Overview

Useful For

Pleural fluid: Identification of exudative pleural effusions

Peritoneal fluid: Differentiating hepatic from other causes of ascites that have elevated serum ascites albumin gradient (SAAG)

Method Name

Photometric, Biuret

NY State Available

Yes

Specimen

Specimen Type

Body Fluid

Advisory Information

For spinal fluid, see test TPSF / Protein, Total, Spinal Fluid.

Specimen Required

Container/Tube: Sterile container

Specimen Volume: 1 mL

Collection Instructions:

1. Centrifuge to remove any cellular material.

2. Indicate specimen source.

Specimen Minimum Volume

0.5 mL

Reject Due To

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
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<tr>
<td></td>
<td>Breast milk, nasal secretions, gastric secretions, bronchoalveolar lavage (BAL or bronchial washings), colostomy/ostomy, or vitreous fluid</td>
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<table>
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<tr>
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<th>Temperature</th>
<th>Time</th>
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<tbody>
<tr>
<td>Body Fluid</td>
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Clinical and Interpretive

Clinical Information

Pleural fluid: Pleural fluid is normally present within the pleural cavity surrounding the lungs, serving as a lubricant between the lungs and inner chest wall. Pleural effusion develops when the pleural cavity experiences an overproduction of fluid due to increased capillary hydrostatic and osmotic pressure that exceeds the ability of the lymphatic or venous system to return the fluid to circulation. Laboratory-based criteria are often used to classify pleural effusions as either exudative or transudative. Exudative effusions form due to infection or inflammation of the capillary membranes allowing excess fluid into the pleural cavity. Patients with these conditions benefit from further investigation and treatment of the local cause of inflammation. Transudative effusions form due to systemic conditions such as volume overload, end stage renal disease, and heart failure that can lead to excess fluid accumulation in the pleural cavity. Patients with transudative effusions benefit from treatment of the underlying condition.(1)

Dr. Richard Light derived criteria in the 1970s for patients with pleural effusions that are still used today.(2) The criteria include the measurement of total protein and lactate dehydrogenase (LD) in pleural fluid and serum. Exudates are defined as meeting one of the following criteria:

1) pleural fluid-to-serum protein ratio above 0.5
2) pleural fluid LD above two-thirds the upper limit of normal serum LD
3) pleural fluid-to-serum LD ratio above 0.6

Light's criteria were designed to be sensitive for detecting exudates at the expense of specificity.(3) Heart failure and recent diuretic use contribute to most misclassifications by Light's criteria (transudates falsely categorized as exudates). Serum-to-fluid protein gradient (serum protein minus fluid protein) may be calculated in these cases and when more than 3.1 g/dL suggests the patient has a transudative effusion.

Peritoneal fluid: The pathologic accumulation of fluid within the peritoneal cavity is commonly referred to as ascites. The most common cause of ascites is liver cirrhosis. Differentiating cardiac from cirrhotic ascites is a common clinical conundrum as they are common conditions presenting with elevated serum ascites albumin gradient (SAAG).(4) Heart failure leads to the development of high gradient ascites due to hepatic sinusoidal hypertension. Since the sinusoids are normal and have not been damaged from collagen deposition associated with cirrhosis, protein tends to leak more readily into ascites and is associated with higher total protein concentrations.

Reference Values
Not applicable

Interpretation

Pleural fluid: Exudative pleural fluid total protein to serum total protein ratio is typically more than 0.5. Transudative pleural effusions misclassified as exudates have serum protein minus pleural fluid protein more than 3.1 g/dL.

Peritoneal fluid: Total protein may be greater than 2.5 g/dL in patients with high albumin gradient ascites caused by heart failure.

Other fluids: Total protein may be used to differentiate transudative from exudative effusions. The decision limits are not well defined in fluids other than pleural fluid and should be interpreted in conjunction with other clinical findings.
Cautions
Total protein may be falsely elevated in samples that contain blood due to trauma during collection.

Clinical Reference


Performance

Method Description
Divalent copper reacts in alkaline solution with protein peptide bonds to form the characteristic purple-colored biuret complex. Sodium potassium tartrate prevents the precipitation of copper hydroxide and potassium iodide prevents auto-reduction of copper. The color intensity is directly proportional to the protein concentration which can be determined photometrically.(Package insert: Roche Protein reagent, Roche Diagnostic Corp., Indianapolis, IN 1999)

PDF Report
No

Day(s) and Time(s) Test Performed
Monday through Sunday; Continuously

Analytic Time
Same day/1day

Maximum Laboratory Time
2 days

Specimen Retention Time
1 week

Performing Laboratory Location
Rochester

Fees and 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 Regional Manager. For assistance, contact Customer Service.
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 U.S. Food and Drug Administration.

**CPT Code Information**

84157

**LOINC® Information**

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