38-year-old Man with Acute Pancreatitis

Celeste C. Thomas

November 29, 2012

History of Present Illness

- History of acute pancreatitis in the past
- T2DM on metformin and glyburide
- Hypertriglyceridemia on gemfibrozil
- Ran out of metformin and glyburide
- Diet high in fat
- Drank 12 cans of beer five days prior to admission and one mixed drink four days prior to admission
- Presented with abdominal pain that started two days prior to admission

History of Present Illness

- Localizes pain to the epigastrium and left upper quadrant
- Sharp as if being poked
- Pain is 8/10, worse with deep breathing
- No nausea, one episode of emesis (non-bloody, non-bilious)

History

- Past Medical History
  - Acute Pancreatitis
  - Hypertriglyceridemia
  - Type 2 DM
  - Hypertension
  - OSA on CPAP
  - Morbid Obesity
  - Alcohol Abuse
- Past Surgical History
  - Repair of meniscal injury - right knee
  - Tonsillectomy - age 18 years
- Allergies: None
- Medications
  - Metformin 1000 mg PO BID
  - Glyburide 2.5 mg PO daily
  - Gemfibrozil 600 mg PO BID
  - OTC Fish oil
  - Amlodipine 5 mg PO daily
  - Benazepril 20 mg PO daily
  - Aspirin 81 mg PO daily

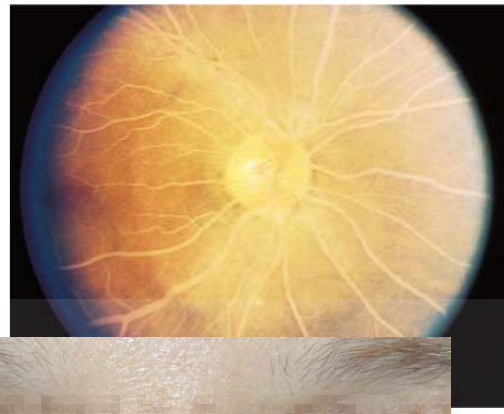
History

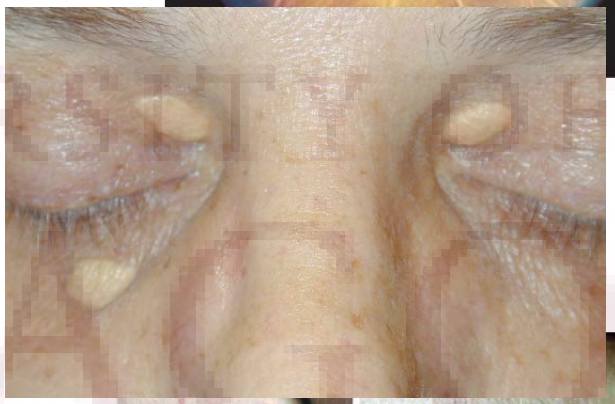
- **Family History**
  - **Father: hypertension, obesity**
  - **Mother: hypertension, T2DM, hypothyroidism, osteoporosis**
  - **2 Brothers: both with hypertension**
  - **Sister: hypothyroidism**
  - **Sister: well**

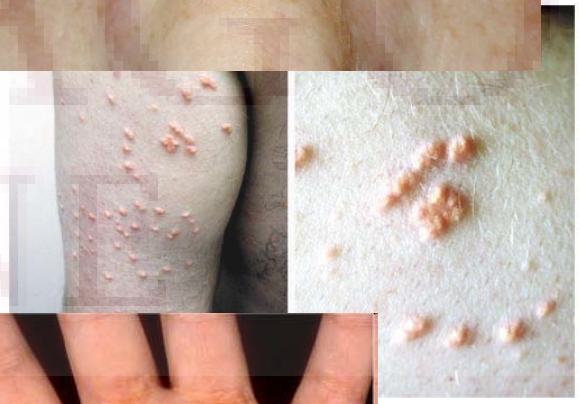
- **Social History**
  - **Lives in a building with mother and sister**
  - **His mother prepares his lunch daily and includes his pills in his lunch**
  - **Single, no children**
  - **Active job, filling vending machinges**
  - **Diet: high-fat foods**
  - **Tobacco: Never smoked**
  - **Alcohol: heavy use on weekends**
  - **Illicits: none**

