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| **Protein, Body Fluid** | | |
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| **Pericardial Fluid Protein** | | |
| Clinical Indications | Supportive evidence for differentiation of exudates and transudates | |
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| Reference Interval and/or Interpretive Information | Fluid-to-serum protein ratio of >0.5 is one component of Light’s criteria for differentiating exudates from transudates, and has been applied to pericardial fluids in one report. [1] | |
| While the sensitivity in another study for detection of pericardial effusion was 97% (when using fluid total protein >3 g/dL) and 96% (when using fluid-to-serum protein ratio of >0.5), these tests have poor specificity (22% and 13%, respectively). [2] | |
| In a study of 30 patients undergoing elective open heart surgery (without evidence of pericardial disease), the “normal” pericardial fluid total protein was 3.3 g/dL (99% confidence interval, 2.8-3.8 g/dL). [3]This was also expressed as a “normal” mean fluid-to-serum protein ratio of 0.6 (99% confidence interval, 0.5-0.7). [3] | |
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| References | [1] Burgess LJ, Reuter H, Taljaard JJF, Doubell AF. 2002. Role of biochemical tests in the diagnosis of large pericardial effusions. CHEST. 121(2):495-499. | |
| [2] Meyers DG, Meyers RE, Prendergast TW. 1997. The usefulness of diagnostic tests on pericardial fluid. Chest. 111(5):1213-21. | |
| [3] Ben-Horin S, Shinfeld A, Kachel E, Chetrit A, Livneh A. 2005. The composition of normal pericardial fluid and its implications for diagnosing pericardial effusions. The American Journal of Medicine. 118:636-640. | |
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| **CSF Protein** | | |
| Clinical Indications | Supportive information for the differentiation of bacterial, fungal, and viral CNS infection. | |
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| Reference Interval and/or Interpretive Information | CSF [1] | mg/dL |
| Premature | 15 - 130 |
| Full-term newborn | 40 - 120 |
| < 1 month | 20 - 80 |
| General | 15 - 40 |
| Lumbar fluid | 15 - 45 |
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| References | [1] Tietz NW, editor. Clinical Guide to Laboratory Tests, 3rd ed. Philadelphia, PA: WB Saunders; 1995:520. | |
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| **Peritoneal/​Ascites Fluid Protein** | | |
| Clinical Indications | Supportive evidence for the evaluation of ascites | |
|  | Supportive evidence for differentiation of secondary from primary bacterial peritonitis | |
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| Reference Interval and/or Interpretive Information | Serum ascites albumin gradient (SAAG) has been a more widely accepted method (versus traditional “exudate versus transudate” concepts using total protein) to differentiate ascites related to portal hypertension. [1,2] | |
| The American Association for the Study of Liver Disease practice guideline, Management of Adult Patients with Ascites Due to Cirrhosis (Update 2012) includes the testing of ascitic fluid total protein as “routine”. [3] | |
| Some sources have suggested that total protein measurement in peritoneal fluid is of “limited value”. [4,5] | |
| Others have suggested that in patients with SAAG <1.1g/dL, ascites fluid total protein (using a 2.5 g/dL cutoff) is useful as a supplementary test in distinguishing several categories of potential causes for ascites. [6] | |
| Differentiation of secondary bacterial peritonitis (GI tract perforation) from spontaneous primary bacterial peritonitis is supported when two of the following three criteria are present: ascites fluid total protein >1g/dL, ascites fluid glucose <50 mg/dL, and ascites fluid LDH >225 IU/L (or greater than the serum upper reference limit). [7,8] | |
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| References | [1] Runyon BA, Montano AA, Akriviadis EA, Antillon MR, Irving MA, McHutchison JG. 1992. The serum-ascites albumin gradient is superior to the exudate-transudate concept in the differential diagnosis of ascites. Ann Int Med. 117(3):215-20. | |
| [2] Burgess LJ. 2004. Biochemical analysis of pleural, peritoneal, and pericardial effusions. Clin Chim Acta. 343:61-84. | |
| [3] Runyon BA. 2012. Practice Guideline. Management of Adult Patients with Ascites Due to Cirrhosis: Update 2012. American Association for the Study of Liver Diseases. | |
