MAYO CLINIC LABORATORIES

Test Definition: CHLBF

Cholesterol, Body Fluid

Overview

Useful For

Aiding in the diagnosis of a cholesterol effusion or cholesterol-rich pseudochylous effusion in body fluids

Distinguishing between chylous and pseudochylous pleural effusions

Distinguishing between malignant and nonmalignant ascites

Method Name

Colorimetry

NY State Available

No

Specimen

Specimen Type

Body Fluid

Ordering Guidance

This test provides a measurement of cholesterol in body fluids, which is useful for screening of a cholesterol effusion or cholesterol-rich pseudochylous effusion. To distinguish between chylous and nonchylous effusions, order BFLA1 / Lipid Analysis, Body Fluid; which measures cholesterol and triglyceride concentrations, as well as chylomicrons and plasma lipoproteins.

Necessary Information

1. Date and time of collection are required.

2. Specimen source is required.

Specimen Required

Preferred Source:

-Peritoneal fluid (peritoneal, abdominal, ascites, paracentesis)

-Pleural fluid (pleural, chest, thoracentesis)

-Drain fluid (drainage, JP drain)

-Pericardial fluid

Acceptable Source: Write in source name with source location (if appropriate)

Collection Container/Tube: Sterile container

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Collection Instructions:

1. Centrifuge to remove any cellular material and transfer into a plastic vial.
2. Indicate the specimen source and source location on label.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	Reject
Anticoagulant or additive Amniotic fluid Breast milk Saliva Nasal secretions Sputum Synovial fluid Bronchoalveolar lavage (BAL) or bronchial washings Colostomy/ostomy Feces Spinal fluid Gastric secretions Urine Vitreous fluid	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Body Fluid	Frozen (preferred)	30 days	
	Ambient	24 hours	
	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

Serum cholesterol is measured to determine the concentration of circulating lipoprotein particles when screening for cardiovascular disease. The concentration is affected by genetic and lifestyle factors. Cholesterol concentrations in

serous effusions increase due to exudative processes that cause cell lysis or increased vascular permeability. Measurement of cholesterol in body fluids is used for the diagnosis of a cholesterol effusion or cholesterol-rich pseudochylous effusion. Pseudochylous effusions contain low triglycerides and high cholesterol and occur from chronic pleural effusions such as rheumatic pleurisy and tuberculosis. Malignant effusions may become enriched with cholesterol due to increased synthesis and release from neoplastic cells or lymphatic obstruction.(1)

Pleural fluid:
Chylothorax is the name given to pleural effusions containing chylomicrons with accordingly high triglyceride and low cholesterol concentrations, which occurs when chyle accumulates from a disruption of the thoracic duct caused mainly by malignancy or trauma.(2)

Pseudochylous effusions accumulate gradually through the breakdown of cellular lipids in long-standing effusions such as rheumatoid pleuritis, tuberculosis, or myxedema, and by definition the effluent contains high concentrations of cholesterol, while chylous effusions contain high concentrations of triglycerides in the form of chylomicrons.(3)

Differentiation of pseudochylothorax from chylothorax is important as their milky or opalescent appearance is similar; however, therapeutic management strategies differ.

Measurement of pleural fluid cholesterol has also been investigated in multiple studies for the purpose of differentiating exudates from transudates.(4) Most of these studies concluded that cholesterol performs as well as measurement of lactate dehydrogenase and total protein applying Light's criteria, but does not add much value beyond that.

Peritoneal fluid:
Ascites is the pathologic accumulation of excess fluid in the peritoneal cavity. Cholesterol analysis in peritoneal fluid may be a useful index to separate malignant ascites from nonmalignant, often cirrhotic ascites. Studies report concentrations ranging from greater than 32 to 70 mg/dL are greater than 88% sensitive and greater than 80% specific for malignant ascites, outperforming cytology.(4)

Reference Values

An interpretive report will be provided.

Interpretation

Pleural fluid cholesterol concentrations between 46 to 65 mg/dL are consistent with exudative effusions. Cholesterol concentrations above 200 mg/dL suggest a pseudochylous effusion.(2)

Peritoneal fluid cholesterol concentrations between 33 to 70 mg/dL suggest a malignant cause of ascites.(4)

Cautions

In very rare cases, gammopathy, in particular type IgM (Waldenstrom macroglobulinemia), may cause unreliable results.

Acetaminophen intoxications are frequently treated with N-acetylcysteine.

N-acetylcysteine, at the therapeutic concentration when used as an antidote, and the acetaminophen metabolite N-acetyl-p-benzoquinone imine (NAPQI), may independently cause falsely low results.

Clinical Reference

1. Gulyas M, Kaposi AD, Elek G, Szollar LG, Hjerpe A. Value of carcinoembryonic antigen (CEA) and cholesterol assays of ascitic fluid in cases of inconclusive cytology. J Clin Pathol. 2001;54(11):831-5. doi:10.1136/jcp.54.11.831
2. Hooper C, Lee YC, Maskell N. BTS Pleural Guideline Group. Investigation of a unilateral pleural effusion in adults: British Thoracic Society Pleural Disease Guideline 2010. Thorax. 2010;65 Suppl 2:ii4-17. doi:10.1136/thx.2010.136978
3. Staats BA, Ellefson RD, Budahn LL, et al. The lipoprotein profile of chylous and nonchylous pleural effusions. Mayo Clin Proc. 1980;55(11):700-704
4. Block DR, Algeciras-Schimnich A. Body fluid analysis: clinical utility and applicability of published studies to guide interpretation of today's laboratory testing in serous fluids. Crit Rev Clin Lab Sci. 2013;50:107-124. doi:10.3109/10408363.2013.844679
5. Bhatnagar M, Fisher A, Ramsaroop S, Carter A, Pippard B. Chylothorax: pathophysiology, diagnosis, and management - a comprehensive review: J Thorac Dis. 2024;16(2):1645-1661. doi:10.21037/jtd-23-1636

Performance

Method Description

Cholesterol esters are cleaved by the action of cholesterol esterase to yield free cholesterol and fatty acid. Cholesterol oxidase then catalyzes the oxidation of cholesterol to cholest-4-en-3-one and hydrogen peroxide. In the presence of peroxidase, the hydrogen peroxide formed effects the oxidative coupling of phenol and 4-aminophenazone to form a red quinone-imine dye. The color intensity of the dye formed is directly proportional to the cholesterol concentration. It is determined by measuring the increase in absorbance.(Package insert: CHOL2, Cholesterol Gen 2. Roche Diagnostics; V 13.0, 10/2023)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

Same day/1 to 2 days

Specimen Retention Time

7 days

Performing Laboratory Location

Mayo Clinic Jacksonville Clinical Lab

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 has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

84311-Spectrophotometry, analyte not specified (cholesterol)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CHLBF	Cholesterol, BF	12183-0

Result ID	Test Result Name	Result LOINC® Value
FLD25	Fluid Type:	14725-6
BFCHL	Cholesterol (BF)	12183-0