serial intravascular ultrasound (IVUS) in 72 pts and measured vessel, lumen, and plaque cross-sectional areas (CSA), % plaque areas of pre-DCA, post-DCA, and follow-up. Acute (pre-DCA vs post-DCA) and chronic (post-DCA vs follow-up) for Δ vessel, Δ lumen, and Δ plaque were compared at the same section of the artery. At follow-up (4.4 ± 2.8 months), restenosis was present in 8/72 (12%) pts.

Conclusions: (1) There were no significant differences in acute increases of vessel, lumen and plaque areas in the restenosis group compared to the no restenosis group. (2) The chronic increase in plaque area and the chronic decreases both in the lumen and vessel area were demonstrated in the restenosis group. (3) It was suggested that intimal hyperplasia was more responsible for restenosis than remodeling.

11:30

744-5 | IVUS-Determined Predictors of Restenosis in PTCA and DCA: Final Report From the GUIDE Trial, Phase II

The GUIDE Trial Investigators. *Stanford University, Stanford, CA*

Phase II of the GUIDE Trial was designed to identify morphological predictors of restenosis using IVUS. Patients from 26 centers undergoing PTCA or DCA of a single target lesion were randomized to clinical or angiographic follow-up at six months. The initial procedure was completed using angiographic guidance alone; IVUS pullback was then performed with the operator *blinded*. The endpoints were angiographic restenosis (ARS), clinical restenosis (CRS), and major clinical events (MCE) of death, QWMI, or target vessel revascularization. To date 390 out of 530 entered cases have been qualified (remaining cases excluded from core lab analysis for evidence of unblinding, treatment of multiple lesions, stenting, and/or incomplete/inadequate IVUS scans). 290 follow-up studies have been analyzed (126 angiographic and 164 clinical). Data from 100 further follow-ups are anticipated prior to completion. ARS occurred in 45% of cases, CRS in 32%, and MCE in 21%. At this point in the analysis, the most significant predictors of outcome are:

	ARS		CRS		MCE	
	no	yes	no	yes	no	yes
U % PA	61 ± 11	69 ± 12*	62 ± 11	67 ± 11*	63 ± 11	60 ± 11
U MLD	2.6 ± 5	2.2 ± 0.4*	2.4 ± 0.5	2.2 ± 0.4	2.5 ± 0.6	2.2 ± 0.6*
A PrS	69 ± 18	75 ± 14	69 ± 17	75 ± 16*	73 ± 17	72 ± 16
A PoS	29 ± 15	31 ± 14	29 ± 15	28 ± 13	28 + 13	28 ± 15

U = IVUS, A = Anglo, PA = plaque area, PrS = pre stenosis, PoS = post stenosis, *P < 0.05

Conclusions: This analysis of Phase II of the GUIDE trial suggests that; (i) Of Angiographic variables, only pre-procedural stenosis is significant (predicting clinical restenosis); (ii) IVUS-determined percent PA is a predictor for both angiographic and clinical restenosis, (iii) IVUS MLD predicts both angiographic restenosis and major clinical events.

11:45

744-6 | Chronic Vessel Remodeling as a Cause of Restenosis After Directional Coronary Atherectomy

Satoru Sumitsuji, Osamu Katoh, Etsuo Tsuchikane, Yumiko Nakagawa, Masanobu Funamoto, Toru Kobayashi. *The Center for Adult Diseases, Osaka, Japan*

Vessel remodeling which has been reported to occur in the chronic phase after PTCA may contribute to restenosis. Vessel remodeling following directional coronary atherectomy (DCA) has not been clarified. The aim of this study was to elucidate the occurrence of vessel remodeling after directional coronary atherectomy (DCA). Intravascular ultrasound (IVUS) was performed in 95 lesions (48 LAD, 31 RCA, 14 LCX, 2 LMT) before and after successful DCA and at a mean follow-up of 6 months. IVUS assessment included external elastic membrane (EEM) areas and plaque + media (P + M) areas. Serial changes in EEM and P + M areas were analyzed in restenotic (•) and non-restenotic (o) lesions. Restenosis was defined as > 50% diameter stenosis by QCA.
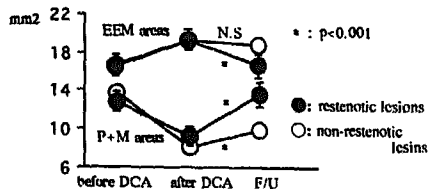
Restenotic lesions (n = 20) were associated with significant EEM areas

reduction (19.0 ± 1.1 vs 16.3 ± 1.3, p < 0.001) as well as significant P + M areas increase (9.4 ± 0.9 vs 13.7 ± 1.3, p < 0.001). However, non-restenotic lesions revealed no significant reduction in EEM areas.

