Therapeutic Plasma Exchange as Effective Treatment for Hypertriglyceridemia-induced Acute Pancreatitis

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INTRODUCTION

Acute pancreatitis is the most common gastrointestinal condition leading to hospital admission in the United States, and costs in excess of 2.5 billion dollars in healthcare expenses[1]. Despite hypertriglyceridemia being the third leading cause of acute pancreatitis, the American College of Gastroenterology does not offer guidelines for its specific treatment[2]. Current mainstay of treatment includes supportive care with insulin or therapeutic plasma exchange (TPE; image 1). Due to the lack of randomized trials to compare efficacy of treatments, management with TPE remains a topic of debate. The purpose of this case report is to raise awareness of the use of TPE in treating hypertriglyceridemia-induced pancreatitis (HTAP) and add to the current literature supporting its use in such scenarios.

CASE

A 53-year-old female without significant past medical history presented to the Emergency Department with complaints of nausea, vomiting, diarrhea, altered mental status, shortness of breath, and abdominal pain radiating to her back. She reported one episode of coffee ground emesis. She admitted to excessive alcohol intake. CT scan of her abdomen showed peripancreatic fat stranding and a diffusely edematous pancreas (image 2), highly suggestive of acute pancreatitis. On laboratory examination she was found to have significant values including lipase of 1,127, glucose >600, amylase of 447, alkaline phosphatase of 216, beta-hydroxybutyrate of 12.96, lactic acid of 3.7, creatinine of 2.58 and a hemoglobin A1C of 17.9. Her arterial blood gas resulted with pH 6.96, CO2 35, and HCO3 8.

She was started on an insulin infusion and IV fluids. Once the triglyceride level results were received at 2,573, the decision was made to plasmapheresis. Vascular Surgery was consulted for Quinton catheter placement. Her triglycerides decreased to 1,883 before the plasma exchanged was initiated, and they dropped down to 950 afterwards. With a goal of a triglyceride level less than 500 a decision was made not to plasmapheresis a second round, as her levels were trending down. Subsequent triglyceride levels were found to be 361, 444, 460, and 202 respectively.With her levels normalizing and her diabetes under better control, she was discharged with extensive counseling on her alcohol abuse and new diagnosis of diabetes.

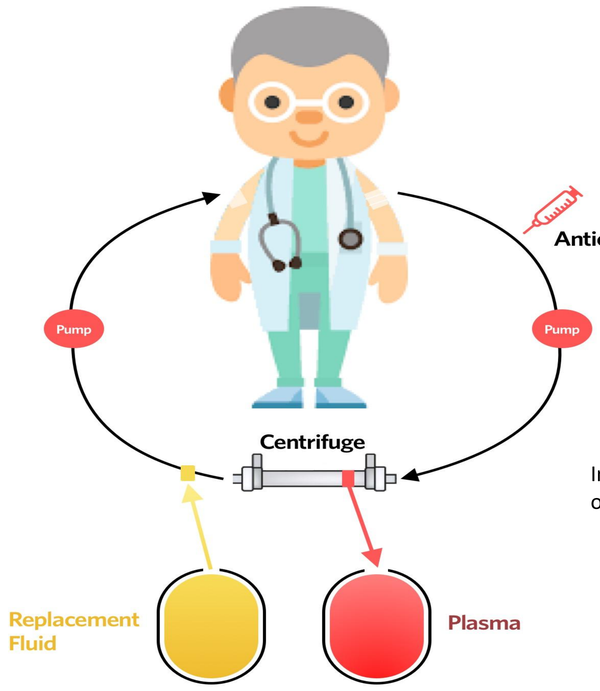


Image 1: diagram of TPE process

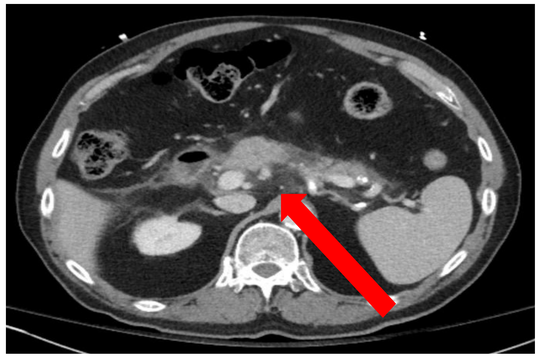
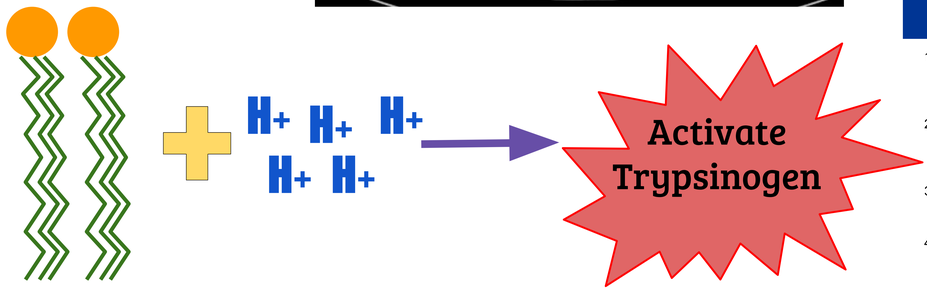


Image 2: CT of acute pancreatitis



DISCUSSION

The pathogenesis behind HTAP is thought to be due to lipotoxicity. This occurs due to the breakdown of triglycerides into toxic free fatty acids via pancreatic lipases. It is the build-up of these free fatty acids that damage pancreatic acinar cells, as well as the endothelium of capillaries. This, along with increased blood viscosity due to elevated chylomicrons, impairs the pancreatic blood flow leading to acidosis and ischemia. In an acidic environment, the free fatty acids activate trypsinogen (image 3) leading to edema and necrosis[2]. Therefore, treatment of HTAP is aimed at supportive care and therapy to quickly lower triglycerides, in order to prevent further ischemia and necrosis, which is the role of TPE[1]. Large, randomized trials to evaluate efficacy of TPE compared to insulin are lacking. However, numerous observational and retrospective studies have indicated a role for TPE in HTAP treatment, including a 2015 review of 74 available case reports and case series, which found a significant average reduction in triglycerides of 85.4% with use of TPE[3].

When making the clinical decision to treat with TPE, there are a few factors to consider. One concern is the need for either central venous access, thus making TPE a more invasive option than insulin treatment[1]. Cost is another factor. Treatment cost can be considerably higher for TPE than insulin. However, there is evidence to suggest TPE decreases overall hospitalization cost via significantly reducing length of stay[3]. TPE may also decrease cost of future hospitalizations due to HTAP, as a promising case report evidenced long-term effect of lower triglyceride levels after TPE[3].

This case report supports the existing literature on the role of TPE in lowering triglycerides effectively. It also emphasizes the need to readily recognize TPE as a viable treatment for HTAP. However, further research including prospective, randomized studies is warranted to delineate the benefit of TPE versus insulin. This case also poses the further question if TPE is the superior treatment in the setting of complicated HTAP, given our patient's success despite her multi-factorial disease.

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