SydPath
ST VINCENT'S PATHOLOGY

www.sydpath.com.au

NT-proBNP INFORMATION SHEET

INTRODUCTION

NT-proBNP (proBNP) is secreted from the cardiac myocyte in response to stretching of the myocardium. A normal serum concentration of proBNP makes a diagnosis of significant heart failure very unlikely. An increased concentration of serum proBNP may be due to heart failure as well as other causes. Thus proBNP is a sensitive but not specific test for heart failure. The interpretation of proBNP concentrations depends on the clinical situation of the patient and the question being posed. Possible uses for proBNP measurements are listed below together with decision limits from the literature.

Causes of elevation of proBNP include heart failure; valvular heart disease, atrial fibrilation, recent myocardial infarction, renal failure, renal failure on dialysis, ITU admission, pulmonary hypertension, pulmonary embolus.

Note: These intervals are based on studies performed with the Roche Elecsys method and may not be applicable to results from other methods. To convert results in pmol/L to ng/L multiply results by 8.5

POPULATION REFERENCE INTERVALS (ng/L)

	Male	Female
18 - 50 years	<70	<120
50 - 65 years	<180	<270
65 - 74 years	<230	<350
75 + years	<850	<650

Note: the distribution in a healthy population is highly skewed with most people having proBNP concentrations well below these approximate 95th centile limits.

EXPECTED VALUES OF proBNP IN CLASSES OF HEART FAILURE

Class	5th centile	Median	95th Centile
NYHA I	30	350	3,500
NYHA II	100	950	6,500
NYHA III	130	1,600	10,000
NYHA IV	150	1,700	12,000

proBNP MEASUREMENT: INDICATIONS AND INTERPRETATION

1. Ambulatory outpatients with shortness of breath – diagnosis (ie General Practice setting)
    - proBNP < 100 ng/L (male) or < 150 ng/L (female) has very high sensitivity in providing confident rule-out of reduced ejection fraction.
2. Acute dyspnoea in Emergency department – diagnosis
    - proBNP < 300 ng/L (male or female) makes heart failure as a cause of dyspnoea very unlikely.
    - proBNP >1200 ng/L (male or female) makes heart failure likely as a cause of SOB.
    - Age-related cutoffs may improve the positive prediction of heart failure in this setting. HF likely if proBNP >1800 ng/L (age >75 years); proBNP>900 ng/L (age 50 – 75); proBNP >450 ng/L (age 20 – 50).
    - Other causes of raised proBNP must be considered: eg AMI, pulmonary hypertension, PE, renal failure, AF, LVH, COPD.
    - See below for comments concerning renal failure.
3. Patients with known heart failure - Prognostic marker
    - proBNP > 1500 ng/L has poor prognostic significance for survival
    - Note that proBNP is a continuous variable, and lower result indicate better prognosis.
4. Patients with chest pain – prognosis
    - Median 400 ng/L
    - <112 good prognosis; >1600 poor prognosis
    - proBNP is a continuous variable with lower results indicating better prognosis and higher results a worse prognosis.
5. Heart transplant patients – prognosis
    - proBNP > 800 ng/L indicates worse survival than less than 800 ng/L
6. Patients with pulmonary embolism
    - proBNP <500 ng/L suggests benign course

OTHER FACTORS AFFECTING proBNP RESULTS

Major Factors

1. Age
    - The concentration of all natriuretic peptides increases with age as shown in the reference intervals above.
    - Age related cutoffs are available for assessment of acute dyspnoea in the emergency department.
    - In general, a single cutoff is proposed for other clinical circumstances.
2. Renal Failure
    - Concentrations of proBNB rise with falls in GFR.
    - The highest concentrations are seen in patients on dialysis.
    - A rise or fall in GFR in an individual may lead to a change in proBNP concentrations.
    - GFR-related cutoffs for proBNP in acute shortness of breath may become available.

Minor Factors

1. Obesity
    - Circulating concentrations of proBNP fall with increasing BMI.
2. Thyroid disease
    - proBNP is higher in hyperthyroid patients and lower in hypothyroid patients, with correction following treatment of the thyroid disease. The effects are small for patients without heart failure and unlikely to lead to misdiagnosis.