Physical Exam

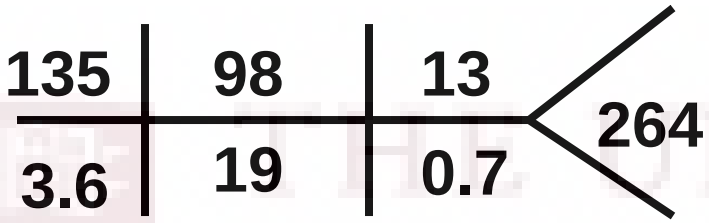
- BP 99/63 | **Pulse 115** | Temp(Src) **38.6 °C (101.5 °F)** (Tympanic) | **Resp 28** | Ht 180.3 cm (5' 11") | Wt 136.079 kg (300 lb) | **BMI 41.84 kg/m2** | SpO2 95%
- Constitutional: obese male sitting on cart in ED in no acute distress
- HEENT: EOMI, no xanthelasma, oropharynx clear
- Neck: supple, large diameter, no thyromegaly
- Cardiovascular: tachy rate, no extra heart sounds
- Pulmonary/Chest: good respiratory effort, clear to auscultation bilaterally
- Abdomen: bowel sounds quiet, soft, tender in the epigastrium and LUQ, no rebound, no guarding
- Musculoskeletal: moving all extremities
- Neurological: sensation intact to light touch on the plantar surface and vibration intact in the first distal phalanx bilaterally
- Skin: warm, dry, no eruptive xanthomas, no palmar crease xanthomas
- Psychiatric: not agitated

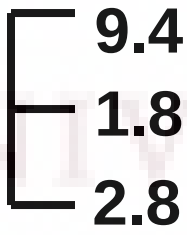


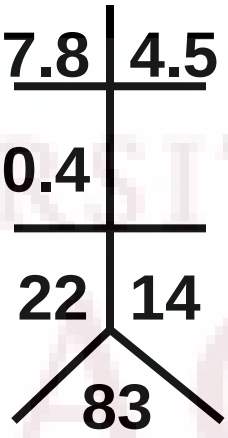


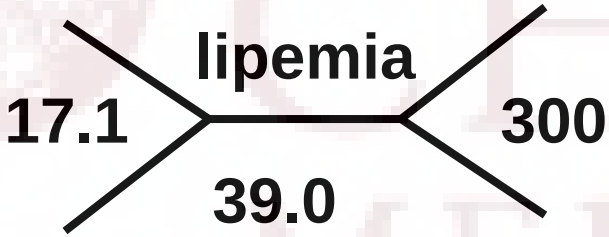


Laboratory Studies









Lipase 1299 U/L
Lactic Acid 1.2 mEq/L
Beta-hydroxybutyrate 0.74 mmol/L

HbA1c 8.1%

TSH 1.50 mcU/mL
Free T4 1.05 ng/dL
Total T3 57 ng/dL
Rev T3 390 pg/mL

Cholesterol 504 mg/dL
HDL 65 mg/dL
TG >5500 mg/dL

Defect in Lipoprotein Lipase?

LPL is a hydrolase that cleaves circulating triglycerides to release fatty acids to the surrounding tissues

- **The enzyme is synthesized in parenchymal cells and transported to its site of action on the capillary endothelium by glycophosphatidylinositol (GPI)-anchored high-density lipoprotein-binding protein 1 (GPIHBP1).**

Causes of Hypertriglyceridemia

Primary hypertriglyceridemia
- **Familial Combined Hyperlipidemia**
- **Familial Hypertriglyceridemia**
- **Familial Dysbetalipoproteinemia**
- **Familial Hypoalphalipoproteinemia**
- **Familial Chylomicronemia and related disorders**

Primary genetic susceptibility
- **Metabolic syndrome**
- **Treated type 2 diabetes**

Secondary hypertriglyceridemia
- **Excess alcohol intake**
- **Drug-induced (*e.g.* thiazides, b-blockers, estrogens, isotretinoin, corticosteroids, bile acid-binding resins, antiretroviral protease inhibitors, immunosuppressants, antipsychotics)**
- **Untreated diabetes mellitus**
- **Endocrine diseases**
- **Renal disease**
- **Liver disease**

