could be accounted for by the higher age of females. In a Cox proportional hazard model including only gender and age as covariates, risk ratio associated with female sex was 0.95 (p = 0.44). When survival was divided into short term survival (within 30 days) and long term survival, it appeared that female gender was an independent risk factor for 30 day mortality in a linear logistic regression model including age, left ventricular wall motion index, se-creatinine, body mass index, known ischemic heart disease, diabetes, hypertension, history of lung or cerebral disease, ventricular fibrillation and congestive heart failure (odds ratio 1.3, p < 0.001). This was compensated by a slight and insignificant trend for increased risk associated with male gender on long term (risk ratio 1.09, p = 0.14).

Conclusion: The increased mortality risk associated with female gender following and MI is fully explained by the higher age of female patients. Female gender may be an independent risk factor for mortality within 30 days of MI.

744 Intravascular Ultrasound Safety and Clinical Utility

Tuesday, March 26, 1996, 10:30 a.m.–Noon
Orange County Convention Center, Room 314

10:30

744-1 Intravascular Ultresound: Safety and Indications for Use in 7085 Consecutive Patients Studied in 32 Centers in Europe and Israel

Günter Görge [1], Ronaldus J. G. Peters, Fausto Pinto, Alessandro Distante, Cees A. Visser, Alan G. Fraser, Raimund Erbel [1] for the Working Group on Echocardiography. [1] *University of Essen, Germany; European Society of Cardiology, Sophia Antipolis, France*

Intravascular ultrasound (IVUS) has gained explosive interest in recent years. However, data on safety and indications are still limited. Therefore, a questionnaire was mailed to 51 centers. Thirty-two centers responded (63%). During 73192 invasive procedures a total of 7085 IVUS studies were performed (9.7%). Centers used mainly mechanical IVUS catheters (85%). Eighty-eight percent gave heparin (median dosage 10.000 units, range 5000–20.000) and 78% nitroglycerin (median 0.2 mg, range 0.1–0.6 mg) before the IVUS study. Indications for IVUS in percent of centers performing studies in selected patients were:

Normal angio:	43%	Acute MI:	25%
LMCA disease:	58%	Unstable angina:	19%
Pre/post PTCA:	69%/75%	Post HTX:	12%
Pre/post Stent:	34%/79%	Vasomotion:	9%
Pre/post DCA:	34%/34%	Non-cardiac:	9%

Spasm occurred in 3% of all patients (range 0–23%). Ten (0.14%) major complication occurred: dissection (n = 7), thrombosis (n = 1), ventricular fibrillation (n = 1), and severe spasm not responding to conventional therapy (n = 1). Six complications occurred before and four after intervention, one in a bypass graft, two in the LAD, three in the LCX, and four in the RCA. Handling of events included four PTCAs and five stent implantations; outcome was uneventful in nine patients, but one myocardial infarction with a CK max of 420 U/l occurred.

Conclusion: IVUS is used predominantly during coronary artery interventions. Despite this highrisk population, IVUS is surprisingly safe.

10:45

744-2 Improved Outcome of Balloon Angioplasty With Intracoronary Ultrasound Guidance — Core Lab Angiographic and Ultrasound Results From the CLOUT Study

Gregg W. Stone, Tom Linnemeier, Fred G. St. Goar, Harald Mudra, Helen Sheehan, John McB. Hodgson. *El Camino Hospital, Mountain View, CA; University Hospitals of Cleveland, Cleveland, OH*

Intracoronary ultrasound (ICUS) frequently demonstrates arterial remodeling with vessel expansion within and adjacent to severely diseased coronary segments which cannot be appreciated by angiography alone. ICUS recognition of remodeled segments may allow the safe use of oversized balloons in selected lsns, which should result in improved acute outcomes. ICUS was first performed in 64 consecutive pts *after* successful standard "optimal" PTCA, followed by protocol driven balloon upsizing if unsuspected reference segment atheroma was present, regardless of otherwise acceptable angiographic results. *Results:* By ICUS, 52 ± 15% of the *reference* segment cross sectional area was occupied by atheroma with mean plaque thickness of 0.67 mm. Balloon upsizing (0.25–1.0 mm increment) was therefore performed in 54 of 66 lesions (82%). Major complications occurred in 2 pts (3%). The measured balloon:artery ratio during "routine" PTCA was 1.03 ± 0.12 compared to 1.16 ± 0.14 after ICUS guided PTCA (P < 0.001). The lesion MLD increased from 0.85 ± 0.33 mm pre-PTCA, to 1.89 ± 0.50 mm post routine PTCA, and increased further to 2.20 ± 0.49 mm after ICUS guided PTCA (P < 0.001). Similarly, dia. stenosis decreased from 66 ± 12% pre-PTCA to 28 ± 17% post routine PTCA to 17 ± 15% after ICUS guided PTCA (P < 0.001). ICUS lesion MLD and area increased from 1.7 ± 0.36 mm and 3.17 ± 1.07 mm^2 post routine PTCA to 2.27 ± 0.38 mm and 4.52 ± 1.0 mm^2, respectively (both P < 0.001).

