Case Report: Massive Hypertriglyceridaemia

Graham RD Jones[1], Alan Ting[2], Kathy Samaras[2], Don Chisholm[2], David Segara[3]
Departments of Chemical Pathology[1], Endocrinology[2] and Surgery[3], St Vincent's Hospital, Sydney.
gjones@stvincents.com.au

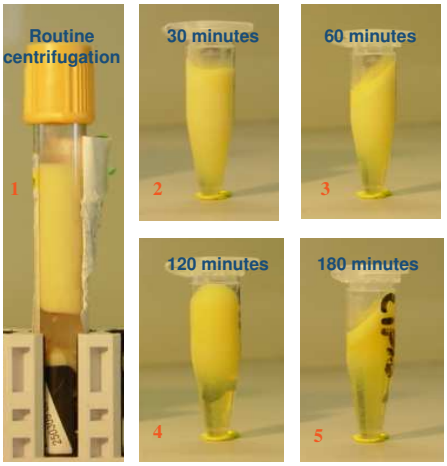
The Case

- 30 year old professional female.
- Presented to Emergency Department with abdominal pain.
- Recent marked increase in ethanol consumption.
- Noted on phlebotomy to have "milky" blood.
- Family history of early cardiac mortality and hyperlipidaemia.
- Body Mass Index 28.

Admission blood samples

- After routine centrifugation, serum was noted to be markedly lipaemic (photo 1).
- Total cholesterol measured at 56 mmol/L and triglycerides at 237 mmol/L on diluted sample.
- Routine centrifugation for lipaemic samples not effective (20 minutes at 10,000 x g).
- Laboratory instructed to "keep spinning until clear infranate obtained"
- Centrifugation for several hours required to produce sufficient clear infranate for analysis (photos 2 - 5)
- Initial blood results consistent with mild pancreatitis, alcoholic hepatitis and massive hypertriglyceridaemia (see table).
- Pancreatitis and fatty liver confirmed by imaging.

Initial Serum



Photographs 1 to 5. Admission serum sample. 1 – after routine centrifugation (10 minutes at 3000 x g). 2 to 5 – after centrifugation for the times shown at 10,000 x g.

Analyte	Units	Ref Int	2 years prior to admission	Hospital Admission						1 Month after admission
				Day 0	Day 1	Day 2	Day 3	Day 4	Day 7	
Total Cholesterol	mmol/L	<6.0	10.7	**55.6**	37	35.4	19.6	15.4	16.7	5.5
Triglycerides	mmol/L	<2.0	15.3	**237**	122	85.6	21.6	4.6	4.7	2.6
HDL Cholesterol	mmol/L	>1.0	1.8						1.7	1.3
LDL Cholesterol *	mmol/L	<4.0							13.5	
Amylase	U/L	<100		**92**	489	132	52	53	40	
Lipase	U/L	<60		**451**	1590	283	162	127	132	
ALT	U/L	<30		**81**	55		25		12	
AST	U/L	<30	28	**145**	79		44		21	
GGT	U/L	35	71	**622**	489		219		116	

Table. Blood results prior to, during and after admission. Day 0 is day of admission. Admission blood results highlighted in brown.

Progress

- Treated with standard pancreatitis treatment.
  - Nil by mouth.
  - Pain relief.
  - Omeprazole.
- Day 1 after admission.
  - Abdominal pain increased.
  - Amylase and lipase increased (see table).
  - Triglycerides reduced to 170 mmol/L.
  - Insulin and dextrose commenced (after 2nd blood sample).
- Subsequent progress.
  - Resolution of abdominal pain and pancreatic enzymes over 4 days.
  - Identification of high LDL cholesterol concentration after resolution of gross hypertriglyceridaemia on day 7 of admission
  - Near complete resolution of lipid abnormalities on follow-up at 2 months

Progress Chart

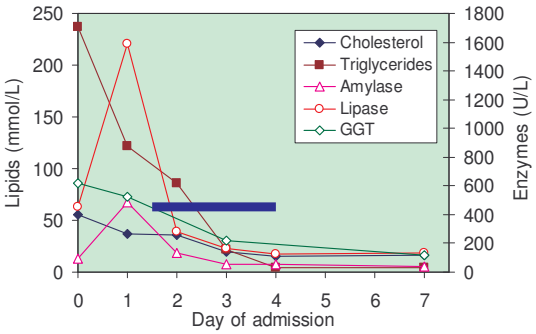


Figure 1. Graph of serum lipids and pancreatitis markers. The thick blue line indicates the period of insulin infusion.

Discussion / Conclusions

This case of hypertriglyceridaemia is the most elevated in our experience, although a triglyceride concentration of 270 mmol/L has been reported elsewhere (1). A number of points arise from this case:

- Sample preparation for routine biochemical analyses with a microfuge was achieved, however several hours centrifugation was required.
- The initial molar ratio of triglycerides to cholesterol of approximately 4:1 is consistent with chylomicron and VLDL remnants persisting due to lack of clearance by lipoprotein lipase.
- Cessation of food and ethanol lead to a rapid fall in serum triglycerides later augmented by insulin therapy. This rapid fall suggests a prominent role for ethanol in inhibition of clearance pathways in this case.
- Plasmapheresis was considered given the worsening pancreatitis and massive triglyceride concentration, but conservative management was successful.
- During the convalescence a markedly elevated LDL cholesterol was seen, giving a "Familial Hypercholesterolaemia" pattern which later resolved to give a normal lipid profile. This has been reported elsewhere (1).
- The cause of the hyperlipidaemia remains unresolved. The patient was not diabetic. Genetic tests have not been performed.

Acknowledgement / Reference

I thank the staff of the St Vincent's Hospital Chemical Pathology laboratory for their careful attention in the handling of samples from this patient.

(1) Orth M, Luley C. Diagnostic pitfalls during therapy for extreme hypertriglyceridaemia. Eur J Clin Chem Clin Biochem 1997;35:101-3.