

Coronary zero flow pressure in percutaneous coronary intervention is elevated and correlated with myocardial perfusion pressure

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Background Percutaneous coronary intervention (PCI) raises hyperemic coronary zero flow pressure (Pzf; interpreted as back pressure to coronary flow), but little is known about its underlying mechanisms of this relationship. **Objective and Methods** Fifteen patients with angina pectoris underwent the PCI of the left coronary artery (10; anterior descending artery, 5; circumflex artery) were enrolled. Coronary flow velocity and pressure were measured using ComboWire (Volcano Corp., San Diego, CA) under adenosine triphosphate infusion via the central vein at a rate of 150 $\mu\text{g}/\text{kg}/\text{min}$. Coronary flow velocity reserve, myocardial fractional flow reserve and the velocity-based hyperemic microvascular resistance index were calculated. The instantaneous hyperemic diastolic velocity-pressure slope index (IHDVPS; interpreted as coronary conductance) and extrapolated Pzf were obtained from a pressure-velocity plot of the diastolic phase and the relationship between these measurements was assessed. **Results** The PCI raised the IHDVPS from $1.88 \pm 1.34 \text{ cm} \cdot \text{s}^{-1} \cdot \text{mmHg}^{-1}$ to $2.38 \pm 1.52 \text{ cm} \cdot \text{s}^{-1} \cdot \text{mmHg}^{-1}$ ($P = 0.024$) and Pzf from $9.8 \pm 11.5 \text{ mmHg}$ to $27.9 \pm 15.8 \text{ mmHg}$ ($P < 0.001$). Pzf was significantly correlated with distal coronary pressure ($R = 0.691$, $P < 0.001$), aortic pressure ($R = 0.579$, $P = 0.001$), mean flow velocity ($R = 0.654$, $P < 0.001$), and myocardial perfusion pressure ($R = 0.734$, $P < 0.001$). **Conclusions** The PCI raises the coronary conductance and Pzf. Pzf has correlation with distal coronary pressure and flow velocity. The acute elevation of myocardial perfusion pressure may cause expansion of the microcirculation and elevation of surrounding pressure resulting in elevation of Pzf.