Management of severe hypertriglyceridemia due to lipoprotein lipase deficiency in children

Sarah WY Poon, Karen KY Leung, Joanna YL Tung

Department of Paediatrics and Adolescent Medicine, Queen Mary Hospital, The University of Hong Kong

Introduction

- **Severe hypertriglyceridemia** is an endocrine emergency and is associated with acute pancreatitis and hyperviscosity syndrome
- When no secondary causes are identified, **genetic evaluation** should be pursued in hypertriglyceridemia in children
- There is no consensus on the management of severe hypertriglyceridemia in the paediatric population
- We describe an infant with **lipoprotein lipase deficiency** with severe hypertriglyceridemia presenting with acute pancreatitis
- Our case highlights the successful use of **insulin** as an adjunct to lower the triglyceride in the acute setting followed by strict **dietary fat restrictions**

Case Presentation

- A 38-day old Chinese girl presented with vomiting, irritability and suspected seizure.
- She was born full term to non-consanguineous parents with a birth weight of 2.8kg with uneventful postnatal course
- Father has **hypertriglyceridemia** with triglyceride (TG) level at 2.8-4.0 mmol/L and diabetes mellitus requiring medication at age of 40
- She was on mixed formula and breast-feeding and was growing along the 25th gentile
- Physical exam showed **hepatosplenomegaly** with no abnormal fat distribution or xanthoma
- Milky serum was noted during venesection (Figure A and B)

Investigation

- Triglyceride > 150 mmol/L, Total cholesterol 23.8 mmol/L
- Serum lipase 2534 u/L (Ref 23-300 u/L), amylase normal
- Serum sodium 129 mmol/L, Potassium 5.1 mmol/L, adjusted Calcium 2.03 mmol/L, bicarbonate 18mmol/L
- Agarose gel electrophoresis showed a dense chylomicron band while the intensity of the very low-density lipoprotein (VLDL) band was mildly increased, compatible with t**ype 1 hyperlipidaemia** with **lipoprotein lipase (LPL) deficiency**
- Computer Tomography of the abdomen showed features of **acute pancreatitis**
- Genetic test confirmed **two heterozygous LPL variants**, p.Cys54 (p.Cys27 in mature protein) (C27X) and p.Leu279Val (L279V), which have been reported to be pathogenic mutations. Parents declined genetic test

Images

Figure A

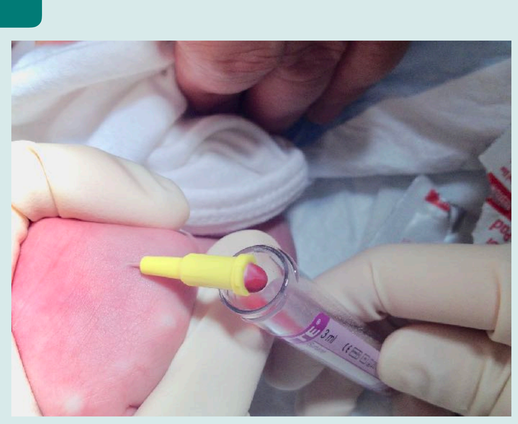
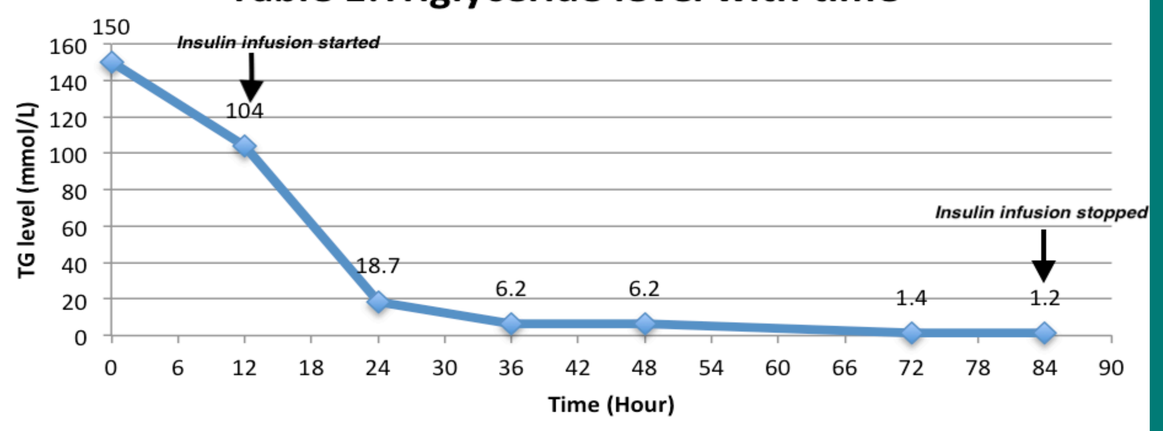


Figure B

Management

- She was kept **fasted** and started on intravenous dextrose
- TG dropped to 104 mmol/L after 11 hours of fasting
- Intravenous **insulin** was then started at 0.05 unit/kg/hour. TG decreased slowly to 1.2 mmol/L after 84 hours before the infusion was stopped (Table 1)
- Lipase gradually normalized
- Feeding was resumed after 1 week of fasting with Monogen, a low fat, medium chain triglyceride (MCT) based infant milk formula (84% MCT, 16% long chain triglyceride)
- Weaning diet was started at 6 months of age with **low fat diet** (fat calorie 15% of total calories)
- Until age of 5, TG was maintained at 2.2-2.9 mmol/L
- She has no further episodes of acute pancreatitis and has normal growth and development

Table 1:Triglyceride level with time



Discussion

- While insulin may only be beneficial with residual LPL activity, it is a **safe and effective** adjunct treatment strategy in the initial management of severe hypertriglyceridemia
- **Plasmapheresis** and **heparin infusion** are associated with **high risk** in young infants
- **Low fat diet** reduces chylomicron formation and is the best long term management in hypertriglyceridemia in familial chylomicronemia syndrome
- Compliance to low fat diet might be challenging for children and collaboration with a dietician is essential
- **Lipid-lowering drugs** have **limited success** as their actions depends on functional LPL lipolytic pathway
- **Gene therapy** and **Antisense oligonucleotide** have been developed and may play a role in future management

Reference

1 Chen T-Z, Xie S-L, Jin R, Huang Z-M. A novel lipoprotein lipase gene missense mutation in Chinese patients with severe hypertriglyceridemia and pancreatitis. Lipids Health Dis. 2014 Mar 19;13:52.
2. Chan AO, But W, Lau GT, Tse W, Shek C. A novel nonsense mutation in the LPL gene in a Chinese neonate with hypertriglyceridemia. Clin Chim Acta. 2006 Jun 1;368(1):120–4.

58ESPE P3-100

Fat, metabolism and obesity

Sarah WY Poon

Poster presented at: ESPE 2019 VIENNA

PosterSessionOnline.com