Predictors of acute heart failure after vascular surgery

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Background: Risk scores currently used for preoperative evaluation focus on prediction of myocardial infarction and ischemic events after surgery, but patients submitted to vascular surgery may also have higher risk of other cardiac complications, such as acute heart failure (AHF), which is also related to higher postoperative mortality. Additional data for risk prediction of AHF after surgery are needed.

Purpose: to determine risk factors for AHF after vascular surgery and, to evaluate the accuracy of three perioperative risk scores for prediction of AHF.

Methods: Patients submitted to arterial vascular surgery were included. Clinical and laboratorial preoperative data were compared between patients with and without AHF after surgery. Multivariate logistic regression was performed to identify independent predictors of AHF. Additionally, Revised Cardiac Risk Index (Lee), Vascular Study Group of New England Cardiac Risk Index (VSG) and American College of Physicians (ACP) scores were calculated, and ROC curves were constructed.

Results: Of the 1,285 patients included, 138 (10.7%) had AHF after surgery. Patients with AHF had higher in-hospital mortality (44.2% vs. 9.7%; P<0.001) than patients without AHF. After multivariate logistic regression analysis, NYHA functional class = II (OR 3.5, 95%CI 1.7–7.1; P=0.001), urgent/emergency surgery (OR 3.1, 95%CI 1.9–5.2; P=0.001), diabetes (OR 1.9, 95%CI 1.2–2.9; P=0.003), age (OR 1.03, 95%CI 1.03–1.06; P=0.004) and, hemoglobin values (OR 0.9, 95%CI 0.8–0.9; P=0.009), remained independent predictors of postoperative AHF, whereas preoperative statin prescription (OR 0.3, 95%CI 0.1–0.5; P<0.001) and being submitted to carotid surgery (OR 0.4, 95%CI 0.2–0.8; P=0.007) were protective factors. In a subanalysis of the 1,015 patients with available left ventricular ejection fraction (LVEF) data, presence of LVEF <50% accessed by echocardiogram before surgery was also a predictor for AHF (OR 3.5, 95%CI, 1.1-11.4; P=0.034). Regarding the scores, the VSG score had an area under the curve (AUC) of 0.66 (95%CI, 0.61-0.71), which was similar than the AUC for ACP score (0.64; 95%CI, 0.59-0.69) and higher than the AUC of the Lee score (0.55; 95%CI, 0.49-0.61) for the prediction of AHF after surgery.

Conclusion: Preoperative NYHA functional class = II, urgent/emergency surgery, diabetes, age and, low hemoglobin levels are predictors of postoperative AHF, whereas being operated on statins could be protective. The VSG and ACP scores have good accuracy for prediction of AHF after vascular surgery.