



In C-A 2023, we introduced the case of a 49-year-old woman who presented to the emergency department with signs and symptoms consistent with acute pancreatitis. Laboratory testing for amylase and lipase confirmed the diagnosis and she was treated with fluids, morphine, and supportive care. Triglycerides were elevated at 2200 mg/dL (reference interval: < 150) and we asked about the possible effect of this level of hypertriglyceridemia on other clinical laboratory tests. We also asked about the approach your laboratory would take to address any suspected interference.

Almost 4000 survey participants responded to this optional educational exercise. In Question 1, given a choice of the following tests, participants selected the one most likely to be significantly affected by the level of hypertriglyceridemia found in this patient as follows:

- a. ALT: 35.1%
- b. Magnesium: 3.6%
- c. Total protein: 10.8%
- d. Sodium: 7.5%
- e. All of the above: 43%

Lipemia can interfere with the measurement of analytes in a variety of ways (1). Any assay which depends on spectrophotometry can be affected by reduced light transmittance or light scattering. ALT determined by NADH absorbance and magnesium or total protein determined by the formation of colorimetric dye complexes being examples in the above case. The increased proportion of the plasma or serum volume occupied by lipid can cause a false decrease for some analytes, depending on how the measurement is made. Sodium is distributed in the aqueous phase and methods such as indirect potentiometry would be susceptible to this type of error when the actual plasma water proportion deviates from the expected normal. Physicochemical effects such as partitioning or interference with antibody binding can affect immunoassays. There is also a tendency for lipemic specimens to exhibit increased rates of hemolysis, contributing even more potential interference. In a way, this was a trick question and the answer probably hinged on the definition of "significantly". Lipemic interference has been described for all of the four analytes listed although some are more commonly affected than others. So perhaps "all of the above" reflects the ability of lipemia, especially at the level seen in this patient, to interfere with a variety of analytes.

When asked, in Question 2, which of the following options best describes the general approach to dealing with interference due to lipemia in their laboratory, participants responded as follows:

- a. Dilution of sample to lower the level of triglycerides: 14.5%
- b. Attempt to remove interference using ultracentrifugation: 54%
- c. Report result with comment/disclaimer based on serum L index: 14.5%
- d. Cancel test and request redraw based on serum L index: 6%
- e. Other: 11%

It is not surprising that a majority of participants use ultracentrifugation to attempt to remove lipemic interference as this is the method recommended by the Clinical Laboratory Standards Institute guideline (2). Although we did not differentiate it from true ultracentrifugation (100,000 g or higher), it is likely that many of these participants depend on high speed microcentrifuges which only reach up to 20,000 g but nonetheless have been shown to be effective in mitigating lipemia interference (3). Of the approximately 400 participants who responded "other", a minority listed the use of lipid clearing reagents, but the overwhelming majority (60%) said that they refer such specimens to another laboratory for testing. Because lipemic samples often come from intensive care units or, as in our patient, emergency departments, it may behoove hospital-based laboratories to develop an effective approach to these problematic specimens.

1. Simundic AM, Dukic L, Radisic Biljak V. Preanalytical variation and pre-examination processes. In Tietz Textbook of Laboratory Medicine, 7th Edition. Elsevier 2023



2. Clinical and Laboratory Standards Institute (CLSI). Hemolysis, icterus, and lipemia/turbidity indices as indicators of interference in clinical laboratory analysis. 1st Edition. CLSI C-56, Wayne PA 2011
3. Castro-Castro M-J, Candás-Estébanez B, Esteban-Salán M et al. Removing lipemia in serum/plasma samples: a multicenter study. Ann Lab Med. 2018 Nov; 38(6):518–523.

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