

## **Correlation between preoperative electrocardiogram findings and NT-proBNP and postoperative cardiac events after noncardiac surgery**

Marie-Camille Soucy-Giguère<sup>1</sup>, Steven Shi<sup>1</sup>, Myriam Hamtiaux<sup>2</sup>, Roberta Daila-Carling<sup>2</sup>, Emmanuelle Duceppe<sup>1,2</sup>

1. Department of Medicine, Faculty of Medicine, University of Montreal, Quebec, Canada
2. Centre de Recherche du Centre Hospitalier de l'Université de Montreal, QC, Canada

**BACKGROUND:** Preoperative electrocardiogram (ECG) are routinely ordered in adults undergoing noncardiac surgery, yet ECG abnormalities have not been found to predict postoperative cardiac complications. Abnormal ECG findings may lead to unnecessary preoperative medical consultation and cardiac imaging. Preoperative NT-proBNP has been shown to enhance cardiac risk prediction and has not been compared to ECG.

**METHODS/RESULTS:** We included a consecutive sample of 1000 patients seen at the preoperative assessment clinic prior to elective noncardiac surgery at a single tertiary-care centre. Eligible patients were either 65 years or older, or 45 to 64 years with at least one risk factor according to the Revised Cardiac Risk Index (RCRI). Mean age was 67.3 years (standard deviation 9.5), 53.7% were male, 52.6% had hypertension, 23.7% diabetes, and 13.6% prior history of coronary artery disease. Two thirds (63.1%) underwent surgery with overnight stay, the remainder had same-day surgery. The majority (97.1%) of patients had a preoperative ECG ordered, of which 51.2% had at least one abnormal ECG finding. The most common abnormal ECG findings as reported by the automated ECG interpretation were supraventricular arrhythmias (181/971; 18.6%), non-specific ST-T waves abnormalities (99/971; 10.2%) and previous myocardial infarction (134/971; 13.8%). Following the abnormal ECG findings, 8.0% (95% confidence interval [CI] 6.0%-10.8%) of patients had a preoperative medical consultation or cardiac imaging ordered. Routine preoperative NT-proBNP was obtained in 29.3% (293/1000), of which 34.8% (102/293) had NT-proBNP  $\geq$ 200 ng/L. For patients who underwent inpatient surgery (n=631), the 30-day incidence of major cardiac complications was 5.9% (95% CI 4.3%-8.0%). No ECG finding was associated with postoperative cardiac events, alone or in combination. A preoperative ECG finding of partial or complete left bundle branch block and supraventricular arrhythmia had a weak correlation with preoperative NT-proBNP  $\geq$ 200 ng/L (Pearson's R 0.185 p=0.003 and 0.202 p=0.001, respectively). In patients who had a preoperative NT-proBNP measured and underwent in-hospital surgery, NT-proBNP  $\geq$ 200 ng/L was independently associated with postoperative major cardiac events (adjusted odds ratio 6.68, 95% CI 2.22-19.56).

**CONCLUSION:** In patients undergoing elective noncardiac surgery, abnormal findings were common on routine ECG and led to medical consultation or cardiac imaging in 1 in 12 patients. Abnormal ECG findings were not associated with postoperative cardiac events but preoperative NT-proBNP was a strong predictor of cardiac complications. Clinicians may consider using NT-proBNP for preoperative cardiac risk stratification in patients with abnormal ECG findings to identify patients at higher risk.