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Pre-operative assessment of endothelial function for prediction of adverse events after cardiovascular surgery

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Background: Cardiovascular surgery is one of the highest risk procedures in the field of surgery. Preoperative assessment of endothelial function has been reported as useful for predicting postoperative adverse events (AEs). The aim of this study was to investigate the relationship between endothelial function assessed by reactive hyperemia index (RHI) and AEs after cardiovascular surgery.

Methods & Results: A prospective observational study of 197 patients who underwent cardiovascular surgery was conducted. RHI was measured before the surgery. The primary endpoint was a composite of postoperative death, reoperation, stroke, newly required dialysis, deep sternum infection and prolonged ventilation within 30 days. The secondary endpoint was new-onset atrial fibrillation (AF) within 30 days. Following cardiovascular surgery, 19 patients (9.6%) had AEs. New-onset AF was documented in 42 (25.9%) of 162 patients without a prior history of AF. In the receiver-operating characteristic curve analysis, RHI significantly predicted AEs (area under the curve [AUC] 0.67, best cutoff value 1.64, $P=0.03$), whereas RHI did not predict new-onset AF (AUC 0.53, $P=0.93$). Patients with RHI 1.64 had more AEs than those with $RHI>1.64$ (16.3% vs. 4.5%, $P=0.005$). Multiple logistic regression analysis showed the number of surgical procedures and RHI 1.64 as significant predictors of AEs.

Conclusions: Preoperative endothelial dysfunction assessed by RHI was associated with postoperative AEs in patients with cardiovascular surgery.

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