A Woman with Primary Biliary Cirrhosis and Hyponatremia

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CASE DESCRIPTION

A 43-year-old woman with a medical history significant for hypertension, depression, and primary biliary cirrhosis (PBC) was admitted to the hospital after outpatient laboratory tests showed hyponatremia. Her complaints on admission included blurry vision, nausea, and significant pruritus. Her review of systems was otherwise negative. She declared no family history of hypercholesterolemia or premature heart disease. She was taking multiple medications including azathioprine, prednisone, amlodipine, losartan, prochlorperazine, sertraline, trazodone, fenofibrate, ranitidine, hydroxyzine, ursodiol, and cholestyramine. Physical exam was remarkable for scleral icterus and mild jaundice; no xanthomas were noted.

Laboratory studieswere performed (Table 1). Once more, the patient was found to have hyponatremia, along with hypokalemia and hypochloremia. Her creatinine was slightly above normal limits but stable compared with past values. A liver profile test panel showed mild increases in transaminases, increased alkaline phosphatase activity, hypoalbuminemia, significant hyperbilirubinemia, and evidence of cholestasis with increased bile acids in the blood.

The patient was started on intravenous fluids (0.9% sodium chloride). Subsequently, a lipid panel was ordered (Table 1). Her most recent total cholesterol (TC) value, measured 1.5 years prior, was 322 mg/dL (8.3 mmol/L). Current testing revealed a markedly increased plasma TC concentration of 2156 mg/dL (55.8 mmol/L). This was the highest TC value ever measured by our laboratory. Furthermore, the sample appearance was clear and not grossly viscous or lipemic. An investigation took place to determine if this was an erroneous result.

Questions to Consider
• What are possible causes of discrepant total cholesterol values?
• What steps can be taken to determine if this was an erroneous result?
• What are the implications for the patient if the results of her lipid panel are accurate?
• What are the mechanisms by which lipemia can interfere with laboratory testing?

Final Publication and Comments

The final published version with discussion and comments from the experts will appear in the August 2015 issue of *Clinical Chemistry*. To view the case and comments online, go to http://www.clinchem.org/content/vol61/issue8 and follow the link to the Clinical Case Study and Commentaries.

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Table 1. Patient laboratory results.

Test	Value	Reference range
Basic metabolic profile		
Sodium, mmol/L	121	135-145
Potassium, mmol/L	3.0	3.6-5.0
Chloride, mmol/L	87	98-109
CO_2, mmol/L	23	22-31
Blood urea nitrogen, mg/dL	16	6-23
Creatinine, mg/dL	0.98	0.51-0.95
Glucose, mg/dL	82	65-200
Calcium, mg/dL	9.5	8.4-10.2
Liver profile panel		
Aspartate aminotransferase, U/L	150	10-35
Alanine aminotransferase, U/L	122	10-35
Alkaline phosphatase, U/L	525	35-104
Bilirubin (total), mg/dL	10	0.2-1.3
Bile acids, μmol/L	>180	<10
Albumin, g/dL	2.6	3.5-5.2
Total protein, g/dL	6.7	6.6-8.7
Lipid profile (2012)		
2012		
TC, mg/dL	322	120-199
LDL cholesterol, calculated, mg/dL	225	≤99
HDL cholesterol, mg/dL	70	45-65
Triglycerides, mg/dL	137	50-150
2014		
TC, mg/dL	2156	120-199
LDL cholesterol, calculated, mg/dL	–	≤99
HDL cholesterol, mg/dL	37	45-65
Triglycerides, mg/dL	226	50-150

All measurements were made on patient plasma using a Roche Cobas® c501 instrument using manufacturer-supplied reagents and instructions. For conversion to the SI units, multiply the above values by 0.357 for blood urea nitroge; 88.4 for creatinine; 0.055 for glucose; 0.25 for calcium; 17.1 for bilirubin; 10 for albumin, total protein; 0.02586 for total, HDL, and LDL cholesterol; and 0.01129 for triglycerides.

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