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Values are valid only on day of printing.

Test ID: PBNP
NT-Pro B-Type Natriuretic Peptide, Serum

Download Test

Useful For

Aiding in the diagnosis of congestive heart failure

Testing Algorithm

See **Laboratory Approach to the Diagnosis of Amyloidosis** in Special Instructions.

Clinical Information

B-type natriuretic peptide (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 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

< or =45 years: < or =51 pg/mL

46 years: < or =53 pg/mL

47 years: < or =55 pg/mL

48 years: < or =56 pg/mL

49 years: < or =58 pg/mL

50 years: < or =59 pg/mL

51 years: < or =61 pg/mL

52 years: < or =62 pg/mL

53 years: < or =64 pg/mL

54 years: < or =67 pg/mL

55 years: < or =68 pg/mL

56 years: < or =70 pg/mL

57 years: < or =71 pg/mL

58 years: < or =73 pg/mL

59 years: < or =76 pg/mL

60 years: < or =77 pg/mL

61 years: < or =79 pg/mL

62 years: < or =82 pg/mL

63 years: < or =83 pg/mL

64 years: < or =85 pg/mL

65 years: < or =88 pg/mL

66 years: < or =89 pg/mL

67 years: < or =92 pg/mL

68 years: < or =95 pg/mL

69 years: < or =97 pg/mL

70 years: < or =100 pg/mL

71 years: < or =103 pg/mL

72 years: < or =104 pg/mL

73 years: < or =107 pg/mL

74 years: < or =110 pg/mL

75 years: < or =113 pg/mL

76 years: < or =116 pg/mL

77 years: < or =119 pg/mL

78 years: < or =122 pg/mL

79 years: < or =125 pg/mL

80 years: < or =128 pg/mL

81 years: < or =131 pg/mL

82 years: < or =135 pg/mL

> or =83 years: < or =138 pg/mL

Females

< or =46 years: < or =140 pg/mL

47 years: < or =141 pg/mL

48 years: < or =144 pg/mL

49 years: < or =146 pg/mL

50 years: < or =149 pg/mL

51 years: < or =150 pg/mL

52 years: < or =152 pg/mL

53 years: < or =155 pg/mL

54 years: < or =157 pg/mL

55 years: < or =160 pg/mL

56 years: < or =162 pg/mL

57 years: < or =166 pg/mL

58 years: < or =168 pg/mL

59 years: < or =171 pg/mL

60 years: < or =173 pg/mL

61 years: < or =177 pg/mL

62 years: < or =179 pg/mL

63 years: < or =183 pg/mL

64 years: < or =185 pg/mL

65 years: < or =189 pg/mL

66 years: < or =193 pg/mL

67 years: < or =196 pg/mL

68 years: < or =199 pg/mL

69 years: < or =202 pg/mL

70 years: < or =206 pg/mL

71 years: < or =210 pg/mL

72 years: < or =214 pg/mL

73 years: < or =218 pg/mL

74 years: < or =222 pg/mL

75 years: < or =227 pg/mL

76 years: < or =230 pg/mL

77 years: < or =235 pg/mL

78 years: < or =239 pg/mL

79 years: < or =244 pg/mL

80 years: < or =248 pg/mL

81 years: < or =253 pg/mL

82 years: < or =258 pg/mL

> or =83 years: < or =263 pg/mL

Interpretation

Under 50 years of age:

N-terminal pro 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 1,200 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 under 50 years of age.

50 to 75 years of age:

NT-proBNP values below 300 pg/mL have a 99% negative predictive value for excluding acute CHF. A cutoff of 1,200 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 in adults 50 to 75 years of age in the absence of renal failure.

Over 75 years of age:

NT-proBNP values below 300 pg/mL have a 99% negative predictive value for excluding acute CHF. A cutoff of 1,200 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 1,800 pg/mL has been suggested in adults over 75 years of age in the absence of renal failure.

NT-Pro BNP levels are loosely correlated with New York Heart Association (NYHA) functional class (see 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 (hypertrophic obstructive cardiomyopathy, mitral stenosis, atrial myxoma).

Supportive Data

The Roche N-terminal pro brain natriuretic peptide (NT-Pro BNP) assay is automated and more precise than the Biosite BNP assay used previously. In addition, in vitro NT-proBNP is more stable than BNP.

Clinical Reference

1. Januzzi JL, van Kimmenade RV, Lainchbury J, et al: NT-proBNP testing for diagnosis and short-term prognosis in acute destabilized heart failure: an international pooled analysis of 1,256 patients; the International Collaborative of NT-proBNP Study. Eur Heart J. 2006 Feb;27(3):330-337

2. van Kimmenade RRJ, Pinto YM, Bayes-Genis A, Lainchbury JG, Richards AM, Januzzi JL Jr: Usefulness of intermediate amino-terminal pro-brain natriuretic peptide concentrations for diagnosis and prognosis of acute heart failure. Am J Cardiol. 2006 Aug;98(3):386-390

3. DeFilippi C, van Kimmenade RRJ, Pinto YM: Amino-terminal pro-B-type natriuretic peptide testing in renal disease. Am J Cardiol. 2008 Feb 4;101(3A):82-88

4. Zipes D, Libby P, Bonow R, Mann D, Tomaselli G, Braunwald E: Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 11th ed. Elsevier; 2019:24, 462-489

Special Instructions

- **Laboratory Approach to the Diagnosis of Amyloidosis**