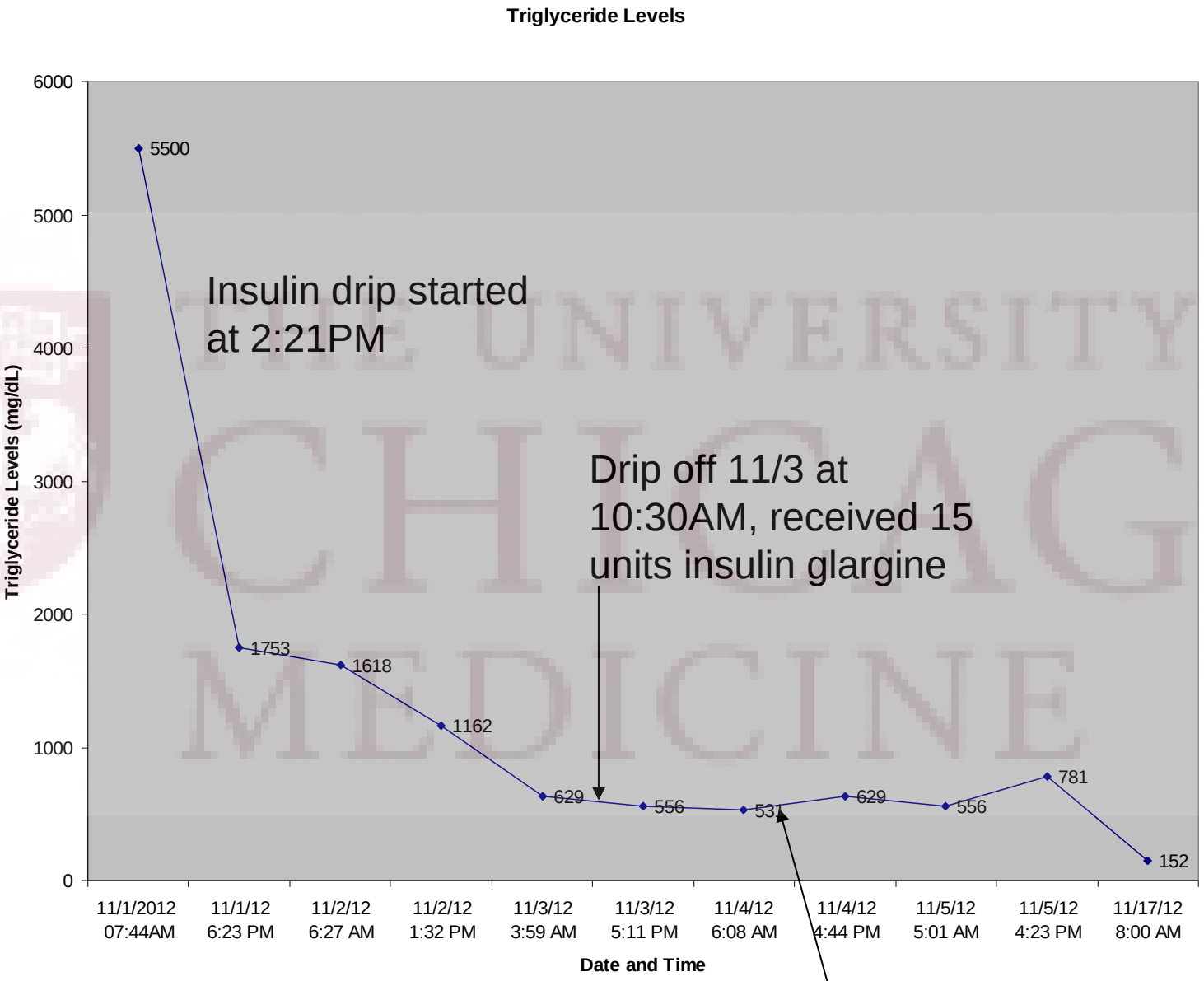
From Endocrine Society Guidelines on HTG

Secondary Causes of HTG

- **Poorly-controlled diabetes mellitus**
  - **In T2DM**
    - **Glucose induces apoCIII transcription → impaired activity of LPL**
    - **Inflammation/Insulin resistance at the adipocyte → increased lipolysis and decreased PPAR-gamma regulated triglyceride synthesis and storage at the adipocyte → flux of free fatty acids to the liver and skeletal muscle**
    - **Increased cholesteryl ester transfer protein activity**
- **Alcohol excess**
  - **Alcohol intake increases hepatic fatty acid synthesis and decreases fatty acid oxidation, with a net effect to stimulate hepatic VLDL triglyceride secretion**

Treatment

- Insulin drip and NPO until can tolerate PO, discharge on insulin
- Alcohol cessation
- When eating, low carbohydrate, low fat diet
- Weight loss
- Fenofibrate 145 mg PO daily
- Restart metformin on discharge
- Follow-up with Dr. Sargis


Triglyceride Levels
6000
5000
4000
3000
2000
1000
0
Triglyceride Levels (mg/dL)
5500
1753
1618
1162
629
556
531
629
556
781
152
Insulin drip started at 2:21PM
Drip off 11/3 at 10:30AM, received 15 units insulin glargine
11/1/2012 07:44AM
11/1/12 6:23 PM
11/2/12 6:27 AM
11/2/12 1:32 PM
11/3/12 3:59 AM
11/3/12 5:11 PM
11/4/12 6:08 AM
11/4/12 4:44 PM
11/5/12 5:01 AM
11/5/12 4:23 PM
11/17/12 8:00 AM
Date and Time
Omelet with swiss cheese

Teaching Points

- **Insulin is effective at improving activity of lipoprotein lipase even when blood glucose levels are not markedly elevated**
- **Lifestyle changes are critical: diet, exercise, weight loss, abstinence from alcohol**
- **Fibrates should be considered in patients with severe hypertriglyceridemia**

References

- Evaluation and Treatment of Hypertriglyceridemia: An Endocrine Society Clinical Practice Guideline
- Sadur CN, Eckel RH. Insulin stimulation of adipose tissue lipoprotein lipase. Use of the euglycemic clamp technique. J Clin Invest. 1982;69:1119–1125.
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