Carotid Artery Stenting in African Americans

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Background: Strokes are particularly devastating to the African American community and extracranial carotid artery disease is a significant etiologic factor. The benefits of surgical intervention with carotid endarterectomy are well documented, but African Americans are underrepresented in most of these trials and there is evidence that their post surgical short-term mortality is increased. Carotid artery stenting (CAS) is rapidly becoming an accepted treatment strategy for certain high risk patient groups and this study examines the safety and efficacy of CAS in African Americans.

Methods: Between December 1999 and August 2003, a total of 172 consecutive patients underwent CAS. Patients were objectively evaluated for pre- and post procedure by a board certified neurologist and NIH stroke scores were recorded. All cases were performed by a single operator in a single institution. All patients received perioperative intravenous IIIb/IIIa inhibitors and fractionated heparin to maintain activated clotting time (ACT) 200-250 secs. All cases were performed without distal protection. All patients received oral antiplatelet therapy for at least 4 weeks post procedure.

Results: In a retrospective review of the 172 patients, 66(38%) were African Americans. Of this group, there was a 100 % procedural success rate. There were no perioperative major or minor strokes. There were no TIAs. There were no significant change in pre-and post procedural NIH stroke scores. There were no deaths. At 30 days there were no new neurovascular events or deaths.

Conclusion: CAS is a safe and efficacious procedure in the management of extracranial cerebrovascular diseases in African Americans.

Fractional Flow Reserve Versus Intravascular Ultrasound for Decision-Making in Equivocal Left Main Coronary Stenosis

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Background: Intravascular ultrasound (IVUS) is frequently used to determine significance of left main stenosis (LMS) in patients with angiographically ambiguous LMS. A fractional flow reserve (FFR) above 0.75 is associated with excellent 3-year outcomes. However, the use of IVUS parameters to determine the physiological significance of LMS is unknown. Methods: In 55 patients with angiographically ambiguous LMS, a 0.014” pressure guidewire was used to calculate the FFR by dividing distal coronary pressure by aortic pressure during hyperemia. IVUS images were obtained during automated pull back. Results: FFR averaged 0.86 ± 0.1 (range 0.64 to 1.0). The following parameters were assessed by IVUS: minimal luminal diameter (MLD) = 3.08 ± 0.61 mm; minimal luminal area (MLA) = 7.65 ± 2.9 mm²; percent cross sectional narrowing (%CSN) was 59 ± 13%; and percent area stenosis (%AS) was 47 ± 19%. Linear regression analysis demonstrated a strong positive correlation between an FFR cut-point of 0.75 and MLA (R² = 0.79, P < 0.0001) and between FFR and MLA (R² = 0.74, P < 0.0001). There were inverse moderate correlations between FFR and %CSN (R² = 0.69, P < 0.0001) and between FFR and %AS (R² = 0.44, P < 0.0001). An FFR MLA cut-point of 2.8 mm had the highest sensitivity and specificity to determine the significance of the LMS (93% and 98%, respectively) followed by an MLA of 5.9 mm² (sensitivity and specificity of 93% and 95%, respectively). Based on FFR measurement of the LMS, coronary artery bypass surgery (CABG) was performed in 14 patients (25.4%). During a follow-up period of 16 ± 10 months, there was one non-cardiac death; a total of 7 patients (12%) were admitted with chest pain, 2 patients underwent stenting of the LCX artery, and 2 patients underwent CABG. Conclusions: 1) A combination of the MLD and MLA cut-points of 2.8 mm and 5.9 mm², respectively, highly predicts physiological significance of LMS; 2) FFR can be used as a surrogate for an IVUS to determine the significance of LMS; and 3) Recommending CABG based on physiological data is safe and results in a low event rate during clinical follow-up.

Coronary Flow Velocity Pattern Immediately After Percutaneous Coronary Intervention as a Predictor of Complications After Acute Myocardial Infarction in Patients Achieving Thrombolysis in Myocardial Infarction Grade 3 Flow

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Background: Reperfusion therapy for acute myocardial infarction (AMI) aims to achieve patency of the epicardial infarct-related coronary artery and thrombolysis in myocardial infarction (TIMI) 3 flow. However, it has been reported that even if TIMI 3 flow is achieved in epicardial coronary arteries, microvascular injury results in insufficient reperfusion of the infarcted myocardium, leading to complications. Our recent studies have shown that microvascular injury can be assessed by coronary flow velocity (CFV) patterns. The purpose of this study was to investigate whether CFV patterns serve as predictors of complications in patients who have achieved TIMI grade 3 flow after reperfusion. Methods: One hundred and forty consecutive patients with first anterior AMI were studied after successful percutaneous coronary intervention (PCI) (angiographically <50% residual stenosis with TIMI grade 3). CFV patterns were recorded using a Doppler guidewire immediately after successful PCI. We defined severe microvascular injury as a diastolic deceleration time (DST) of <600 ms. Patients were divided into those without severe microvascular injury (Group 1, n=114) and those with severe microvascular injury (Group 2, n=26).

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Are High Doses of Intracoronary Adenosine an Alternative to Standard Intravenous Adenosine for the Assessment of Fractional Flow Reserve?

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Background: Fractional flow reserve (FFR) is a measure of coronary stenosis severity based on pressure measurements obtained at maximal hyperemia. Therefore, achieving maximal vasodilatation is a prerequisite for determining FFR. All validation studies were performed with intravenous adenosine (Ado-iv). However, compared to intracoronary adenosine (Ado-ic), Ado-iv is more expensive, more time consuming and possibly associated with more side effects. The present study was designed to compare high doses of Ado-ic with Ado-iv.

