Management of severe hypertriglyceridemia due to lipoprotein lipase deficiency in children
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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 2.8 kg 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 percentile
• 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 18 mmol/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 type 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

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

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


Table 1: Triglyceride level with time

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<th>Time (Hour)</th>
<th>TG level (mmol/L)</th>
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Figure A: Milky serum during venesection
Figure B: Normal fat distribution

Images

Figure A

Figure B

Poster presented at: P3-100 Fat, metabolism and obesity
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