Conclusions: ICUS demonstration of angiographically unsuspected atheromatous remodeling allows the safe use of larger balloons and results in improved lumen dimensions compared to PTCA with angiographic guidance alone. Further studies will determine whether these acute gains result in reduced restenosis rates.

11:00

744-3 Prediction of Intravascular Ultrasound of Inflation Pressure Required for Stenosis Ablation by PTCA

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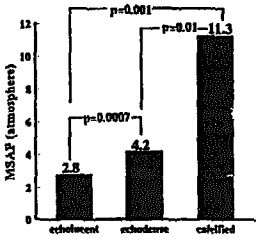
Pressures required for stenosis ablation by PTCA vary widely. Since high pressures may result in excessive mural trauma and increased risk of complications, we tested the ability of intravascular ultrasound (IVUS) to predict the minimum stenosis ablation pressure (MSAP) during PTCA of 65 lesions. MSAP was quantified by noting the pressure required for elimination of the "waist" on the balloon created by the stenosis. Inflation pressure was increased in a standardized manner (1 atmosphere per 10 seconds) during PTCA. Lesions were classified by IVUS as predominantly echolucent (n = 26), echodense (n = 33), or echodense with extensive calcification (n = 6). Eighty percent of lesions occurred in patients with unstable coronary syndromes. The majority of lesions were eccentric (72%). The lowest MSAP was associated with echolucent lesions and the highest with calcified lesions. MSAP tended to be lower in unstable versus stable lesions (3.9 vs 5.4 atm, p = 0.09). Lesion eccentricity did not correlate with MSAP.



Conclusion: IVUS can be utilized to predict pressures required for stenosis ablation by PTCA and may assist in the selection of the optimal interventional approach.

11:15

744-4 Mechanisms of Restenosis After Aggressive Directional Coronary Atherectomy (DCA) Guided by Intravascular Ultrasound

Masaki Yokoya, Takahiko Suzuki, Hiroaki Hosokawa, Motoya Hayase. *National Toyohashi Higashi Hospital, Toyohashi, JAPAN*

To evaluate mechanisms of arterial restenosis following DCA, we performed

	Restenosis (n = 8)	No restenosis (n = 64)	P-value
Reference diameter	4.7 ± 0.3	4.5 ± 0.5	n.s.
Vessel CSA (mm^2)	17.5 ± 2.5	16.3 ± 3.4	n.s.
Lumen CSA (mm^2)	3.0 ± 0.9	3.3 ± 1.2	n.s.
% Plaque areas (pre-DCA)	81.6 ± 6.6	79.8 ± 5.8	n.s.
% Plaque areas (post-DCA)	58.3 ± 8.7	54.8 ± 7.2	n.s.
% Plaque areas (follow-up)	64.9 ± 10.8	55.5 ± 9.9	< 0.05
Acute Δ vessel (mm^2)	0.2 ± 1.0	0.5 ± 1.9	n.s.
Acute Δ lumen (mm^2)	4.2 ± 1.8	4.3 ± 1.6	n.s.
Acute Δ plaque (mm^2)	−4.1 ± 1.6	−3.7 ± 2.0	n.s.
Chronic Δ vessel (mm^2)	−0.6 ± 1.0	0.5 ± 2.4	n.s.
Chronic Δ lumen (mm^2)	−3.1 ± 1.9	0.4 ± 1.8	< 0.001
Chronic Δ plaque (mm^2)	2.5 ± 3.1	0.1 ± 1.6	< 0.0001