

QUALITATIVE ASSESSMENT OF PERIPHERAL VESSELS BY
INTRAVASCULAR ULTRASOUND BEFORE AND AFTER INTERVENTIONS

Kenneth Rosenfield, M.D., Douglas W. Losordo, M.D., K. Ramaswamy, M.D., F.A.C.C., Susan Kelly, R.N., John O. Pastore, M.D., F.A.C.C., Bernard D. Kosowsky, M.D., F.A.C.C., Jeffrey M. Isner, M.D., F.A.C.C. Tufts Medical School, St. Elizabeth's Hospital, Boston, MA

Systematic intravascular ultrasound (IVUS) examination using a novel 20 MHz, 6.6 Fr. device during peripheral vascular procedures has enabled accurate, high-resolution characterization of the vessel wall and plaque configuration, both at baseline and following various interventions (balloon angioplasty, atherectomy, laser, stenting). Of 13 lesions examined in 8 patients, 5 (38%) were moderately or severely eccentric; 3 (23%) displayed heavy calcification at the lesion site; 8 (62%) consisted predominantly of "soft" [less-dense] plaque; and 10 (77%) had smooth, circular lumina at the stenotic site (vs. rough, irregular borders). The 3-layered IVUS appearance typical of normal vessel wall was well-preserved (≥250% of circumference) at 4 (31%) of the lesion sites. Following intervention, only 5 (38%) of vessels retained a smooth circular appearance at the lesion site. In contrast, 9 (69%) demonstrated cracks, 7 (54%) dissections, and 0 (0%) significant flaps. No significant flaps or dissections were seen at atherectomy sites. The characteristics of the closest "normal" segment of vessel to stenotic sites were also examined: although the degree of calcification was not significantly different from the lesions themselves, the 3-layer appearance was more likely to be preserved. Conclusion: IVUS enables accurate characterization of plaque, vessel wall, and trauma/injury resulting from interventional procedures. Such characterization may facilitate the understanding of the mechanisms of recanalization and may ultimately enhance initial results reduce restenosis.

Tuesday, March 20, 1990
2:00PM-3:30PM, Room 24
Silent Ischemia I

PROGNOSIS OF SILENT ISCHEMIA DURING AMBULATORY MONITORING IN THE LOW RISK SUBSET OF PATIENTS WITH CORONARY ARTERY DISEASE

Arshed A. Quyyumi, M.D., Julio A. Panza, M.D., Jean Diodati, M.D., Timothy S. Callahan, M.S., William B. Choi, M.D., Stephen E. Epstein, M.D., F.A.C.C. Cardiology Branch, NHLBI, Bethesda, MD.

The presence of silent ischemia during daily activities has been considered an adverse prognostic factor in pts with coronary artery disease (CAD). Whether its presence also confers increased risk in pts who are in an anatomical and functional low risk subset is not known. We followed 60 CAD pts without left main stenosis or 3-vessel CAD with inducible ischemia for 16.5 ± 6 months (mean ± SD) (range 6 to 30). Pts had 48-hour ambulatory monitoring for ST depression episodes (STE) after withdrawal of antianginal medications. Thirty-four (58%) pts had 1 to 16 STE/48 hours, lasting 9 to 694 mins. During the 16.5 month follow-up on medical therapy, given only for symptom control, two non-fatal events occurred, but none of them in the subset of 14 pts with frequent STE (>120 mins/48 hours). One pt in the group with STE (2.9%) and one in the group without STE (3.8%) had a myocardial infarct. Both pts had ischemia attributable to significant left anterior descending CAD initially, but suffered inferior infarctions due to right coronary occlusions, 4 and 18 months later. Thus, the presence of silent ischemia during daily life is not an indicator of poor outcome in the medium term in pts in a low risk anatomical and functional category. Moreover, the possible site of myocardial infarction may be unrelated to the site of severest narrowing and ischemia. Previously reported increased risk in pts with silent ischemia was probably because of inclusion of high risk pts in the STE positive group.

TIME DEPENDENT EFFECTS OF ASYMPTOMATIC ISCHEMIA ON PROGNOSIS IN CHRONIC STABLE ANGINA

Alan C. Yeung M.D., Joan Barry B.A., Kether E. Raby M.D., Andrew P. Selwyn M.D., F.A.C.C. Brigham & Women's Hospital, Boston, MA.

Ischemia on ambulatory ECG monitoring (AEM) has been shown to adversely affect short term prognosis in patients with unstable angina, post-MI and chronic stable angina.

In this long term study, we followed 152 stable patients (mean age 59) with proven coronary artery disease and positive exercise tests. All patients underwent 48 hr AEM with a validated FM system. Anti-anginal medication were discontinued in 74% of the patients, while 26% were on their usual cardiac medications during AEM. A positive AEM was defined as at least one episode of ST depression ≥ 1mm, 80 msec from J point lasting ≥ 1 min per 24 hr period. Cardiac death (D) and MI were taken as end points. Patients were followed by their physicians blinded to the AEM result. Follow-up was obtained in 90% of the patients, with a median period of 28 mos (range 1 to 52 mos). 64 patients had a positive AEM (group 1) and 74 had a negative AEM (group 2). Kaplan-Meier analysis for the time-dependent probability of event free survival showed that group 1 had significantly worse prognosis (5 D + 2 MI vs 1 MI) until a median of 15.5 mos (range 1 to 26 mos) (p < 0.01); after which there was no statistically significant difference (6 D + 2 MI vs 2 D + 2 MI) between the 2 groups.

Conclusions: 1) Ischemia on AEM in stable angina patients predicts unfavorable outcome over 1-2 years. 2) This predictive value is lost thereafter. 3) The data show that yearly AEM may be useful for predicting long term prognosis.

RELATIONSHIPS BETWEEN HEART RATE, ISCHEMIA AND DRUG THERAPY DURING DAILY LIFE IN PATIENTS WITH CORONARY ARTERY DISEASE

James M. McLenachan MD, Franz F. Weidinger MD, Joan Barry, Andrew P. Selwyn MD. Brigham and Women's Hospital, Boston, MA.

We tested the hypotheses that significant increases in heart rate (HR) precede ischemic events during daily life and that different classes of drugs have diverse effects on ischemia occurring at high and low heart rates. Analysis of HR in 21 untreated patients with ≥ 4 ischemic episodes/24 hours showed that HR rose significantly (74 ± 11 v 95 ± 15 bpm, p < 0.01) prior to ischemia but that 75% of the rise in HR occurred between 5 and 30 minutes before the onset of ischemia. To further examine the influence of duration of HR increase on ischemic threshold, 6 patients underwent 2 exercise tests; compared with a Bruce test, a modified protocol resulted in delay in onset of ST depression and a reduction in HR at onset of ischemia (85 ± 16 v 97 ± 15 bpm, p < 0.05). In a placebo-controlled trial, treatment with propranolol reduced ischemic events occurring at moderate and high HR, while nitrate therapy reduced only events at low HR. Thus important increases in HR do precede most ischemic events during daily life; the long duration of this increase may explain the onset of ischemia at lower HR during daily life than during exercise testing. Finally, different classes of drugs have characteristic effects on ischemia occurring at different heart rates.