between FFR and CFVR a normal h-SRv (<0.80) was associated with a significantly lower MACE rate than an abnormal (≥0.80) SRv (14% vs. 42%, 95% confidence interval: 1.05-7.72, *p*=0.042).
Conclusion: Discordant results between FFR and CFVR were documented in 30% of the lesions that underscores the need for combined measurements, as deferral of PTCA is associated with a high MACE rate. Furthermore, these results indicate that stenosis resistance index is a promising parameter for clinical decision making in lesions showing discordant results between FFR and CFVR.

1077-200 Four-Year Clinical Experience With Ad Hoc Fractional Flow Reserve Measurement to Guide Revascularization Strategy

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Background: Fractional flow reserve (FFR) has been proposed as a convenient way to assess intermediate lesion significance in the cath lab. **Methods:** We reviewed our 4 year experience with the use of FFR (Wave wire, JOMED) performed ad hoc to assist in clinical patient management. Technical measurement factors and the influence on PCI were evaluated. **Results:** Between 6/97 and 12/01 250 patients were evaluated (6.1% of cath volume). Use has grown from 3.9% of cases to >7% of cases. Mean visual lesion severity was 55%. No complications occurred. Overall, 80.4% of patients evaluated had PCI deferred in the tested lesion. Of these, 85.6% had medical treatment, 2.5% were referred to CABG and 11.9% had PCI in another vessel. In 19.6 % of patients, initial FFR led to PCI in the tested lesion. Patients received heparin (mean ACT 237±67) and intracoronary adenosine stimulus (mean 30±9.9mg, range 12-72). We attempted to use diagnostic catheters whenever possible. Of the patients deferred, 69.7% were tested with a diagnostic catheter. The use of diagnostic catheters to measure FFR has increased over time from 64% to 75%. FFR had little impact on overall PCI volume. Even if all FFR cases were converted to PCI, the overall volume would have increased only 7.5%. Ad-hoc FFR measurement allows optimal selection of revascularization strategy by defining the physiologic significance of intermediate lesions. While 2.5% of diagnostic cases were referred to CABG, as many as 9.6% of FFR cases may have been "converted' from CABG to PCI. **Conclusions:** FFR may be rapidly measured ad-hoc using diagnostic catheters. Such a strategy allows deferral of unnecessary PCI in over 80% of lesions. Furthermore, traditional CABG candidates may be triaged to PCI if some of the potential target vessels are shown not to have hemodynamically significant lesions.

1077-201 Microvascular Resistance in Addition to Stenosis Resistance Best Predicts Inducible Myocardial Ischemia

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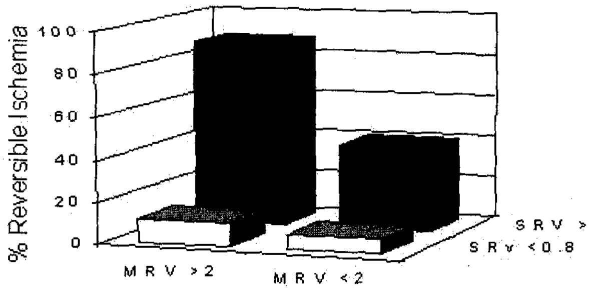
Background: Since ischemia is the result of insufficient perfusion of the relevant myocardial area we hypothesized that the sum of stenosis and minimal coronary microvascular resistance is the best predictor of reversible ischemia.
Methods: A total of 151 patients with stable angina with 181 coronary lesions were studied. Pharmacological SPECT was performed to determine reversible defects in regions of interest. Distal coronary pressure and blood flow velocity were assessed during baseline and maximal hyperemia. Coronary stenosis resistance index (SRv) was defined as the ratio of hyperemic stenosis pressure gradient (mean aorta pressure-mean distal pressure) and hyperemic average peak flow velocity (h-APV) and microvascular resistance index (h-MRv), was defined as the ratio of mean hyperemic distal pressure and h-APV. H-MRv was also determined in an angiographically normal coronary reference vessel (h-MRv-Ref).
Results: The regions where categorized into four groups (based on the best cut off value for SRv of 0.80 and 2.0 for MRv; median of ref-MRv): 1) MRV >2 and SRV >0.80, 2) MRV <2 and SRV >0.8, 3)MRV >2 and SRV <0.8 and 4) MRV <2 and SRV >0.8. The predictive value of SRv and MRv for reversible ischemia is depicted in figure 1.
Conclusion:
This study demonstrates the importance of microvascular resistance for the induction of myocardial ischemia. The likelihood for myocardial ischemia is high when both coronary and microvascular resistance are enhanced.



