Effect of nitroglycerin and nicorandil on regional poststenotic quantitative coronary blood flow in coronary artery disease: a combined digital quantitative angiographic and intracoronary doppler study

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Little information is available concerning the effects of nitrates and potassium channel openers on local poststenotic blood flow in coronary artery disease (CAD). Combined quantitative digital angiography (QCA) and intracoronary Doppler (IVADO) velocity measurements were used to determine changes in absolute poststenotic blood flow after intracoronary injection of 0.2 mg nitroglycerin and 0.5 mg nicorandil. Quantitative blood flow (QBF) was calculated from average peak-flow velocity (APV) and angiographic cross-sectional area (CSA): QBF (ml/min) = CSA x APV x 0.5. In group I (n = 9), 0.5 mg nicorandil i.c. was identified as optimal to achieve maximal vasodilatation. In patients with CAD (group II, n = 12), i.c. injection of 0.5 mg nicorandil induced a significant increase in poststenotic CSA (+38%) and QBF (+50%). In contrast, 0.2 mg nitroglycerin (group III, n = 12) increases poststenotic CSA (+38%) without a significant change in QBF (+23%). Additional application of nicorandil in these patients induced further significant increases in CSA (+55%) and QBF (+48%) compared with baseline. There were no significant changes in stenosis area. Poststenotic blood flow can be increased by nicorandil after application of nitroglycerin. This effect is most likely mediated by the potassium channel-opening effect of nicorandil. Combined use of QCA and IVADO is a unique approach to measure local poststenotic QBF in patients with CAD.