Abstract 4

Descriptive Perioperative BNP and CRP in Vascular Surgery Patients

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Background: Vascular surgery is the most morbid of noncardiac surgeries, with a 30-day mortality of 3% to 10% and a 6-month mortality of 10% to 30%. Clinical prediction indices such as the Revised Cardiac Risk Index (RCRI) have a receiver operating characteristic curve of 0.80 and perform as well for vascular surgery as do subjective methods such as the American Society of Anesthesiologists score. Biomarkers may increase our ability to predict adverse postoperative outcomes. There has been preliminary work suggesting that baseline B-type natriuretic peptide (BNP) and C-reactive protein (CRP) may be associated with adverse postoperative events in vascular surgery, but no data have been published on postoperative BNP and CRP in noncardiac surgery.

Methods: 25 vascular surgery patients presenting between May 2008 and October 2009 for open abdominal aortic aneurysm repair or lower extremity bypass surgery were enrolled. Preoperative data included demographics, past medical history, medication use, and RCRI scores, as well as NT-proBNP, CRP, and troponin T levels. Postoperative data included blood samples drawn at postoperative days 1, 2, and 3. The primary outcome was myocardial ischemia, myocardial infarction, heart failure, new arrhythmia, coronary revascularization, stroke, or death at 30 days and 6 months.

Results: 48% of the patients were low risk, 44% were intermediate risk, and 8% were high risk. 4 of 25 patients (16%) had a primary outcome (3 positive troponins, 1 of which was recognized as a clinical NSTEMI, and 1 postoperative atrial fibrillation). Follow-up at 30 days was complete, and at 6 months was 17 of 25 patients (68%).

There was a statistically significant difference for peak postoperative BNP and delta postoperative BNP (difference between baseline and peak BNP) for risk level of RCRI ($P = 0.013$ and 0.006, respectively). CRP had no statistically significant association with RCRI. Baseline values for BNP and CRP were also not statistically significant. One patient had a detectable baseline troponin T of 0.01 ng/mL and subsequently had atrial flutter with nonfatal MI at 6 months.

Conclusions: This descriptive pilot study was not statistically powered to clarify perioperative risk stratification for vascular surgery. However, peak postoperative BNP and delta postoperative BNP were associated with RCRI risk level. Interestingly, a detectable preoperative troponin T predicted a clinical outcome. Further research is needed to clarify the potential role of biomarkers in perioperative risk stratification and optimization.