

## Prognostic Value of Intracoronary Flow Parameters in Acute Myocardial Infarction

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**Purpose:** This study was designed to evaluate the prognostic value of intracoronary flow parameters in the prediction of left ventricular function, remodeling, and prognosis after PCI in patients with acute myocardial infarction (AMI).

**Methods:** To avoid the effect of epicardial stenosis on intracoronary flow measurement, baseline and intracoronary adenosine-induced hyperemic average peak velocity (hAPV) of infarct-related artery (IRA) were measured after successful PCI (diameter stenosis <30% and TIMI flow  $\geq 2$ ) using Doppler wire in 130 AMI patients within 7 days after onset. To evaluate the area of ischemic injury as a whole, intracoronary flow was measured at distal segment adjacent to angioplasty site. Left ventricular end diastolic and systolic volume index (LVEDVI, LVESVI), ejection fraction (LVEF), and regional wall motion score index (RWMSI) were assessed by echocardiography before and 6 months after PCI. Two-year follow up was conducted with regard to major cardiovascular events (MACE), including cardiac death, nonfatal MI, and CHF ( $\geq$ NYHA III). Receiver operating curve of intracoronary flow parameters were used to determine the accuracy and best cut-off value (BCV) in relation to LV volume and function change, and MACE.

**Results:** In relation to the prediction of  $\Delta$ LVEDVI and  $\Delta$ LVEF, the accuracy of coronary flow reserve (CFR) was 83.1% on the BCV of 1.7 and 56.3% on the BCV of 1.4, respectively. In patients with CFR < 1.4 (mean CFR:  $1.19 \pm 0.15$ , mean hAPV:  $26 \pm 10$  cm/s), CFR did not correlate with  $\Delta$ LVEF and  $\Delta$ RWMSI ( $r = -0.21$ ;  $p = 0.31$ , and  $r = 0.29$ ;  $p = 0.15$ , respectively). However, hAPV showed significant correlation with  $\Delta$ LVEF and  $\Delta$ RWMSI ( $r = -0.43$ ,  $p = 0.03$ , and  $r = 0.48$ ;  $p = 0.01$ , respectively). The accuracy of hAPV for the prediction of  $\Delta$ LVEF and  $\Delta$ RWMSI was 83.7% and 83.6% on the BCV of 28 cm/s, respectively. Patients with hAPV  $\geq 28$  cm/s showed significant improvement in LVEF and RWMSI ( $43 \pm 8\%$  vs.  $49 \pm 11\%$ ;  $p < 0.05$ ,  $2.74 \pm 0.25$  vs.  $2.21 \pm 0.47$ ;  $p < 0.05$ , respectively), and patients with hAPV < 28 cm/s showed no significant improvement in LVEF and RWMSI ( $50 \pm 7\%$  vs.  $47 \pm 10\%$ ;  $p = \text{ns}$ ,  $2.38 \pm 0.34$  vs.  $2.55 \pm 0.23$ ;  $p = \text{ns}$ , respectively) at follow-up. The accuracy of CFR for the prediction of MACE was 82.0% on the BCV of 1.4. Kaplan-Meier analysis revealed that patients with CFR  $\leq 1.4$  had significant worse prognosis than those with CFR > 1.4 (Event-free survival: 69.8% vs. 95.4%,  $p < 0.001$ ). Age, baseline heart rate, CFR and LVESVI were significantly associated with MACE by Cox proportional hazard analysis.

**Conclusions:** Coronary flow reserve and hyperemic flow velocity of infarct-related artery, measured after successful PCI at early recovery phase of AMI, may be useful on-site predictor of MACE and left ventricular function and remodeling after PCI.