiretrovirals, propofol, olanzapine, mirtazapine, retinoids, thiazides, and Beta-blockers
• Pregnancy
• Alcohol
• Hypothyroidism

PRESENTATION

• Very similar to other causes of pancreatitis:
  • Epigastric abdominal pain, usually severe
  • Nausea/vomiting
  • May have eruptive xanthomas on arms, legs, buttocks, back

DIAGNOSIS

• Must have 2 out of 3 criteria for acute pancreatitis:
  • Severe, persistent epigastric pain usually radiating to the back
  • Serum lipase or amylase > 3X upper limit of normal
  • Characteristic findings on advanced imaging
• Triglycerides must be >1000mg/dL to be considered the cause of pancreatitis
Management

- Treatment of acute pancreatitis
- Reducing triglyceride levels
HYPERTRIGLYCERIDEDEMIA MANAGEMENT

• Promoting metabolism of triglycerides
  • IV regular insulin infusion
  • Heparin
• Removal of triglycerides
  • Apheresis
INSULIN

• Unfortunately, there are no standardized guidelines regarding the use of insulin in non-diabetic patient’s with hypertriglyceridemia

• Case reports have used both subcutaneous and IV insulin infusions with fairly rapid lowering of triglyceride levels using either method

• Regular insulin infusion is usually 0.1-0.3 units/kg/hr, with dextrose infusion added if blood glucose < 200 mg/dL

• Continue infusion until triglycerides < 1000-500 mg/dL

Heparin is another potent activator of lipoprotein lipase and has been successfully used to treat pancreatitis secondary to hypertriglyceridemia.

Usually given as infusion with bolus and levels are kept therapeutic using a standard infusion nomogram.

**APHERESIS**

- Usually reserved for those patients in whom conservative treatment fails or in very severe pancreatitis
- More studies are needed as efficacy is unclear
- A Chinese study in 2004 did not demonstrate any significant benefit in mortality, systemic or local complications with apheresis

MAINTENANCE THERAPY

• Lifestyle modifications:
  • Dietary changes, weight loss, alcohol, avoiding concentrated sugars
• Fibrates:
  • Fenofibrate, gemfibrozil
• Nicotinic acid
• Fish Oil
CONCLUSION

• Hypertriglyceridemia induced pancreatitis is an uncommon but potential cause of acute pancreatitis
• Triglyceride lowering therapies should be initiated to prevent worsening and expedite clinical improvement
• There are no randomized controlled trials upon which from which to create guidelines, just expert opinion and case studies
• Randomized controlled trials are needed to better clarify efficacy of apheresis vs insulin infusion