9:45

**INTRAOPERATIVE INTRAVASCULAR ULTRASOUND IMAGING OF CORONARY ARTERIES, BYPASS GRAFTS AND ANASTOMOTIC SITES IN HUMANS - FEASIBILITY, METHODS, SAFETY, AND DIAGNOSTIC ABILITY**

Andrew Weintraub, Steven Schwartz, Natesa Pandian, Robert Bojar, Hasan Rastegar, Sarah Katz, Kenneth Warner, Richard Cleveland.
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The ability to image coronary arteries (CA) using intravascular ultrasound (IVUS) has been shown in the catheterization laboratory. The feasibility and the clinical potential of IVUS coronary artery imaging in the operating room has not been explored. We used a 20 MHz, 4.8 F IVUS catheter intraoperatively in 14 pts undergoing CABG before and after bypass-graft (BG) placement. The IVUS catheter was introduced into the CA via the arteriotomy site and images of the distal CA were obtained with antegrade advance of the catheter and of proximal CA with retrograde engagement. Immediately following BG placement, the IVUS catheter was introduced into the BG and advanced to image the BG, BG-CA anastomosis and the distal CA beyond the anastomosis. A total of 22 CAs (7 LAD, 8 RCA, 7 Marginal), 14 grafts and 14 anastomoses were imaged. Although not as crisp as IVUS images in the cath laboratory, intraoperative IVUS still yielded high resolution cross-sectional images of all the vascular sites. Intra-op IVUS imaging was able to: (1) identify the severe proximal CA lesions, (2) verify that the arteriotomy for BG placement was indeed distal to significant stenotic lesions, (3) depict abnormalities including calcific plaques and discrete luminal narrowings in 8/22 distal vessels which were missed by angiography (4) visualize the anastomotic sites in all pts, allowing evaluation of the match between the BG and the CA (The BG/CA diameter ratio was 2.7±0.5), and (5) assure the lack of anastomotic complications such as anastomotic stenosis or intimal tears by providing immediate information after performing the anastomosis. The average time requirement for intraoperative IVUS imaging was 3 min per vessel including BG imaging. There were no complications. We conclude that intraoperative IVUS imaging of CAs and BG in humans can be performed quickly with ease and safety, and that this technique provides images of diagnostic quality and has important intraoperative clinical potential.

8:45

**EXCIMER LASER CORONARY ANGIOPLASTY OF LESIONS NOT FAVORABLE FOR BALLOON ANGIOPLASTY**

Stephen L. Cook, Neal L. Eigler, Arie Shefer, Lisa Hestrin, Tsvi Goldenberg, James S. Forrester, Frank Litvack, Alvarado Medical Center, San Diego, California, and Cedars-Sinai Medical Center, Los Angeles, California.

**Purpose:** To assess the acute efficacy of Excimer Laser Coronary Angioplasty (ELCA) in lesions identified as not ideal for PTCA.
**Methods:** Angiograms of the first 127 patients undergoing ELCA at Cedars-Sinai Medical Center were analyzed by BARI and ACC/AHA Task Force criteria. Laser success was defined as >20% improvement in diameter stenosis and a resultant lumen ≥ 0.8mm, 1.0mm, and 1.3mm with 1.3mm, 1.6mm, and 2.0mm laser catheters, respectively. Procedural success was defined as a final diameter stenosis ≤ 50% with or without adjunctive PTCA.
**Results:** 61% of patients had lesions unfavorable for PTCA due to length ≥10mm (tubular or diffuse morphology), total occlusion, or ostial location. The acute laser success rate in this subgroup was 83% (73% of total occlusions, 87% of non-totally occluded lesions). and the procedural success rate was 92%. Success, complication, and adjunctive PTCA rates did not differ significantly between favorable and unfavorable lesions. Laser was successful in 38/44 tubular or diffuse lesions, 10/11 ostial stenoses (6/7 aorto-ostial), 12/13 moderately or heavily calcified lesions, and 6/8 lesions in which PTCA had failed. Side branch occlusion occurred in 0/17 patients in whom one or more major branches originated within the lesion treated. Of 134 lesions treated, 30% were ACC/AHA Type A, 47% Type B, and 23% type C. Laser and procedural success were obtained in 83% and 88% of type A, 87% and 94% type B, and 81% and 84% type C lesions, respectively.
**Conclusions:** ELCA is effective in long and diffuse disease, calcified lesions, ostial stenoses, and stenoses that cannot be crossed or dilated with a balloon. This technique may provide a useful adjunct or alternative to PTCA in lesions not favorable for PTCA.

