MAYO CLINIC LABORATORIES

Test Definition: CEAPT

Carcinoembryonic Antigen (CEA), Peritoneal Fluid

Overview

Useful For

An adjunct to cytology to differentiate between malignancy-related and benign causes of ascites formation

Method Name

Immunoenzymatic Assay

NY State Available

Yes

Specimen

Specimen Type

Peritoneal

Specimen Required

Container/Tube: Plain, plastic, screw top tube

Specimen Volume: 2 mL

Forms

If not ordering electronically, complete, print, and send an Oncology Test Request (T729) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Peritoneal	Frozen (preferred)	90 days	
	Ambient	7 days	
	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

Malignancy accounts for approximately 7% of cases of ascites formation. Malignant disease can cause ascites by various mechanisms including peritoneal carcinomatosis (53%), massive liver metastasis causing portal hypertension (13%), peritoneal carcinomatosis plus massive liver metastasis (13%), hepatocellular carcinoma plus cirrhosis (7%), and chylous ascites due to lymphoma (7%). The evaluation and diagnosis of malignancy-related ascites is based on the patient clinical history, ascites fluid analysis, and imaging tests.

The overall sensitivity of cytology for the detection of malignancy-related ascites ranges from 58% to 75%. Cytology examination is most successful in patients with ascites related to peritoneal carcinomatosis as viable malignant cells are exfoliated into the ascitic fluid. However, only approximately 53% of patients with malignancy-related ascites have peritoneal carcinomatosis. Patients with other causes of malignancy-related ascites almost always have a negative cytology.

Carcinoembryonic antigen (CEA) is a glycoprotein that is shed from the surface of malignant cells. Measurement of CEA in ascitic fluid has been proposed as a helpful test in detecting malignancy-related ascites given the limited sensitivity of cytology.

Reference Values

An interpretive report will be provided.

Interpretation

A peritoneal fluid carcinoembryonic antigen (CEA) concentration greater than 6.0 ng/mLis suspicious, but not diagnostic, of malignancy-related ascites. This clinical decision limit cutoff yielded 48% sensitivity and 99% specificity in a study of 137 patients presenting with ascites. CEA concentrations were significantly higher in ascites caused by malignancies known to be associated with elevated serum CEA levels, including lung, breast, ovarian, gastrointestinal, and colorectal cancers. However, ascites caused by other malignancies, such as lymphoma, mesothelioma, leukemia, and melanoma and hepatocellular carcinoma, routinely had CEA concentrations less than 6.0 ng/mL. Therefore, negative results should be interpreted with caution, especially in patients who have, or are suspected of having, a malignancy not associated with elevated CEA levels in serum.

Cautions

Do not use peritoneal fluid carcinoembryonic antigen (CEA) concentration as absolute evidence of the presence or the absence of malignant disease. The CEA result should be interpreted in conjunction with information from the clinical evaluation of the patient and other diagnostic procedures.

In some immunoassays, the presence of unusually high concentrations of analyte may result in a high-dose "hook" effect. This may result in a lower or even normal measured analyte concentration. If the reported result is inconsistent with the clinical presentation, the laboratory should be alerted for troubleshooting.

In rare cases, some individuals can develop antibodies to mouse or other animal antibodies (often referred to as human anti-mouse antibodies [HAMA] or heterophile antibodies), which may cause interference in some immunoassays. Caution should be used in interpretation of results and the laboratory should be alerted if the result does not correlate with the clinical presentation.

CEA values are method-dependent; therefore, the same method should be used if patients are serially monitored.

Clinical Reference

1. Torresini RJ, Prolla JC, Diehl AR, Morais EK, Jobim LF: Combined carcinoembryonic antigen and cytopathologic examination in ascites. Acta Cytol. 2000 Sep-Oct;44(5):778-782
2. Tuzun Y, Yilmaz S, Dursun M, et al: How to increase the diagnostic value of malignancy-related ascites: discriminative ability of the ascitic tumour markers. J Int Med Res. 2009 Jan-Feb;37(1):87-95
3. Kaleta EJ, Tolan NV, Ness KA, O'Kane D, Algeciras-Schimnich A: CEA, AFP and CA 19-9 analysis in peritoneal fluid to differentiate causes of ascites formation. Clin Biochem. 2013 Jun;46(9):814-818. doi: 10.1016/j.clinbiochem.2013.02.010
4. Trape J, Sant F, Montesinos J, et al: Comparative assessment of two strategies for interpreting tumor markers in ascitic effusions. In Vivo. 2020 Mar-Apr;34(2):715-722. doi: 10.21873/invivo.11829

Performance

Method Description

The instrument used is Beckman Coulter UniCel DXI 800. The Access CEA assay is a 2-site immunoenzymatic sandwich assay using mouse monoclonal carcinoembryonic antigen (CEA) antibodies that react with different epitopes of CEA. A sample is added to a reaction vessel, along with the first CEA monoclonal antibodies-alkaline phosphatase conjugate and the second CEA monoclonal antibodies bound to paramagnetic particles. The incubation is followed by a magnetic separation and washing. A chemiluminescent substrate is added to the vessel, and the light generated by the reaction is measured with a luminometer. The light production is proportional to the concentration of CEA in the sample. The amount of analyte in the sample is determined by means of a stored, multipoint calibrator curve.(Package insert: Access CEA Assay, Beckman Coulter, Inc; 2020)

For all samples with CEA concentrations greater than 3 ng/mL, a dilution series is performed. A linear dilution excludes hooking and most major interferences. Samples that contain CEA concentrations less than or equal to 3 ng/mL are spiked with exogenous CEA to identify possible interferences that may cause a false-low result.

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

1 to 3 days

Specimen Retention Time

12 months

Performing Laboratory Location

Rochester

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

82378

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CEAPT	CEA, Peritoneal Fluid	40622-3

Result ID	Test Result Name	Result LOINC® Value
CEAPN	CEA, Peritoneal Fluid	40622-3
SITED	Site	39111-0