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Changes in coronary flow velocity measuring during coronary bypass grafting can predict elevation of cardiac troponin

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Background: Stenosis of a coronary artery results in an increase in flow velocity in the pathologic segment. Effective grafting should decrease the stenotic native coronary velocity according to a hemodynamic law. The range of decreased velocity can hypothetically reflect the effectiveness of a graft. Grafting effect insufficiencies often cause elevations in periprocedural cardiac troponin (cTn) elevation. The aim of the study is to determine, if measuring coronary flow velocity changes during coronary artery bypass grafting (CABG) can predict further cTn elevation.

Methods and results: Consecutive 68 patients (48 men, 64 ± 9 years old), who were referred for CABG, were included into the study. A standard basic perioperative transesophageal echocardiography (TEE) examination was performed with additional scans of the left main, left anterior descending (LAD), and circumflex (LCx) arteries' proximal segments. Measurements of coronary flow velocities was performed before and after grafting in the same sites of the arteries. The maximal value of cTnI within 48 hours after CABG was accounted for in the analysis. All patients had arterial hypertension, 15 patients (22%) had diabetes mellitus, 12 patients (18%) was current smokers. Forty-one patients (60%) had prior myocardial infarctions, 18 persons (26%) had previous coronary stenting. The ejection fraction before the operation was $56 \pm 13\%$. Before grafting the mean velocity in the left main artery was 79 cm/s (25th-75th quartile, 42-111), in LAD 98 cm/s (25th-75th quartile, 71-125), and in LCx 116 cm/s (25th-75th quartile, 68-156).

There was a strong significant correlation between changes in coronary flow velocities and the value of cTnI ($R = 0.56$, $p < 0.0004$). The patients with and without significant elevations in cTnI had differences in coronary velocity changes before and after grafting ($p < 0.009$). Patients with elevated cTnI in more than 5 times, had, on average, an increase in the velocities for native arteries of 21 ± 19 cm/s.

Conclusion: Coronary flow velocity assessment during CABG could predict an elevation of cardiac troponins after cardiac surgery.

Abstract P1564 Figure.

