Test Definition: BFLA1

Lipid Analysis, Body Fluid

Overview

Useful For
Distinguishing between chylous and nonchylous effusions

Method Name
Colorimetry/Spectrophotometry (SP)/Electrophoresis

NY State Available
Yes

Specimen

Specimen Type
Body Fluid

Necessary Information
1. Date and time of collection are required.
2. Specimen source is required.

Specimen Required
Specimen Type: Body fluid
Preferred Sources:
-Peritoneal fluid (peritoneal, abdominal, ascites, paracentesis)
-Pleural fluid (pleural, chest, thoracentesis)
-Drain fluid (drainage, JP drain)
-Pericardial
Acceptable Source:
Collection Container/Tube: Sterile container, no additive
Submission Container/Tube: Plastic vial
Specimen Volume: 3 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
2.5 mL

Reject Due To

Gross hemolysis	OK

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

Measurement of cholesterol and triglycerides combined with detection of chylomicrons in body fluids is useful for diagnosing chylous effusion or differentiating from pseudochylous effusion.(1) Chylous effusions are characterized by the presence of chyle, which contains chylomicrons circulating through the lymphatic system. Pseudochylous effusions do not have chylomicrons. Cholesterol concentrations in serous effusions increase over time due to chronic exudative processes that cause cell lysis or increased vascular permeability. These fluids have a milky appearance can be confused with chylous effusions. While chylous effusions often have elevated triglyceride concentrations and decreased cholesterol concentrations, identification of chylomicrons is considered the gold standard for the diagnosis.

Pleural Fluid:
Chylothorax is the name given to pleural effusions containing chylomicrons. They develop when chyle accumulates from disruption of the lymphatic system, often the thoracic duct, caused mainly by malignancy or trauma.(1) Lymph fluid

contains chylomicron-rich chyle characterized by high concentrations of triglycerides. Pseudochylous effusions are the name given to milky appearing effusions that do not contain lymphatic contents but rather form 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.(2) Differentiation of pseudochylothorax from chylothorax is important as their milky or opalescent appearance is similar, however therapeutic management strategies differ.

Peritoneal Fluid:
Chylous ascites is the name given to peritoneal effusions containing chylomicrons. Obstruction of lymph flow causing leakage from dilated subserosal lymphatics, exudation through the walls of retroperitoneal megalymphatics, and direct leakage of chyle due to a lymphoperitoneal fistula have been proposed as possible mechanisms causing chylous ascites.(3) Elevated triglyceride concentrations have the best correlation with detection of chylomicrons, while cholesterol is not useful at predicting the presence or absence of chylomicrons.

Reference Values

An interpretive report will be provided.

Interpretation

Pleural Fluid:
Pleural fluid cholesterol concentrations 46 to 65 mg/dL are consistent with exudative effusions.
Cholesterol concentrations greater than 200 mg/dL suggest pseudochylous effusion.
Triglyceride concentrations greater than 110 mg/dL are consistent with chylous effusions.
Triglyceride concentrations less than 50 mg/dL are usually not due to chylous effusions.

Peritoneal Fluid:
Peritoneal fluid triglyceride concentrations greater than 187 mg/dL are most consistent with chylous effusion.
Cholesterol concentrations 33 to 70 mg/dL suggest malignant causes of ascites.

Cautions

No significant cautionary statements

Clinical Reference

1. 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-ii17
2. Staats BA, Ellefson RD, Budahn LL, Dines DE, Prakash UB, Offord K. The lipoprotein profile of chylous and nonchylous pleural effusions. Mayo Clin Proc. 1980;55(11):700-704
3. Thaler MA, Bietenbeck A, Schulz C, Luppa PB. Establishment of triglyceride cut-off values to detect chylous ascites and pleural effusions. Clin Biochem. 2017;50(3) 134-138
4. Burtis CA, Ashwood ER, Bruns DE, Tietz NW, eds. In: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 5th ed. Elsevier; 2012:1 (xviii, 2238)
5. Noble RP. Electrophoretic separation of plasma lipoproteins in agarose gel. J Lipid Res 1968;9(6):693-700
6. Sepiashvili L, Dahl AR, Meeusen JM, Loftus CG, Donato LJ. A man with recurrent ascites after laparoscopic cholecystectomy. Clin Chem. 2017;63(7):1199-1203
7. Ellefson RD, Elveback L, Weidman W. Application of methods used for lipoprotein analysis: plasma lipoproteins of children and youths in Rochester, MN. DHEW Publication No. (NIH). 1978;78-1472

Performance

Method Description

Electrophoresis:
Samples are analyzed for qualitative interpretation of chylomicrons and plasma lipoproteins using a lipid specific Sudan black stain.(Package insert: Hydragel 7, 15 and 30 LIPO + Lp(a). Sebia Inc; 07/2020)

Cholesterol:
Cholesterol esters are cleaved by the action of cholesterol esterase to yield free cholesterol and fatty acids. 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: Cholesterol Gen2 Reagent. Roche Diagnostics; V 16.0, 10/2023)

Triglycerides:
Samples analyzed for triglycerides are measured by an automated enzymatic method. The chemistry includes hydrolysis of the triglycerides and phosphorylation of the resulting glycerol.(Package insert: Triglycerides Reagent. Roche Diagnostics; V13.0, 03/2022)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

3 to 4 days

Specimen Retention Time

3 weeks

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

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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

82664-Electrophoretic technique, not elsewhere specified (Chylomicrons and lipoproteins)
84311-Spectrophotometry, analyte not specified (Cholesterol)
84478-Triglycerides

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BFLA1	Lipid Analysis, BF	94872-9

Result ID	Test Result Name	Result LOINC® Value
BFCMT	Comment	21025-2
FLD28	Fluid Type:	14725-6
BFCHO	Cholesterol, BF	12183-0
BFTRG	Triglycerides, BF	12228-3