Conclusion: EEM reduction which means vessel remodeling occurs after DCA and contributes to restenosis.

745 | Molecular and Cellular Characteristics in Heart Failure

Tuesday, March 26, 1996, 10:30 a.m.–Noon
Orange County Convention Center, Room 222

10:30

745-1 | Load Dependence of Diastolic Right Ventricular Geometry in Right Ventricular Failure in the Conscious Dog

R. Eric Lilly, Scott C. Silvestry, Umesh S. Marathe, James W. Davis, Donald D. Glower. *Duke University, Durham NC*

The effects of acute versus chronic alterations in RV afterload on diastolic RV geometry in the normal and the failing RV have been difficult to elucidate. As such, 8 dogs underwent implantation of pneumatic pulmonary artery occluders, and epicardial dimension transducers. RV volumes (RVV) were calculated using a shell subtraction model (RVV = biventricular epicardial volume-LV epicardial volume-RV wall volume). Micromanometers measured ventricular pressures. Dogs were studied in the control state, after 15 minutes of pulmonary stenosis (PS), in clinical RV failure (2.3 weeks mean duration of PS), and after acute release of PS during RV failure. RV diastolic geometry was quantified using the x-intercept (x_{PRSW}) of the linear stroke work versus end-diastolic volume relationship.

	Control	15 min PS	Failure release	15 min PS
RV mean-ejection pressure (mmHg)	38 ± 8.7	60 ± 9.4*	80 ± 18*	49 ± 12†
x_{PRSW} (ml)	48 ± 21	47 ± 21	64 ± 26*	60 ± 26*

Data are mean ± S.D., *p < 0.05 vs control, †p < 0.05 vs failure

These data demonstrate that acute alterations in RV afterload in both normal and failing ventricles do not significantly alter x_{PRSW}. Chronic PS, however, significantly increases x_{PRSW}. Therefore, chronic, not acute, elevations in RV afterload significantly alter RV diastolic geometry. This altered geometry persists acutely despite reversal of altered loading conditions in RV failure.

10:45

745-2 | Angiotensin II Formation From Angiotensin Converting Enzyme and Chymase-Like Enzyme in the Normal Human Heart and in Hearts From Various Mammals

Eduardo Balcells, Qing C. Meng, Suzanne Oparil, Louis J. Dell'Italia. *Univ of Alabama at Birmingham, Birmingham, Al*

Previous studies have demonstrated that greater than 80% of angiotensin II (ANG II) formation in the human heart is from heart chymase and that less than 10% is from angiotensin converting enzyme (ACE). This finding appears to be unique to the human heart; however, there has been no systematic comparison of ACE and chymase ANG II forming capacities in various animal species. Accordingly, we studied the ANG II forming capacity in heart tissue extracts from normal human donor hearts rejected for transplantation (n = 4), and in normal dog (n = 5), rat (n = 4), rabbit (n = 3) and mouse (n = 2) hearts. Utilizing the ACE site specific inhibitor, captopril, and the chymase inhibitor, chymostatin, we determined the relative ANG II formation from ACE and chymase-like enzymes with high performance liquid chromatography. Percent ANG II formation from chymase was highest in the human heart (97.8 ± 0.2% [SE]) and 83.6 ± 3% in dog, 81.8 ± 0.4% in rat, 22.7 ± 5.7% in rabbit, and 15.1 ± 0.6% in mouse. In contrast, percent ANG II formation from ACE was lowest in the human heart (0.7 ± 0.4%), 6.0 ± 2.3% in dog, 20.4 ± 1.5% in rat, 77.2 ± 5.7% in rabbit, 85.0 ± 0.6% in mouse. Total ANG II formation (nmol/gm/min) in the normal human heart was extremely high (161.3 ± 55.1) compared to dog (23.3 ± 1.9), rat (3.5 ± 0.2), rabbit (4.5 ± 0.5), and mouse (7.6 ± 1.4). Therefore, when compared to the human heart, there exists a marked difference in intracardiac ANG II forming capacity and a variable contribution from chymase to ANG II formation across species.