

Title: Association of postoperative NT-proBNP and cardiovascular events in patients with myocardial injury after noncardiac surgery: a Vascular events In noncardiac Surgery patients cohort evaluation (VISION) sub-study

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Background: Elevated preoperative NT-proBNP concentrations are associated with adverse cardiovascular outcomes after noncardiac surgery. A systematic review and meta-analysis suggest that a postoperative NT-proBNP concentration of 718 pg/ml is the best threshold for predicting death and myocardial infarction within 30 days after surgery. Most perioperative guidelines recommend monitoring postoperative troponin measurements in at-risk patients because of the prognostic value of myocardial injury after noncardiac surgery (MINS). In contrast, postoperative NT-proBNP measurements have not been incorporated into clinical practice although NTproBNP may have prognostic value in patients with MINS. MINS is strongly associated with postoperative mortality, but it is difficult to predict which MINS patients are at highest risk of recurrent cardiovascular events and death. The aim of this VISION sub-study was to determine the prognostic value of postoperative NTproBNP in patients with MINS on major cardiovascular outcomes at 30 days after noncardiac surgery.

Methods/Results: We performed a nested prospective substudy in the VISION study¹ that included 179 patients with MINS and a postoperative NTproBNP measurement after the MINS event. Patients were aged ≥ 45 years and had in-patient noncardiac surgery. We used Cox proportional hazard models in which the dependent variable was a composite of all-cause mortality, myocardial infarction on postoperative day 4 or later, congestive heart failure, non-fatal cardiac arrest, and cardiac revascularization at 30 days (primary) and 1 year (secondary). Independent variables included a postoperative NTproBNP measurement after the MINS event and age. The primary outcome occurred in 22/179 (12%) patients at 30 days and 45/178 (25%) at 1 year after surgery. Median postoperative NTproBNP concentration was 698 pg/ml (IQR 338-1433) in patients without the primary outcome compared to 1223 pg/ml (IQR 472-2614) in patients with the primary outcome at 30 days after surgery. Patients with postoperative NTproBNP concentrations >718 pg/ml had a primary 30-day outcome rate of 16/22 (17%) compared to 6/22 (7%) events in patients with values ≤ 718 pg/ml (adjusted hazard ratio [aHR] 2.9, 95% CI 1.1- 7.6, $p=0.026$). At one year, a postoperative NTproBNP concentration ≥ 718 pg/ml was not independently associated with increased risk of major cardiovascular events (aHR 1.8, 95% CI 0.97, 3.3, $p=0.062$).

Conclusion: In patients with MINS, postoperative NTproBNP concentrations predict risk of recurrent cardiovascular events and death 30 days after surgery. Postoperative NTproBNP concentrations help guide short-term cardiac risk stratification, medical management, and follow-up in patients with MINS. Larger prospective studies are required to confirm these findings.