1077-202 The Angiographical Stenotic Flow Reserve Compared to Intracoronary Hemodynamic Parameters for Evaluation of Coronary Lesion Severity

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BACKGROUND: Based on fluid dynamics equations and the geometry of coronary narrowings, quantitative coronary angiography (QCA) provides an estimate of coronary flow reserve (the stenotic flow reserve SFR).
OBJECTIVE: A direct comparison between stenotic flow reserve and intra-coronary-derived coronary flow reserve parameters (fractional flow reserve (FFR) and coronary flow velocity reserve (CFVR)) for functional evaluation of coronary lesion severity as determined by ^{99m} Tc MIBI-SPECT as a substudy of the ILIAS study Intermediate Lesions: Intracoronary-flow Assessment vs. ^{99m} Tc MIBI-SPECT). METHODS: A total of 187 patients with stable (CCS class 1-3) or unstable (Braunwald class I-II) angina underwent myocardial perfusion scintigraphy in a two day stress-rest protocol to determine reversible perfusion defects. Quantative coronary angiography was performed using the CMS-QCA software 3.32 (MEDIS, Leiden, the Netherlands) which includes the analysis of stenotic flow reserve. FFR and CFVR were determined with guide wires distal to 291 coronary lesions (mean diameter stenosis of 57%; range 31%-88%), during baseline and maximum hyperemia (induced by 15-20 mcg adenosine ic). Linear regression was performed to determine the relationship between stenotic flow reserve and FFR and CFVR. ROC-analysis was performed to determine the best cut off value of stenotic flow reserve and the predictive values of stenotic flow reserve, FFR and CFVR for the detection of reversible perfusion defects (by area under the curve, AUC). RESULTS: Linear regression showed moderate relations between stenotic flow reserve and FFR (r^2= 0.32, p<0.0001) and CFVR (r^2=0.22, p<0.0001). The area under the curve of stenotic flow reserve was 0.78 +/- 0.04 with a best cut-off value of 2.3. The area under the curve of FFR and CFVR was 0.82 +/-0.03, 0.79 +/-0.03 respectively.
CONCLUSION: Stenotic flow reserve has a moderate agreement with fractional and coronary flow reserve, while the predictive value of stenotic flow reserve for the presence of reversible perfusion defects is similar to the intracoronary derived hemodynamic parameters.

POSTER SESSION

1078 Restenosis, Mechanisms, and Prevention

Monday, March 31, 2003, 9:00 a.m.-11:00 a.m.
McCormick Place, Hall A
Presentation Hour: 9:00 a.m.-10:00 a.m.

1078-177 Atherosclerotic Plaque and Dose Attenuation of Different Vascular Brachytherapy Sources: An Ex Vivo Dosimetry Study

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Background: Dose prescription and reporting in vascular brachytherapy is based on the assumption that the vessel wall is water equivalent, which does not consider a possible dose perturbation by atherosclerotic plaque. The actual attenuation has never been measured to our knowledge.
Methods: Sr/Y-90 and Ir-192 sources for vascular brachytherapy were fixed to an irradiation phantom embedded in water-equivalent gel in order to deliver a reference dose at 2.5mm distance. The delivered doses from the source with and without human peripheral arteries surrounding the delivery catheter were read from the radiochromic films. Plaque and vessel wall thickness were measured from HE-stained vessel sections using light microscopy. We assessed 19 sections irradiated with Sr/Y-90 and 7 sections irradiated with Ir-192. The attenuated dose was expressed as ratio of the reference dose, and this ratio was correlated with plaque thickness at the corresponding vessel section based on an exponential function. The attenuation coefficient of atherosclerotic plaque (µP) and of vessel wall (µW) was calculated by regression analysis.
Results: The dose attenuation of beta-radiation correlated strongly with maximal plaque thickness (r=0.877, p<0.001), whereas we detected no correlation for gamma-radiation. The attenuation did no correlate with the thickness of the nondiseased vessel wall. µP for radiation delivered from Sr/Y-90 was 0.61, µW was 0.03, whereas the attenuation of Ir-192 was below the measurement uncertainties. In our calculation model a nondiseased arterial wall of 1mm thickness results in a dose decrease of only 3%, whereas plaque of the same thickness increases the attenuation to 50%.
Conclusions: Plaque thickness should be considered for future evaluation of dose prescription calculations in vascular brachytherapy with beta-radiation.