

## Commentary

# Natriuretic peptide determinations in critical care medicine: part of routine clinical practice or research test only?

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See related research by Coquet *et al.*, <http://ccforum.com/content/12/6/R137>

## Abstract

Measurement of N-terminal pro-B-type natriuretic peptide has been shown a good rule-out test for cardiac dysfunction in patients in the intensive care unit. The peptide measurement should not be used as a replacement for other forms of monitoring, and performs best as a diagnostic test when interpreted together with other clinical findings and investigations. At a cutoff value similar to that found in other clinical studies in acute decompensated heart failure, measurement of N-terminal pro-B-type natriuretic peptide offers an additional tool for diagnostic assessment of patients presenting to the intensive care physician.

Measurement of the B-type natriuretic peptide (BNP) and measurement of the N-terminal portion of the prohormone, N-terminal pro-B-type natriuretic peptide (NTproBNP), are part of the routine assessment of patients presenting with acute dyspnoea. The measurement of BNP/NTproBNP is now included in the recommendations from professional societies.

Coquet and colleagues [1] have studied NTproBNP measurement in the critical care population. They compared the diagnostic performance of NTproBNP using a final diagnosis of cardiac dysfunction based on a combination of clinical and echocardiographic criteria. Using this diagnosis as the dichotomous variable, the authors performed receiver operating characteristic curve analysis and showed that the area under the receiver operating characteristic curve was 0.76 (95% confidence interval, 0.69 to 0.83) for the ability of NTproBNP concentrations to detect cardiac dysfunction. In addition, using a composite model including NTproBNP, electrocardiographic changes and severity assessed by the organ system failure score, the area under the receiver operating characteristic curve for a final diagnosis of cardiac dysfunction improved to 0.83 (95% confidence interval, 0.77 to 0.90).

The Breathing Not Properly study, a multicentre evaluation of BNP [2], the N-terminal pro-BNP Investigation of Dyspnoea in

the Emergency Department study [3] and the International Collaborative NTproBNP study [4] for NTproBNP clearly demonstrated that measurement of BNP is diagnostically accurate when compared with a consensus final diagnosis of acute heart failure and defined diagnostic cut-off values. The study by Coquet and colleagues found that an NTproBNP value <500 ng/l predicted the absence of cardiac dysfunction with a sensitivity of 89% and a specificity of 43% [1]. Although age and renal function affect NTproBNP levels, which is reflected in reference ranges for this analyte, diagnostic performance was not significantly affected. This value of <500 ng/l is very similar to that proposed by other workers in the field as a rule-out cutoff point for NTproBNP [4].

How should this translate into routine clinical practice? Are NTproBNP measurements good surrogates for invasive haemodynamic monitoring? NTproBNP measurements have been compared with invasive haemodynamic measurements in acute decompensated heart failure and found to show good diagnostic performance [5] and a tight correlation existed between BNP measurement and pulmonary capillary wedge pressure as a dichotomous variable. Other studies have shown in the intensive care unit that correlation between natriuretic peptide measurements and invasively measured haemodynamic parameters in the acute situation are relatively poor [6-8]. When cardiac intensive care patients are used, a more closely defined relationship is seen [9,10]. Measurement of BNP or NTproBNP should not be used as a substitute for other monitoring techniques in the intensive care population.

The authors highlight that NTproBNP measurement is most powerful when used as a rule-out test for cardiac dysfunction. They also clearly demonstrate that the diagnostic power is improved when interpreted with other variables. To misquote John Donne, no test is an island. Elevation of NTproBNP

BNP = B-type natriuretic peptide; NTproBNP = N-terminal pro-B-type natriuretic peptide.

occurs in a range of other clinical conditions other than cardiac dysfunction, including sepsis [11]. Values are frequently raised in the intensive care population, and both BNP and NTproBNP measurements have been shown to be prognostic in this population [12,13]. BNP and NTproBNP values predict a poor prognosis when markedly elevated – the death hormone.

The routine measurement of NTproBNP is certainly extremely valuable as part of the initial assessment of a patient admitted to intensive care as a rule-out test for cardiac dysfunction. This measurement is not a rule-in test, and it is debatable whether NTproBNP measurement should form part of routine monitoring of the patient once they have been admitted.

### Competing interests

The author declares that they have no competing interests.

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