Therapeutic plasma exchange for severe hyperlipidaemia in a patient with poorly controlled diabetes

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DESCRIPTION

Hypertriglyceridaemia (HTG) is a common condition in the USA and is often caused or exacerbated by uncontrolled diabetes mellitus (DM), obesity and other metabolic disorders. It is usually asymptomatic until triglycerides exceed 1000 mg/dL. Signs include gastrointestinal pain, nausea, vomiting and dyspnoea. In type I DM, insulin deficiency leads to an inhibition of lipoprotein lipase (LpL).¹ Control with insulin restores LpL function and reduces triglyceride levels. While initiating glucose control, therapeutic plasma exchange (TPE) can be used adjunctively, with intravenous insulin, to rapidly decrease triglyceride levels and prevent acute pancreatitis.

A man of 30 with poorly controlled type I DM, secondary to gallstone pancreatitis, presented for treatment of abdominal pain, nausea, vomiting and HTG. His father also has HTG, but no genetic testing for inherited lipid disorders has been pursued. The patient's initial glucose level was 335 mg/dL and his HbA1c was 14.2%. His lipid panel included a triglyceride level >3360 mg/dL,

cholesterol of 1435 mg/dL, low-density lipoprotein >279 mg/dL and high-density lipoprotein <5 mg/dL. The patient had evidence of ketoacidosis, with a β -hydroxybutyrate of 2.73 mg/dL (0.02–0.27) and a lactic acid of 8.8 mmol/L (0.5–2.2). A mild elevation of his lipase level was also noted at 93 units/L (8–78). His ionised calcium was 1.08 mmol/L (1.19–1.34). An abdominal CT scan revealed pancreatic fat stranding consistent with pancreatitis. In the first 12 hours of his admission, the patient was treated with intravenous fluids, an insulin drip (to maintain blood glucose levels between 140 and 180 mg/dL), fasting and TPE (1.0 plasma volume with 5% albumin replacement).

The patient underwent one TPE procedure, and his plasma had a milky white appearance (figure 1). Thirty minutes into the procedure, he had nausea and tingling consistent with hypocalcaemia. The procedure was paused briefly, and the citrate anticoagulant inlet was slowed. The procedure was resumed when the tingling subsided and was completed without complication. In fact, the patient was very satisfied with the procedure and stated that he 'felt wonderful and had never had this feeling in the last three years.' His immediate postprocedure triglyceride level was 874 mg/dL, which declined to 677 mg/dL 5 hours later. Twenty-four hours after the procedure, his triglyceride level was 533 mg/dL (last value obtained). The patient was discharged with fenofibrate, placed on a low-fat diet and was followed by an endocrinologist.

Figure 1 Milky white plasma collected in a plasmapheresis procedure for severe hypertriglyceridaemia.

Learning points

- ▶ Hypertriglyceridaemia is a common condition in the USA, which is often caused or exacerbated by uncontrolled diabetes mellitus, but is usually asymptomatic until triglyceride levels exceed 1000 mg/dL.
- ▶ While initiating glucose control, therapeutic plasma exchange can be used adjunctively, with intravenous insulin, to rapidly decrease triglyceride levels and prevent acute pancreatitis.
- ▶ The 2016 American Society for Apheresis Guidelines categorise hypertriglyceridaemic pancreatitis as a category III indication (ie, optimum role of apheresis therapy is not established; decision-making should be individualised).

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As advocated by the Endocrine Society, the therapeutic approach to HTG includes a combination of lifestyle modifications (diet, exercise, weight reduction) and medications (fibrates, N-3 fatty acids, niacin).² However, TPE is considered a means to prevent or treat pancreatitis associated with severe HTG.³ The American Society for Apheresis categorises hypertriglyceridaemic pancreatitis as a category III indication (ie, optimum role of apheresis therapy is not established; decision-making should be individualised) with a grade 2C recommendation (ie, weak, with low-quality evidence).³ However, as this case clearly demonstrates, TPE can be an effective adjunctive therapy in patients with uncontrolled DM, HTG and symptoms of acute pancreatitis, and is the most rapid method available for acutely lowering triglyceride levels.

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