

Identifying high-risk patients with acute dyspnoea in the emergency setting

The emergency care of patients with acute dyspnoea could be greatly improved by the availability of an accurate and reliable test with good diagnostic and prognostic value. Shortness of breath (SOB) is among the most common complaints in any emergency department. An important cause of this condition in the emergency setting is congestive heart failure (CHF) and diagnosis may be inaccurate with a clinical assessment.

A number of recent trials have highlighted the plasma NT-proBNP assay which can provide more accurate diagnosis and has predictive value for future risks from coronary artery disease. BNP (brain natriuretic peptide) is produced by the heart myocytes in response to increased left ventricular wall stretch. BNP is then cleaved into N-terminal proBNP and a reduced amino acid BNP, respectively. Recent data supports the use of NT-proBNP testing in the emergency department to assist in evaluation of dyspnoeic patients.^{1,2}

A recent NT-proBNP clinical trial was undertaken at the Harvard Medical School¹ to evaluate the capability of NT-pro-brain natriuretic peptide test to rule out dyspnoea due to congestive heart failure in patients presenting at the emergency department of the Massachusetts Hospital. The clinicians were blinded to the NT-proBNP results in this prospective study of 600 patients. The primary end-point was a comparison of NT-proBNP results with that of the clinical assessment of the managing physician for identifying acute CHF.

The median NT-proBNP level among the 209 patients (35%) who had acute CHF was 4 054 pg/ml, versus 131 pg/ml among the 390 patients (65%) who did not have CHF. The NT-proBNP rule-in cut-off points of less than 900 pg/ml for patients younger than 50 years of age and more

than 900 pg/ml for older patients were highly sensitive and specific for the diagnosis of acute CHF ($p < 0.001$). The testing system used is a commercially available non-isotopic assay (Elecsys, Roche Diagnostics).

An NT-proBNP level < 300 pg/ml was optimal for ruling out acute CHF, with a negative predictive value of 99%. Increased NT-proBNP was the strongest independent predictor of a definitive diagnosis of acute CHF. The authors concluded that 'NT-proBNP testing alone was superior to using only clinical judgment, but NT-proBNP plus clinical judgment was the best option'.

In a French study² conducted in the Ambroise Pare Emergency Department, 160 elderly patients (mean age 80 years) with dyspnoea were examined by two senior cardiologists and a diagnosis of congestive heart failure was made on the basis of ECG, echocardiography, chest X-rays and the effect of therapy according to European guidelines. Physicians were blinded to the NT-proBNP results. Body mass index and creatinine clearance was included in the patient profile.

The study showed the NT-proBNP cut-off value of 1 000 pg/ml had a sensitivity of 97%, a specificity of 63% and an accuracy of 80% in these elderly patients. Lower values of NT-proBNP

(600 pg/ml) had a negative predictive value of 97% and 100%, respectively.

'An important point is that trials looking at costs have shown that the NT-proBNP test, with its improved diagnostic ability, results in improved patient care and reduced costs in both the emergency-care setting and from subsequent hospitalisation'.³

The NT-proBNP test is available on the Elecsys Instrument at all Core Laboratory testing sites.

On reading this, you are invited to contact Roche Diagnostics, who is handing out, on behalf of the private laboratories, a voucher for a free Elecsys NT-proBNP test which you may use to screen yourself, a family member or a patient. For more information please contact Merle Loubser or Annil Pargas at Roche Diagnostics, on tel: (011) 504-4600 or cell: 072 527 0443.

1. Jannuzzi JL (jnr), *et al.* The N-terminal ProBNP Investigation of Dyspnea in the Emergency department (PRIDE) study. *Am J Cardiol* 2005; **95**: 948-954.
2. Alibay Y, *et al.* Plasma N-terminal natriuretic peptide and brain natriuretic peptide in assessment of acute dyspnea. *Biomed Pharmacother* 2005; **59**: 20-24.
3. Jannuzzi JL (jnr), *et al.* The value of NT-proBNP for the evaluation of acute CHF: a multicenter, international meta-analysis of 1 256 subjects. *J Am Col Cardiol* 2005; **45**(Suppl A): 140A.

TABLE I. OPTIMAL NT-PROBNP CUT-OFF POINTS FOR DIAGNOSING OR EXCLUDING ACUTE CHF

Age (years)	Optimal cut-off point (pg/ml)	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)	Accuracy
<i>Rule in</i>						
< 50 (n = 183)	450	97	93	76	99	95
50-75 (n = 554)	900	90	82	82	88	85
> 75 (n = 519)	1800	85	72	92	55	83
<i>Rule out</i>						
All patients	300	99	60	77	98	83