N-Terminal Pro-Brain Natriuretic Peptide in Combination with the 80-Lead Body Surface Map Improves Detection of Acute Inferior Myocardial Infarction with Right Ventricular Involvement

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Right ventricular myocardial infarction (RVMI) with an acute inferior infarction (AIMI) remains a diagnostic challenge and is associated with increased rates of morbidity and mortality necessitating rapid myocardial reperfusion for their reduction.

Methods: Consecutive patients presenting to our unit with acute chest pain between 2003-6 were enrolled if they had blood sampled for NT-proBNP, a standard 12-lead ECG and body surface map (BSM) recorded at first medical contact. AIMI was defined as 1mm ST-elevation in at least two contiguous leads of the standard 12-lead ECG, i.e. II, III or aVF in combination with a peak Troponin T 0.03g/L. Definition of RVMI was by angiographic occlusion of the RCA proximal to the origin of the first major RV branch. Patients were excluded if they had LVEF $<55\%$, severe valvular disease, renal impairment or did not undergo coronary angiography.

Results: Enrolled were 407 patients (age 62 ± 13 yrs; 70% male). Of these 407, 72 had STEMI at presentation. AIMI occurred in 39/72 (54%). Of those 39 patients, 24 (62%) had RVMI. On the basis of ROC analysis, a NT-proBNP of 373ng/L provided the best discrimination of patients with and without RVMI (sensitivity 71%, specificity 67%). In diagnosis of RVMI, BSM had a sensitivity 79% and specificity 87%. NT-proBNP levels were significantly higher in those with RVMI compared to non-RVMI (996 ng/L v 305 ng/L, p=0.006). Of those with AIMI, the c-statistic for distinguishing RVMI from non-RVMI using NT-proBNP alone was 0.761 (95% CI: 0.609 - 0.913) and BSM alone was 0.807 (95% CI: 0.713-0.882). Using the combination of BSM and NT-proBNP the c-statistic was 0.861 (95% CI: 0.728 - 0.995; $p<0.001$).

Conclusion: In patients with acute inferior STEMI, the combination of NT-proBNP and BSM identifies those with RVMI (c-statistic = 0.861, $p<0.001$), thus identifying a group where early reperfusion is paramount.