Pseudohypertriglyceridemia

- Should be suspected when

1. there is no lipemia despite high levels of triglyceride
2. Normal total cholesterol and HDL-C despite very high levels of triglyceride
3. No history of acute pancreatitis and no response to triglyceride-lowering therapy

- Most reagents for the triglyceride concentration measurement use the enzymatic method based on glycerol reaction (oxidation or dehydrogenation), therefore, an increased amount of glycerol in the sample will result with falsely increased concentration of triglycerides
- Increased glycerol in plasma/serum could be due to exogenous or endogenous

Endogenous Glycerol	Exogenous Glycerol
Glycerol Kinase Deficiency	Glycerol ingestion
Alcoholism	Some alcoholic beverages
Hyperthyroidism	Glycerol containing medications (propofol)
Severe liver disease	Detergents & beauty produces

Box 1. Other potential causes of hyperglycerolemia.

- Critical illness (stress)
- Heparin infusions
- Glycerol-containing medications
- Intravenous lipids
- Propofol
- Glycerin suppositories
- Peritoneal dialysis solutions
- Alcoholism
- Hyperthyroidism
- Pre-analytical aging of samples
- Oral glycerol challenge tests (for hearing loss)
- Blood collection tubes with glycerol-coated stoppers
- Exposure to laboratory detergents
- Contamination with skin care products used by laboratory personnel rare instances
- Poorly controlled insulin-dependent diabetes mellitus
- Severe hepatic disease

Glycerol kinase deficiency

- Glycerol kinase catalyses the phosphorylation of glycerol by ATP to yield glycerol-3-phosphate and ADP
- Glycerol kinase deficiency is an X-linked recessive disorder causing hyperglycerolemia and hyperglyceroluria
- Glycerol is a weak inhibitor of two key enzymes in gluconeogenesis, gructose-1,6-diphosphatase and phosphoenolpyruvate carboxykinase
- Glycerol may reduce glucose formation from alanine, one of the major gluconeogenic substrate
    - Ketonemia may be the consequence of decreased gluconeogenesis
- Three forms of glycerol kinase deficiency
    1. Complex/contiguous GKD
    - Xp21 contiguous gene syndrome
    - Associated with Duchenne muscular dystrophy and congenital adrenal hypoplasia
    - Salt wasting dehydration, vomiting, failure to thrive, acidosis, lethargy, seizure, psychomotor retardation and coma
    2. Isolated symptomatic GKD
    - Wide range of symptoms from asymptomatic to childhood metabolic crisis
    3. Isolated asymptomatic GKD
    - Asymptomatic
    - Discovered in adulthood as pseudohypertriglyceridemia
- Confirmations:
    1. Glycerol blanking
    2. Urine triglyceride
    3. Mutational analysis of the GK gene
- Treatment: IV glucose for crisis, avoid fasting, low fat diet

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