| [4] Karcher DS, McPherson RA. Chapter 29: Cerebrospinal, synovial, serous body fluids, and alternative specimens. In Henry’s Clinical Diagnosis and Management by Laboratory Methods. 22nd Ed. McPherson RA, Pincus MR. Eds. Elsevier Saunders: Philadelphia, PA, 2011. ISBN: 1437709745. | |
| [5] Kjeldsberg CR, Straseski JA, Couturier MR, Cohen MB. Chapter 6: Peritoneal fluid. In Kjeldsberg’s Body Fluid Analysis. Hussong JW and Kjeldsberg CR, Eds. ASCP Press: Chicago, IL, 2015. ISBN: 978-089189-5824. | |
| [6] McGibbon A, Chen GI, Peltekian KM, van Zanten SV. 2007. An evidence-based manual for abdominal paracentesis. Dig Dis Sci. 52(12):3307-15. | |
| [7] Runyon BA, Hoefs JC. 1984. Ascitic fluid analysis in the differentiation of spontaneous bacterial peritonitis from gastrointestinal tract perforation into ascitic fluid. Hepatology. 4(3):447-450. | |
| [8] Block DR, Franke DDH. Quick Guide to Body Fluid Testing. AACC Press (Washington, DC), 2015. ISBN 978-1-59425-180-1. | |
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| **Pleural Fluid Protein** | | |
| Clinical Indications | Differentiation of exudates and transudates | |
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| Reference Interval and/or Interpretive Information | Light’s criteria can be used to identify most pleural exudative effusions if one or more of the following criteria are present: pleural fluid-to-serum protein ratio of >0.5, pleural fluid-to-serum LDH ratio of >0.6, or a pleural fluid LDH activity that is >2/3 the upper limit of a normal serum LDH activity. [1,2,3,4] | |
| Heart failure associated misclassifications (by Light’s criteria) may be differentiated as transudative effusions by subsequently evaluating a serum-to-pleural albumin gradient (>1.2 g/dL) and/or a serum-to-fluid protein gradient (>3.1 g/dL). [3,5] | |
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| References | [1] Light RW, MacGregor MI, Luchsinger PC, Ball WC. 1972. Pleural effusions: the diagnostic separation of transudates and exudates. Annals of Internal Medicine. 77:507-513. | |
| [2] Hooper C, Lee YCG, Maskell N, on behalf of the BTS Pleural Guideline Group. 2010. Investigation of a unilateral pleural effusion in adults: British Thoracic Society pleural disease guideline 2010. Thorax. 65(Suppl 2):ii4-ii17 | |
| [3] Porcel JM, Light RW. 2006. Diagnostic approach to pleural fluids in adults. American Family Physician. 73(7):1211-1220. | |
| [4] Karcher DS, McPherson RA. Chapter 29: Cerebrospinal, synovial, serous body fluids, and alternative specimens. In Henry’s Clinical Diagnosis and Management by Laboratory Methods. 22nd Ed. McPherson RA, Pincus MR. Eds. Elsevier Saunders: Philadelphia, PA, 2011. ISBN: 1437709745. | |
| [5] Porcel JM. 2013. Identifying transudates misclassified by Light’s criteria. Curr Opin Pulm Med. 19:362-367. | |
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| **Synovial Fluid Protein** | | |
| Clinical Indications | Not well-defined | |
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| Reference Interval and/or Interpretive Information | The reference range for total protein in synovial fluid has been described as 1.0-3.0 g/dL. [1] | |
| Synovial fluid total protein (typically >3.0 g/dL) may be found in a variety of inflammatory, infectious, or hemorrhagic conditions. [2] | |
| Routine testing is generally not recommended as results are often “not informative.” [3,4] | |
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| References | [1] Karcher DS, McPherson RA. Chapter 29: Cerebrospinal, synovial, serous body fluids, and alternative specimens. In Henry’s Clinical Diagnosis and Management by Laboratory Methods. 22nd Ed. McPherson RA, Pincus MR. Eds. Elsevier Saunders: Philadelphia, PA, 2011. ISBN: 1437709745. | |
| [2] Couturier MR, Straseski JA, Kjeldsberg CR. Chapter 7: Synovial fluid. In Kjeldsberg’s Body Fluid Analysis. Hussong JW and Kjeldsberg CR, Eds. ASCP Press: Chicago, IL, 2015. ISBN: 978-089189-5824. | |
| [3] Shmerling RH, Delbanco TL, Tosteson ANA, Trentham DE. 1990. Synovial fluid tests: what should be ordered? JAMA. 264(8):1009-1014. | |
| [4] Margaretten ME, Kohlwes J, Moore D, Bent S. 2007. Does this adult patient have septic arthritis? JAMA. 297(13):1478-1488. | |
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| https://www.aruplab.com/bodyfluids | | |