MAYO CLINIC LABORATORIES

Test Definition: BAFS

Bile Acids, Fractionated and Total, Serum

Overview

Useful For

Measuring tauro- and glycol-conjugated and unconjugated bile acid constituents in serum specimens

Monitoring patients receiving bile acid therapy, such as cholic acid, deoxycholic acid, or ursodeoxycholic acid

Aiding in the evaluation of liver function; evaluation of liver function changes before the formation of more advanced clinical signs of illness such as icterus

Determining hepatic dysfunction as a result of chemical and environmental injury

Indicating hepatic histological improvement in chronic hepatitis C patients responding to interferon treatment

Indicating intrahepatic cholestasis of pregnancy

This assay is **not useful for** the diagnosis of peroxisomal biogenesis disorders or inborn errors of bile acid metabolism.

Testing Algorithm

For information see Bile Acid-Associated Tests Ordering Guide

Special Instructions

- Bile Acid-Associated Tests Ordering Guide

Highlights

Bile acids are elevated in individuals with liver dysfunction.

This bile acid test can be used in the diagnosis of intrahepatic cholestasis of pregnancy.

Fractionated bile acids, including tauro- and glycol-conjugates of cholic acid, chenodeoxycholic acid, deoxycholic acid, and ursodeoxycholic acid are individually summed and reported.

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

This test is useful in diagnosing intrahepatic cholestasis of pregnancy and does not support the assessment of either peroxisomal biogenesis disorders or inborn errors of bile acid metabolism.

For diagnostic testing for peroxisomal biogenesis disorders, order BAIPD / Bile Acids for Peroxisomal Disorders, Serum.

Specimen Required

Patient Preparation:
Fasting: 12 to 14 hours, required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send a Gastroenterology and Hepatology Test Request (T728) with the specimen.

Specimen Minimum Volume

0.3 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	90 days	
	Ambient	90 days	
	Frozen	90 days	

Clinical & Interpretive

Clinical Information

Bile acids are formed in the liver from cholesterol, conjugated primarily to glycine and taurine, stored and concentrated in the gallbladder, and secreted into the intestine after the ingestion of a meal. In the intestinal lumen, the bile acids

serve to emulsify ingested fats to promote digestion. During the absorptive phase of digestion, approximately 90% of the bile acids are reabsorbed.

The efficiency of the hepatic clearance of bile acids from portal blood maintains serum concentrations at low levels in normal persons. An elevated fasting level of bile acids due to impaired hepatic clearance is a sensitive indicator of liver disease. Following meals, serum bile acid levels have been shown to increase only slightly in normal persons, but they are markedly elevated in patients with various liver diseases, including cirrhosis, hepatitis, cholestasis, portal-vein thrombosis, Budd-Chiari syndrome, cholangitis, Wilson disease, and hemochromatosis. No increase in bile acids will be noted in patients with intestinal malabsorption. Metabolic hepatic disorders involving organic anions (eg, Gilbert disease, Crigler-Najjar syndrome, and Dubin-Johnson syndrome) do not cause abnormal serum bile acid concentrations.

Reference Values

Total cholic acid: < or =5.00 nmol/mL
Total chenodeoxycholic acid: < or =6.00 nmol/mL
Total deoxycholic acid: < or =6.00 nmol/mL
Total ursodeoxycholic acid: < or =2.00 nmol/mL
Total bile acids: < or =19.00 nmol/mL

Interpretation

Total bile acids are metabolized in the liver and can serve as a marker for normal liver function. Increases in serum bile acids are seen in patients with acute hepatitis, chronic hepatitis, liver sclerosis, liver cancer, and intrahepatic cholestasis of pregnancy.

Cautions

This test does not measure sulfated bile acids.

Clinical Reference

1. Marschall HU. Management of intrahepatic cholestasis of pregnancy. Expert Rev Gastroenterol Hepatol. 2015;9(10):1273-1279
2. Ducroq DH, Morton MS, Shadi N, et al. Analysis of serum bile acids by isotope dilution-mass spectrometry to assess the performance of routine total bile acid methods. Ann Clin Biochem. 2010;47(Pt 6):535-540
3. Piechota J, Jelski W. Intrahepatic cholestasis in pregnancy: Review of the literature. J Clin Med. 2020;9(5):1361. doi:10.3390/jcm9051361
4. Society for Maternal-Fetal Medicine (SMFM). Lee RH, Mara Greenberg, Metz TD, Pettker CM. Society for Maternal-Fetal Medicine Consult Series #53: Intrahepatic cholestasis of pregnancy: replaces consult #13, April 2011. Am J Obstet Gynecol. 2021;224(2):B2-B9. doi:10.1016/j.ajog.2020.11.002

Performance

Method Description

Bile acid concentrations in serum are measured by liquid chromatography tandem mass spectrometry stable isotope dilution analysis. Serum is mixed with isotopically labeled internal standards of selected bile acids and then subjected to protein precipitation. Sample preparation is semi-automated using a liquid handler. Reverse-phase liquid chromatography is performed using mobile phases to separate free bile acids, their respective tauro- and

glyco-conjugates, and 2 bile acid precursors.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
3 to 5 days

Specimen Retention Time
1 month

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
82542

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BAFS	Bile Acids, Fractionated and Tot, S	43130-4

Result ID	Test Result Name	Result LOINC® Value
35796	Total Cholic acid	30518-5
35797	Total Chenodeoxycholic acid	30519-3
35798	Total Deoxycholic acid	30520-1
35799	Total Ursodeoxycholic acid	55159-8
35800	Total bile acids	14628-2