3:00

DETECTION OF REGIONAL CORONARY STENOSES IN PATIENTS WITH COMPLEX CORONARY ANATOMY USING DOBUTAMINE STRESS ECHOCARDIOGRAPHY

Pamela A. Marcovitz, Wilson Mathias, Ronald J. L. Dick, William F. Armstrong, University of Michigan Medical Center, Ann Arbor, MI

Dobutamine stress echocardiography (DSE) was performed in 44 patients undergoing catheterization for evaluation of coronary artery disease. Coronary arteriograms were scored using a computer-assisted program from which maximal percent stenosis was determined. Out of 32 patients with at least one coronary stenosis ≥ 50%, DSE correctly identified 31, yielding an overall sensitivity of 97%. Of 11 patients without coronary stenoses ≥ 50%, DSE correctly identified only 5 as having no significant stenoses at the time of study yielding an overall specificity of 45%. Of the 6 patients incorrectly identified as having CAD, 4 had wall motion abnormalities in the area of a previously dilated coronary artery or cardiomyopathy. Sensitivity and specificity for localization of coronary stenoses in either the anterior (LAD) or posterior (RCA/LCX) circulation were:

	Sensitivity	Specificity
LAD	90%	72%
RCA/LCX	95%	73%

Of 13 regions with a positive DSE but no significant stenosis in the area of a wall motion abnormality, 10 were in the area of a previousinfarct which had undergone intervention or associated with wall motion abnormalities due to dilated cardiomyopathy.

We conclude that DSE is sensitive for identifying patients with coronary stenoses and for localizing obstructive lesions, but specificity is low in patients with prior intervention or cardiomyopathy.

3:15

ADENOSINE ECHOCARDIOGRAPHY WITH OR WITHOUT HANDGRIP IN THE DIAGNOSIS OF CORONARY ARTERY DISEASE: COMPARISON WITH EXERCISE ECHOCARDIOGRAPHY

William B. Baker, Anatole D. Trakhtenbroit, Ranley Desir, Neal S. Kleiman, William A. Zoghbi, Baylor College of Medicine, Houston, Texas, U.S.A.

We have recently demonstrated that adenosine echocardiography (ADE) can be used as a pharmacologic stress test for the assessment of coronary artery disease (CAD). To determine the comparative accuracy of ADE and post treadmill exercise echo (EXE) and evaluate whether the addition of handgrip (HG) improves the sensitivity of ADE for CAD, we performed ADE, ADE-HG and EXE in 29 pts (19 male, mean age 54 ± 12 yrs) referred for evaluation of CAD. Images were digitized in a quad-screen and randomized as to the stage and mode of intervention. Thirteen pts had documented CAD and the other 16 had either normal coronary arteries (n = 7) or low probability for CAD. Resting wall motion abnormality was present in 8 pts. New or worsening wall motion abnormality was detected by ADE in 5 pts, by ADE-HG in 7 and by EXE in 10 pts; these were false positive for ischemia in 1 pt, 1 pt and 2 pts, respectively. Concordance between findings by ADE and EXE was seen in 24/29 pts or 83% and reached 90% between ADE-HG and EXE. The sensitivity for CAD of ADE, ADE-HG and EXE was 62%, 69% and 77%, with a specificity of 94%, 94% and 88%, respectively. The quality of ADE and ADE-HG studies was superior to that of EXE in 10/29 pts while that of EXE was superior in 2 pts. Conclusion: The addition of handgrip to adenosine echocardiography improves its sensitivity for CAD and approaches that of exercise echocardiography with better image quality. This pharmacologic stress test can therefore be used as an alternative stress modality for the diagnosis of CAD in patients unable to exercise.

Wednesday, March 6, 1991
2:00PM–3:30PM, Room 367, West Concourse
Intravascular Interventions: Promising New Techniques II

2:00

COMBINATION BALLOON-ULTRASOUND IMAGING CATHETER (BUIC) ALLOWS CONTINUOUS MONITORING OF BALLOON INFLATION, DEFLATION, AND IMMEDIATE RECOIL IN PATIENTS UNDERGOING BALLOON ANGIOPLASTY.

Jeffrey M. Isner, Kenneth Rosenfield, Douglas W. Losordo, Paul Palefski, R. Eugene Langevin, Jr., Syed Razvi, Bernard D. Kosowsky, Tufts University School of Medicine, St. Elizabeth's Hospital, Boston, MA.

We investigated a combination balloon (B)-ultrasound (U) imaging (I) catheter (C) (BUIC) which houses a 20 MHz U transducer within and midway between 2 ends of an angioplasty (A) B (7 or 8mm x 4cm) to determine: a) relationship between U measurements obtained through AB versus those obtained by standard (non-B) intravascular U catheter (IVUS); b) % recoil (R) at BA site immediately following B deflation (D); and c) onset of plaque cracks developing on-line during B inflation (I). BUIC was used to perform BA at 1 or more stenotic sites (Σ=12) in the iliac arteries (9 pts) or vein graft (1 pt). Each BA site was also evaluated pre- and post-BA by standard (non-B) 20MHz IVUS. Cross-sectional area (XSA) of BA sites by BUIC immediately pre-BI (1.2±0.1mm2) did not differ significantly from XSA by IVUS pre-BA (0.9±0.1mm2) (p=NS). Likewise, XSA of BA site by BUIC immediately post-BD (3.0±0.2mm2) did not differ significantly from XSA by IVUS post-BA (3.1±0.2mm2) (p=NS). Post-BA, % R, (ratio of XSA of BA site by BUIC immediatedly post-BD to B XSA at full BI (6 atm)) measured 21.3±.6.8%; in 4/12 cases in which R was most marked (39, 46, 50, 61%), BI was observed to be asymmetric due to eccentric lesion morphology. Finally, plaque cracks were identified on line in 7/12 BI; in each, initiation of plaque crack was identified at BI pressures < 2 atm. Conclusion: this preliminary human experience with BUIC establishes feasibility and potential utility of continuous on-line intravascular ultrasound monitoring of lumen/plaque/wall alterations during BA.

2:15

Angioscopically Guided Dissolution of Arterial Thrombi By Ultrasound

Mehrdad Ariani, Michael C. Fishbein, Robert J. Siegel. Cedars-Sinai Medical Center, Los Angeles, California USA

Catheter delivered ultrasound energy has been shown to be effective for in vitro and in vivo dissolution of thrombi. To further assess the in vivo efficacy, and safety of this modality, we recanalized 7 thrombosed canine superficial femoral arteries under angioscopic guidance. We used an 89 cm prototype ultrasound wire probe ensheathed in a 7-9F angioscope to apply pulsed wave (11-25 watts) intermittent ultrasound energy at a frequency of 20 kHz. Acute thromboses were induced by subjecting a 5-7 cm segment of superficial femoral artery to crush injury with subsequent injection of 200 units of thrombin followed by 2 ml of 72 hour old autologous clot. After 2 hours the presence of stable thrombus and luminal occlusion was documented by angioscopy and angiography. The ultrasound ball-tipped wire probe was directed to the thrombi under angioscopic guidance and energy was then applied while the wire probe was held stationary. All thromboses were disrupted in ≤4 minutes. Luminal patency was found in all cases by both angioscopy and angiography. By angioscopy the intima appeared smooth and without any evidence of tears, dissection or residual thrombus. Histologic studies showed no evidence of thermal or blast injury, occlusive emboli or perforations. Angioscopic guidance permits more complete clean up of residual thrombi not detectable by angiography and can be utilized as an adjunct to ultrasound dissolution of arterial thrombi.