

SCA 10

B-TYPE NATRIURETIC PEPTIDE (BNP) AND THE RISK OF ATRIAL FIBRILLATION AFTER CARDIAC SURGERY

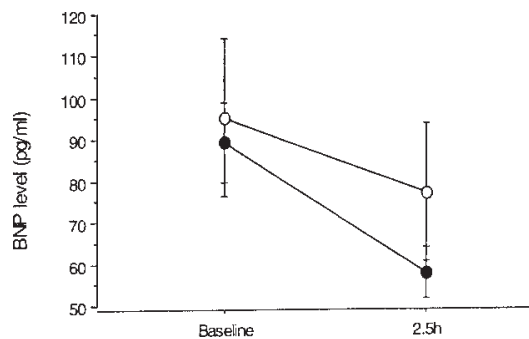
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Introduction: Atrial fibrillation (AF), one of the most common complications after coronary artery bypass graft (CABG) surgery, is associated with increased morbidity, length of stay and cost [1, 2]. Identifying subgroups of patients who are at increased risk of developing postoperative AF would aid in the selective use of prophylactic antiarrhythmic therapy [3]. BNP, a peptide secreted mainly from the cardiac ventricles, was shown to be related to increased left ventricular (LV) wall stress [4] and to both systolic and diastolic LV dysfunction [5]. In non-surgical patients, elevations in BNP have been associated with an increased incidence of AF [6, 7]. In addition, BNP levels after cardiac surgery were correlated with CK-MB release and hence with the effectiveness of intraoperative myocardial protection [8]. Therefore, we sought to determine the relationship between perioperative BNP levels and the risk of post cardiac surgery AF.

Methods: Following IRB approval, patients undergoing primary elective CABG surgery had blood samples collected before induction of anesthesia (baseline) and 2.5 hours after termination of cardiopulmonary bypass (CPB). BNP level was measured using immunological assay (Biosite Diagnostics, Inc, San Diego, CA) [5]. Exclusion criteria included a history of preoperative AF, creatinine >2 mg % and residual neurological damage. Patients were subsequently followed prospectively for the occurrence of AF (detected by telemetric electrocardiographic monitoring). In order to define the predictive ability of BNP, changes in BNP level from baseline to 2.5 hours post-CPB (that is, very near to the end of surgery) were analyzed.

Results: Data from 123 patients (age 64±10 years, 59% males) were included in the analysis. The median [IQR] number of grafts was 3 [3-4], CPB time was 111±36 min (mean ±SD) and aortic cross-clamp time 61±24 min. Twenty-six patients (21%) developed postoperative AF. BNP levels decreased from baseline of 98±21 pg/ml and 90±10 pg/ml (mean±SE, AF and No-AF groups, respectively) to 81±18 pg/ml and 57±6 pg/ml 2.5 hours post-CPB (Figure 1). Although the difference in BNP change was not significant in univariate analysis (p=0.23, beta=0.78), a multivariable logistic regression model (accounting for patient age and gender, LV ejection fraction, CPB time and a history of COPD) showed that BNP change is a significant predictor for AF (R²=0.18, ROC = 0.78, overall p = 0.002; Table 1).

Figure 1. Change in BNP levels from baseline to 2.5h post-CPB in relation to postoperative AF.



○ ~ Patients with postoperative AF

◻ ~ Patients without AF

Discussion: We have shown that CABG patients who will develop postoperative AF demonstrate a smaller decrease in BNP levels (i.e. have a higher BNP level) early after surgery. Knowledge of the postoperative BNP levels may be helpful in identifying a high-risk patient group who may benefit from prophylactic antiarrhythmic therapy.

References:

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4. Am Heart J, 1997. 133(3): p. 307-14.
5. Prog Cardiovasc Dis, 2002. 44(4): p. 293-321.
6. Jpn Circ J, 2000. 64(12): p. 965-70.
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Table 1.

Factor	Coefficient	P value *
BNP change	-0.013	0.03
Age	-0.072	0.01
Gender (female)	-0.372	0.17
CPB time	-0.015	0.04
LV ejection fraction	0.045	0.04
COPD (no)	0.534	0.18

Results of the multivariable logistic regression model for prediction of postoperative AF. * P value calculated by likelihood ratio test.