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CLINICAL VIGNETTE

A Case of Hypertriglyceridemia-Induced Pancreatitis

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Case Presentation

A 40-year-old male with type 2 diabetes, hyperlipidemia, and recurrent pancreatitis of unclear etiology presented to the emergency department with sudden abdominal pain for one day. The pain was in the left upper quadrant, radiated to the back, and was 10/10 in severity. He reported mild nausea but no emesis. He denied fevers, chills, diarrhea, rectal bleeding, or urinary complaints. He had been diagnosed with diabetes ten years prior and had been on insulin in the past, but was currently just taking metformin due to the high cost of insulin. He had been previously hospitalized for pancreatitis, four months and five months before the current presentation. During those hospitalizations, his triglycerides had been mildly elevated, up to 302 mg/dL, with normal abdominal ultrasounds and normal calcium levels. He had not been taking any new medications or recent ERCP. He has no history of gallstones or alcohol use. He was started on atorvastatin 80 mg three months ago. His family history included hypertriglyceridemia and pancreatitis in both his mother and his brother.

On presentation, vital signs were within normal limits. His BMI was 23. His exam was notable for dry mucous membranes and mild left upper quadrant tenderness without rebound tenderness or guarding. Initial labs were notable for WBC 12.2 k/uL, Glucose was 403 but he otherwise had a normal BMP and calcium of 8.9 mg/dL. Hemoglobin A1c was 14.3%. His LFTs were normal. His lipase was 192 but peaked at 310 U/L. Triglycerides were elevated at 8920 mg/dL and abdominal ultrasound was normal.

The patient was diagnosed with severe hypertriglyceridemia-induced pancreatitis. He was made NPO, given IV fluids, and started on an insulin infusion. The insulin infusion was initially at 0.1 units/kg/hr, and was maintained at 5-7 units/hour. Dextrose-containing IV fluids were given to avoid hypoglycemia and maintain blood glucose between 150-200 mg/dL. The insulin infusion was continued for 52 hours, and triglyceride levels decreased rapidly to 452 mg/dL. His AST increased to 260 U/L and his ALT increased to 342 U/L, before they both downtrended. His abdominal pain and lipase levels improved. Given his mildly elevated LFTs at the time of discharge, fenofibrate was held but was started as an outpatient.

Discussion

Excess triglycerides are transported as triglyceride-rich lipoproteins (chylomicrons), which are broken down in the pan-

creas. Pancreatic enzymes hydrolyze triglycerides into toxic free fatty acids (FFAs). High levels of FFAs surpass the binding capacity of plasma albumin, and unbound FFAs self-aggregate into toxic micellar structures that induce necrotic cell death through release of intracellular calcium and inhibition of mitochondrial complexes I and V. It has also been postulated that elevated levels of chylomicrons increase the plasma viscosity, which results in the plugging of capillaries. The increase in toxic FFAs and increased plasma viscosity both lead to ischemia and acidosis, which activates trypsinogen and triggers acute pancreatitis. The increase in FFAs also upregulates inflammatory mediators such as TNF- α , MCP-1, and IL-6, which cause both local and systemic damage.^{1,2}

Hypertriglyceridemia occurs when the serum triglyceride level is higher than 150 mg/dL. Hypertriglyceridemia can occur from a primary genetic abnormality of lipid metabolism or the presence of secondary factors, such as insulin resistance, visceral obesity, alcohol use, pregnancy and oral estrogen use.³ Hypertriglyceridemia has been reported to be responsible for up to 7% of all cases of acute pancreatitis, but rarely occurs unless triglyceride levels >1000 mg/dL.⁴ The risk of pancreatitis in patients with serum triglycerides >1000 mg/dL is approximately 5%, and the risk with triglycerides >2000 mg/dL is 10-20%.⁵ Hypertriglyceridemia has been shown to have poorer outcomes compared to other etiologies of pancreatitis.⁴ The higher the serum triglyceride levels, the greater is the morbidity, mortality, and likelihood for persistent organ failure.

Initial treatment of hypertriglyceridemia-induced pancreatitis is similar to any case of acute pancreatitis, which involves pancreatic rest by decreased oral intake, intravenous hydration, and pain management. However, there are also two options to lower significantly elevated triglyceride levels. An insulin infusion is effective in decreasing triglyceride levels. Insulin increases lipoprotein lipase (LPL) activity, which can degrade chylomicrons and reduce serum triglycerides.⁵ An insulin infusion is typically initiated at a rate of 0.1 to 0.3 units/kg/hour while closely monitoring blood glucose levels. Apheresis has also been shown to rapidly decrease triglyceride levels, lowering triglyceride levels by approximately 65% and 85% after one or two sessions respectively.⁶ However, it is an expensive treatment option, is more invasive (requires a hemodialysis catheter), and is not available in all medical centers.⁷

Conclusion

Hypertriglyceridemia is an uncommon cause of pancreatitis, but has worse outcomes compared to other etiologies. It is important to consider an insulin infusion or apheresis to rapidly lower triglyceride levels.

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