## Wednesday, March 6, 1991
## 8:30AM–10:00AM, Room 367, West Concourse
## New Clinical Angioplasty Techniques II

8:30

**ANGIOGRAPHIC RISK FACTORS FOR CORONARY RESTENOSIS FOLLOWING MECHANICAL ROTATIONAL ATHERECTOMY.**

Khusrow Niazi, M.D., David R. Cragg, M.D., Michelle Strzelecki, R.N., Harold Z. Friedman, M.D., F.A.C.C., V. Gangadharan, M.D., F.A.C.C., William W. O'Neill, M.D., F.A.C.C., William Beaumont Hospital, Royal Oak, MI.

Angiographic variables have been reported which define the risk of restenosis following coronary balloon angioplasty, but little data exist with regard to atherectomy. To identify angiographic risk factors for restenosis following mechanical rotational atherectomy (MRA) employing the Auth Rotablator™, we evaluated 60 lesions (56 native coronary arteries and 4 saphenous vein bypass grafts) in 56 patients who had undergone MRA and had protocol, 6-month follow-up angiography. Quantitative arteriography was performed on all patients with successful atherectomy (final lesion diameter < 50%). Restenosis was defined as diameter stenosis of ≥ 50% at 6 month follow-up.

The restenosis risk was assessed for the following variables: unstable angina 55% vs stable angina 45% ($P$=0.7), LAD 56% vs non-LAD 30% ($P$=0.05), ostial 69% vs proximal 45% vs mid and distal 20% ($P$=0.01), previous PTCA 29% vs de novo lesions 54% ($P$=0.1), adjunctive PTCA following MRA 42% vs primary MRA 50% ($P$=0.7), saphenous vein bypass grafts 100% vs non-grafts 43% ($P$=0.04). Following MRA the absolute lesion diameter in the restenosis group went from 1.1 mm to 1.9 mm and ultimately to 0.9 mm at 6 month follow-up. In the no restenosis group, lesion diameter changed from 1.1 mm to 1.9 mm following MRA to 1.7 mm at 6 month follow-up ($P$<0.001).

Conclusions: Using the Auth Rotablator™ we identified the following risk factors for restenosis: LAD lesions, ostial and proximal locations and saphenous vein bypass grafts. Pts with stable angina, de novo lesions and those receiving adjunctive PTCA did not have lower restenosis rates. The restenosis risk in native non-ostial lesions is similar to that seen following PTCA alone (32%).

9:00

**SIX MONTH FOLLOW-UP OF EXCIMER LASER CORONARY ANGIOPLASTY REGISTRY PATIENTS**

James R. Margolis, Dan Krauthamer, Frank Litvack, Donald A. Rothbaum, William J. Untereker, John F. Bresnahan, Kenneth M. Kent, Frank E. Cummins, and the ELCA Registry Investigators, South Miami Hospital, South Miami, Florida.

Of the first 958 patients and 1151 lesions to undergo excimer laser coronary angioplasty (ELCA), 6 month follow-up is completed on 446 patients. Angiographic restenosis was defined as loss of >1/2 of gain in lumen diameter and final stenosis >50%. At 6 months, 129 patients had had either repeat intervention or CABG. An additional 7 had myocardial infarction, and there were 6 late deaths. 189 additional patients had follow-up angiography at 6 mo. 32% of these had restenosis. Out of 115 patients who had neither an adverse event nor follow-up angiography, 19 had recurrent symptoms and/or a positive exercise test. Catheter size (1.6mm vs. 2.0mm) use of adjunctive PTCA (vs. stand alone laser), history of prior PTCA, and lesion length did not appear to correlate with restenosis rates. There was a strong inverse relationship between catheter tip energies and restenosis. There was less restenosis at energy density of 30-39mJ/mm2, lesser at 40-49 mJ/mm2 and least at 50-59mJ/mm2.

Conclusion: Restenosis after ELCA remains a significant problem. Systematic use of higher energies, which may lead to more precise cutting, may favorably effect future restenosis.