



DEVELOPMENT OF INVASIVELY MEASURED CORONARY FLOW RESERVE BEFORE AND AFTER REPERFUSION OF ACUTE MYOCARDIAL INFARCTION: RESULTS FROM AN EXPERIMENTAL PORCINE MODEL AND A PATIENT STUDY

Poster Contributions

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Background: An impaired coronary flow reserve (CFR) directly after primary PCI for treatment of acute myocardial infarction (AMI), is related to a worse clinical outcome. The individual contribution of baseline and hyperemic flow to CFR however, remain undescribed. In a combined porcine and patient study we investigated the changes in CFR, baseline and hyperemic flow.

Methods: Intracoronary Doppler flow velocity measurements were obtained both before and directly after 90 minute balloon occlusion, with subsequent reperfusion, of the circumflex artery in an AMI porcine model (n=11) and also directly after successful PCI in humans (n=40). A propensity matched group of stable patients free from angiographic coronary artery disease (n=40) served as controls. CFR was defined as the ratio between hyperemic and basal average peak velocity (h-APV and b-APV). CFR was correlated to histological infarct size as percentage of left ventricle (IS%LV) in pigs and IS%LV as defined by cardiac magnetic resonance imaging in humans.

Results: CFR was significantly correlated to IS%LV in both pigs ($r = -0.61$; $p=0.047$) and humans ($r = -0.48$; $p=0.005$). In pigs, CFR decreased after AMI (2.4 ± 0.9 vs. 1.5 ± 0.4 ; $p=0.04$ for pre and post AMI respectively) and this finding was consistent for the human situation (2.7 (95% CI, 2.5 to 3.0) vs. 1.8 (95% CI, 1.6 to 2.1 for control vs. AMI patients). Both components of CFR contributed to its reduction after reperfusion (in pigs, b-APV increased by 8 and h-APV decreased by 6 cm/s, while in humans, b-APV increased by 6 and h-APV decreased by 4 cm/s).

Conclusion: A decrease in CFR is observed in patients as well as in porcine model of reperfused AMI and is related to a larger infarct size. Both the resting and hyperemic components contribute to the reduced CFR.