Alzheimer's Disease Markers, CSF

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Featured ARUP Testing

Alzheimer's Disease Markers, CSF 3017653

Method: Quantitative Electrochemiluminescent Immunoassay (ECLIA)

The Alzheimer's Disease Markers, CSF panel is intended for use in adult patients aged 55 years and older being evaluated for Alzheimer's disease (AD) and other causes of cognitive impairment. This test uses electrochemiluminescence immunoassays for the measurement of beta (β)-amyloid (1-42) (Abeta42), phospho-tau (181P) (pTau181), and total tau (tTau) protein concentrations in cerebrospinal fluid (CSF). These measurements are used to calculate pTau181/Abeta42 and tTau/Abeta42 ratios, which show good concordance with amyloid positron emission tomography (PET). These ratio results are used as an adjunct to other clinical diagnostic evaluations.

Disease Overview

AD is a neurodegenerative disorder characterized by progressive memory loss and eventual dementia.[1,2] AD is primarily diagnosed through clinical examination, which may be supported by amyloid PET imaging and laboratory testing.[1,2,3,4]

β-amyloid and tau proteins, including phosphorylated tau, have been studied for potential utility as biomarkers of AD.[4] The ratios of pTau181/Abeta42 and tTau/Abeta42 in CSF have an approximately 90% agreement with amyloid PET and provide information that may support or aid in ruling out an AD diagnosis, potentially reducing the need for imaging.[3]

Specimen Collection and Preparation

Kits Used

This test uses the following kits from Roche Diagnostics Corporation:

- Elecsys β-Amyloid (1-42) CSF II
- Elecsys Phospho-Tau (181P) CSF
- Elecsys Total-Tau CSF

Collection Tubes

Specimens must be collected in a low-bind polypropylene tube.

- Preferred: 2.5 mL low-bind false bottom CSF tube (Sarstedt 63.614.625)
  - An ARUP collection kit (ARUP Supply #55810) may be used if desired. This kit is available online through eSupply using ARUP Connect™ or by contacting ARUP Client Services at 800-522-2787.
- Acceptable: 1.5 mL or 2 mL low-bind false bottom CSF tubes
- Not acceptable: any other tubes, including polystyrene tubes
  - Exposing CSF to polystyrene may decrease Abeta42 concentrations.

Specimen Collection

Collection Steps

1. Perform lumbar puncture and discard the first 1 to 2 mL of CSF.
2. Collect CSF directly into low-bind false bottom CSF tube using the drip method.
   a. Avoid the use of syringes or extension tubing.
   b. Fill the tube at least 50% full.

3. Do not process the CSF sample before transport.
    a. Do not mix/invert, transfer tubes, or aliquot.
    b. Centrifugation should be avoided.
    c. Attempt to maintain the tube in an upright position.
4. Freeze or refrigerate specimen.
    a. Avoid thawing frozen specimens. Do not refreeze thawed specimens.
5. Send specimen in original collection tube (do not aliquot).

Note: Samples must **not** undergo any freeze/thaw cycles.

Test Interpretation

Analytic Sensitivity

The concentrations of pTau181, Abeta42, and tTau are used to calculate two ratios:

Reportable Ranges for Ratios Calculated by Alzheimer's Disease Markers, CSF	
Ratio	**Reportable Range**
pTau181/Abeta42	0.003 to 0.800
tTau/Abeta42	0.032 to 8.667

Results Interpretation

The pTau181/Abeta42 and tTau/Abeta42 ratio are reported. The concentrations of individual analytes are not reported.

Results and Interpretation for Alzheimer's Disease Markers, CSF		
pTau181/Abeta42 CSF ratio		
Numerical Ratio	**Interpretation**	**Clinical Implications**
≤0.023	Negative (below cutoff)	Consistent with negative amyloid PET scan result Reduces the likelihood that a patient's cognitive impairment is due to AD
>0.023	Positive (above cutoff)	Consistent with positive amyloid PET scan result Does not establish a diagnosis of AD or other cognitive disorders
tTau/Abeta42 ratio		
Numerical Ratio	**Interpretation**	**Clinical Implications**
≤0.28	Negative (below cutoff)	Consistent with a negative amyloid PET scan result Reduces the likelihood that a patient's cognitive impairment is due to AD
>0.28	Positive (above cutoff)	Consistent with a positive amyloid PET scan result Does not establish a diagnosis of AD or other cognitive disorders

Limitations

- Failure to adhere to the sample collection instructions provided may result in falsely reduced Abeta42 concentrations and therefore false elevations in the reported ratios.

- Reported ratios have not been FDA approved for predicting development of dementia or other neurologic conditions or for monitoring responses to therapies.
  - Results of this test must always be interpreted in the context of other clinical diagnostic evaluations and should not be used alone to establish a diagnosis of Alzheimer's disease or other cognitive disorders.
- Results obtained with different assay methods or kits other than the stated Roche Diagnostics Inc. electrochemiluminescence assays may be different and cannot be used interchangeably.

References

1. Bird TD. Alzheimer disease overview. In: Adam MP, Feldman J, Mirzaa GM, et al, eds. *GeneReviews*. University of Washington, Seattle. Updated Dec 2018; accessed Aug 2024.

2. McKhann GM, Knopman DS, Chertkow H, et al. The diagnosis of dementia due to Alzheimer's disease: recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. *Alzheimers Dement*. 2011;7(3):263-269.

3. Hansson O, Seibyl J, Stomrud E, et al. CSF biomarkers of Alzheimer's disease concord with amyloid-β PET and predict clinical progression: a study of fully automated immunoassays in BioFINDER and ADNI cohorts. *Alzheimers Dement*. 2018;14(11):1470-1481.

4. Jack CR Jr, Bennett DA, Blennow K, et al. NIA-AA Research Framework: toward a biological definition of Alzheimer's disease. *Alzheimers Dement*. 2018;14(4):535-562.

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