MAYO CLINIC LABORATORIES

Test Definition: PBNP1

NT-Pro B-Type Natriuretic Peptide, Serum

Overview

Useful For
Aiding in the diagnosis of congestive heart failure using serum specimens

Testing Algorithm
For more information see Amyloidosis: Laboratory Approach to Diagnosis

Special Instructions
- Amyloidosis: Laboratory Approach to Diagnosis

Method Name
Electrochemiluminescence Immunoassay

NY State Available
Yes

Specimen

Specimen Type
Serum

Necessary Information
Patient's age and sex are required.

Specimen Required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL
Collection Instructions:
1. Within 2 hours of collection, centrifuge the specimen.
2. For red-top tubes, aliquot the serum into a plastic vial.

Forms
If not ordering electronically, complete, print, and send a Cardiovascular Test Request Form (T724) with the specimen.

Specimen Minimum Volume
0.5 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Frozen (preferred)	365 days	
	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

B-type natriuretic peptide (previously brain natriuretic peptide: BNP) is a small, ringed peptide secreted by the heart to regulate blood pressure and fluid balance.(1) This peptide is stored in, and secreted predominantly from, membrane granules in the heart ventricles in a pro form (proBNP). Once released from the heart in response to ventricle volume expansion or pressure overload, the N-terminal (NT) piece of 76 amino acids (NT-proBNP) is rapidly cleaved by the enzymes corin (atrial natriuretic peptide-converting enzyme) and furin to release the active 32-amino acid peptide (BNP).(2)

Both BNP and NT-proBNP are markers of atrial and ventricular distension due to increased intracardiac pressure. The New York Heart Association (NYHA) developed a 4-stage functional classification system for congestive heart failure (CHF) based on the severity of the symptoms. Studies have demonstrated that the measured concentrations of circulating BNP and NT-proBNP increase with the severity of CHF based on the NYHA classification.

Reference Values

Males
0-2 days: 321-11,987 pg/mL
3-11 days: 263-5918 pg/mL
12 days-1 month: Not applicable
2 months-1 year: 37-646 pg/mL
2 years: 39-413 pg/mL
3 years-6 years: 23-289 pg/mL
7 years-14 years: < or =157 pg/mL
15 years-18 years: < or =158 pg/mL
19-39 years: <79 pg/mL
40-44 years: < or =72 pg/mL
45-54 years: < or =87 pg/mL
55-64 years: < or =88 pg/mL
> or =65 years: < or =540 pg/mL

Females
0-2 days: 321-11,987 pg/mL

3-11 days: 263-5918 pg/mL
12 days-1 month: Not applicable
2 months-1 year: 37-646 pg/mL
2 years: 39-413 pg/mL
3 years-6 years: 23-289 pg/mL
7 years-14 years: < or=157 pg/mL
15 years-18 years: < or =158 pg/mL
19-39 years: <160 pg/mL
40-44 years: < or =162 pg/mL
45-54 years: < or =141 pg/mL
55-64 years: < or =226 pg/mL
> or =65 years: < or =540 pg/mL

Interpretation

Younger than 50 years:
N-terminal pro-B-brain natriuretic peptide (NT-proBNP) values below 300 pg/mL have a 99% negative predictive value for excluding acute congestive heart failure (CHF). A cutoff of 1200 pg/mL for patients with an estimated glomerular filtration rate (eGFR) below 60 yields a diagnostic sensitivity and specificity of 89% and 72% for acute CHF. NT-proBNP values greater than 450 pg/mL are consistent with CHF in adults younger than 50 years.

50-75 years of age:
N-terminal pro brain natriuretic peptide values below 300 pg/mL have a 99% negative predictive value for excluding acute CHF. A cutoff of 1200 pg/mL for patients with an eGFR below 60 yields a diagnostic sensitivity and specificity of 89% and 72% for acute CHF. A diagnostic NT-proBNP cutoff of 900 pg/mL has been suggested for adults 50 to 75 years of age in the absence of kidney failure.

Older than 75 years:
N-terminal pro-brain natriuretic peptide values below 300 pg/mL have a 99% negative predictive value for excluding acute CHF. A cutoff of 1200 pg/mL for patients with an eGFR below 60 yields a diagnostic sensitivity and specificity of 89% and 72% for acute CHF. A diagnostic NT-proBNP cutoff of 1800 pg/mL has been suggested for adults older than 75 years in the absence of kidney failure.

N-terminal pro-brain natriuretic peptide levels are loosely correlated with New York Heart Association (NYHA) functional class (see Table).

Table. Interpretive Levels for CHF

Functional class	5th to 95th percentile	Median
I	31-1110 pg/mL	377 pg/mL
II	55-4975 pg/mL	1223 pg/mL
III	77-26,916 pg/mL	3130 pg/mL
IV	*	*
*In a Mayo Clinic study of 75 patients with CHF, only 4 were characterized as class IV. Accordingly, range and median are not provided.		

Cautions

Lack of N-terminal pro-brain natruretic peptide (NT-proBNP) elevations have been reported if congestive heart failure is very acute (first hour) or occurs with ventricular inflow obstruction (eg, hypertrophic obstructive cardiomyopathy, mitral stenosis, atrial myxoma).

Clinical Reference

1. Januzzi JL, van Kimmenade RR, Lainchbury J, et al. NT-proBNP testing for diagnosis and short-term prognosis in acute destabilized heart failure: an international pooled analysis of 1256 patients: the international collaborative of NT-proBNP study. Eur Heart J. 2006;27(3):330-337. doi:10.1093/eurheartj/ehi631

2. van Kimmenade RR, Pinto YM, Bayes-Genis A, et al. Usefulness of intermediate amino-terminal pro-brain natriuretic peptide concentrations for diagnosis and prognosis of acute heart failure. Am J Cardiol. 2006;98(3):386-390. doi:10.1016/j.amjcard.2006.02.043

3. DeFilippi C, van Kimmenade R, Pinto YM. Amino-terminal pro-B-type natriuretic peptide testing in renal disease. Am J Cardiol. 2008;101(3A):82- 88. doi:10.1016/j.amjcard.2007.11.029

4. Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018

Performance

Method Description

This test is an automated, double-incubation sandwich assay. In the first incubation, antigen from the patient specimen reacts with biotinylated monoclonal sheep N-terminal pro-brain natriuretic peptide (NT-proBNP) antibody and monoclonal NT-proBNP antibody labeled with ruthenium complex. During the second incubation, streptavidin-labeled microparticles are added, and the resulting complex is bound to the solid-phase via biotin-streptavidin interaction. The resulting reaction mixture is aspirated into the measuring cell where the microparticles are magnetically captured onto the surface of an electrode. Unbound substances are washed away. Voltage is then applied to the electrode, which induces chemiluminescent emission that is measured by a photomultiplier. Results are obtained by comparing this measurement against the calibration curve. The Roche E Modular NT-proBNP assay standardization is traceable to an internal Roche standard. Assigned values for calibrators are traceable to this standardization.

The Roche NT-proBNP assay is automated and more precise than the Biosite BNP assay used previously. In addition, in vitro NT-proBNP is more stable than BNP.(Package insert: ProBNP II, Roche Diagnostics; V 3.0, 08/2023)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 days

Specimen Retention Time

7 days

Test Definition: PBNP1

NT-Pro B-Type Natriuretic Peptide, Serum

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

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

83880

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
PBNP1	NT-Pro BNP, S	83107-3

Result ID	Test Result Name	Result LOINC® Value
PBNP1	NT-Pro BNP, S	83107-3