Methods: 57 lesions (LAD,n=27; LCx, n=15; RCA, n=15) were studied in 54 pts. FFR was assessed five times in every pt, with 4 boluses injections of Ado-ic (60, 90, 120 and 150 µg) and standard Ado-iv (140 µg/kg/min) in a randomized changing sequence.

Results: No adverse events occurred with Ado-ic injections into the LCA. Transient AV-blocks were observed with Ado-ic into the RCA (4/15). With Ado-iv, minor side effects (angina, dyspnoe) were noticed in 21/54 pts (39%). Hemodynamics were not different. Mean FFR was 0.79±0.80, 0.78, 0.77 with 60 µg, 90 µg, 120 µg, 150 µg Ado-ic and 0.76 with Ado-iv. Focusing on the lowest absolute FFR value in every patient this was achieved in 2% with the 60 µg dose, in 8% with 90 µg, in 20% with 120 µg, in 16% with 150 µg and in 62% with the intravenous application. With 60 µg of adenosine, 32% of FFR values were below the cut-off point of 0.75. Higher doses increased this percentage to 40%, 41%, 41%, and 46% for 90 µg, 120 µg, 150 µg, and the iv administration, respectively.

Conclusions: This study suggests a dose-response relationship for intracoronary doses higher than 60 µg. The administration of intracoronary adenosine (Ado-ic), Ado-iv is more expensive, more time consuming and possibly associated with more side effects. The present study was designed to compare high doses of Ado-ic with Ado-iv.

A total of 56 patients with a history of bypass surgery underwent coronary angiography with Doppler velocity measurements before and after adenosine administration due to recurrent chest pain. Velocity was digitized to compute baseline and stress average peak velocity (APV; cm/s), systolic peak velocity (SPV; cm/s), diastolic peak velocity (DPV; cm/s), diastolic-to-systolic velocity ratio (DSVR) and CFVR. Quantitative coronary arteriography was performed to objectively determine stenosis severity.

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Methods: Sixty-seven grafts had a luminal stenosis severity <50% (<50% of 70 patients) or 50-75% stenosis (n=20). To determine diagnostic performances of each parameter in the identification of intermediate stenoses (50-75%) in single grafts with significant areas-under-the-curve in receiver operating characteristic analysis were found for DPVbaseline, APVbaseline, SPVstress and SPVbaseline (p<0.05). In sequential grafts significant areas-under-the-curve were demonstrated for APVstress and DPVbaseline (p<0.05). CFVR did not show significance in separating grafts with stenoses <50% and 50-75% for single or sequential grafts. In multivariate analysis sensitivity/specificity/diagnostic accuracy of velocity parameters for the identification of intermediate stenoses were 92%/72%/78% for single grafts and 100%/73%/82% for sequential grafts.

Conclusion: Doppler velocity accurately identifies intermediate stenoses by differentiating between <50% and 50-75% stenosis in both single and sequential vein grafts and recipient vessels. Doppler velocity measurements have additional diagnostic value in evaluating intermediate stenoses in vein grafts and recipient vessels.

Significant Increase in the Thrombolysis in Myocardial Infarction Infarction Frame Count When the Coronary Artery Stenosis Is More Than 75 Percent Reflects Significant Flow Abnormalities at This Degree of Stenosis in Chronically Diseased Coronary Arteries

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The TFC has been proposed as a quantitative method to assess coronary blood flow. The TFC is not available.

Aim: To determine the impact of coronary artery stenosis severity on the TFC in chronically stenosed coronary arteries when films are acquired at 12.5 f/s.

Methods: Coronary angiography was performed using 6F Judkins diagnostic catheters after 200 milliseconds of intracoronary nitrate acquired at 12.5 f/s. Analysis was performed to obtain the mean TFC and the corrected TFC for <50% stenosis (group A), 50-75% stenosis (group B) and >75% stenosis (group C). Results were corrected to give values equivalent to an acquisition rate of 30 f/s. TFC frame counting was performed by an independent observer using the Philips Intuit Suite viewer R2.2.

Results are shown in table 1. There was statistically significant difference in the TFC between groups C & A and groups C & B: p=0.01 and p=0.01 for RCA; p=0.01 and <0.01 for CX; and p=0.01 and <0.01 for LAD respectively. There was no significant difference in the TFC between groups A & B (p=0.1, 1.0 and 0.4 for RCA, CX and LAD respectively).

Conclusion: We have demonstrated that there was a significant increase in the TFC when the coronary artery stenosis was more than 75% reflecting significant flow abnormalities at this degree of stenosis in chronically diseased coronary arteries.

Coronary Flow Velocity Pattern Immediately After Percutaneous Coronary Intervention in Patients With Acute Myocardial Infarction Can Predict Myocardial Viability Assessed by Thallium Scintigraphy at Six Months

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Background: Some studies have shown that the no-reflow phenomenon after coronary reflow implies the absence of residual infarct-zone viability. Furthermore, it has been reported that the coronary flow velocity (CFV) pattern of no-reflow in patients with reperfused acute myocardial infarction (AMI) is characterized by the appearance of early systolic retrograde flow and short diastolic deceleration time (DT). However, the relationship between CFV pattern and residual myocardial viability has not been discussed.

Aim: The aim of this prospective study was to examine whether the CFV pattern may predict myocardial viability at the late stage.

Methods: The study population consisted of 113 consecutive patients with a first anterior AMI successfully treated with percutaneous coronary intervention (<50% residual stenosis). We examined the CFV pattern immediately after coronary intervention using a Dop-