Association of Postoperative High-Sensitivity Troponin Levels With Myocardial Injury and 30-Day Mortality Among Patients Undergoing Noncardiac Surgery

Writing Committee for the VISION Study Investigators

IMPORTANCE Little is known about the relationship between perioperative high-sensitivity troponin T (hsTnT) measurements and 30-day mortality and myocardial injury after noncardiac surgery (MINS).

OBJECTIVE To determine the association between perioperative hsTnT measurements and 30-day mortality and potential diagnostic criteria for MINS (ie, myocardial injury due to ischemia associated with 30-day mortality).

DESIGN, SETTING, AND PARTICIPANTS Prospective cohort study of patients aged 45 years or older who underwent inpatient noncardiac surgery and had a postoperative hsTnT measurement. Starting in October 2008, participants were recruited at 23 centers in 13 countries; follow-up finished in December 2013.

EXPOSURES Patients had hsTnT measurements 6 to 12 hours after surgery and daily for 3 days; 40.4% had a preoperative hsTnT measurement.

MAIN OUTCOMES AND MEASURES A modified Mazumdar approach (an iterative process) was used to determine if there were hsTnT thresholds associated with risk of death and had an adjusted hazard ratio (HR) of 3.0 or higher and a risk of 30-day mortality of 3% or higher. To determine potential diagnostic criteria for MINS, regression analyses ascertained if postoperative hsTnT elevations required an ischemic feature (eg, ischemic symptom or electrocardiography finding) to be associated with 30-day mortality.

RESULTS Among 21842 participants, the mean age was 63.1 (SD, 10.7) years and 49.1% were female. Death within 30 days after surgery occurred in 266 patients (1.2%; 95% CI, 1.1%-1.4%). Multivariable analysis demonstrated that compared with the reference group (peak hsTnT <5 ng/L), peak postoperative hsTnT levels of 20 to less than 65 ng/L, 65 to less than 1000 ng/L, and 1000 ng/L or higher had 30-day mortality rates of 3.0% (123/4049; 95% CI, 2.6%-3.6%), 9.1% (102/1118; 95% CI, 7.6%-11.0%), and 29.6% (16/54; 95% CI, 19.1%-42.8%), with corresponding adjusted HRs of 23.63 (95% CI, 10.32-54.09), 70.34 (95% CI, 30.60-161.71), and 227.01 (95% CI, 87.35-589.92), respectively. An absolute hsTnT change of 5 ng/L or higher was associated with an increased risk of 30-day mortality (adjusted HR, 4.69; 95% CI, 3.52-6.25). An elevated postoperative hsTnT (ie, 20 to <65 ng/L with an absolute change ≥5 ng/L or hsTnT ≥65 ng/L) without an ischemic feature was associated with 30-day mortality (adjusted HR, 3.20; 95% CI, 2.37-4.32). Among the 3904 patients (17.9%; 95% CI, 17.4%-18.4%) with MINS, 3633 (93.1%; 95% CI, 92.2%-93.8%) did not experience an ischemic symptom.

CONCLUSIONS AND RELEVANCE Among patients undergoing noncardiac surgery, peak postoperative hsTnT during the first 3 days after surgery was significantly associated with 30-day mortality. Elevated postoperative hsTnT without an ischemic feature was also associated with 30-day mortality.