	Basal (a)	p (a) vs (b)	Control (b)	p (b) vs (c)	Final	p (a) vs (c)
MLD (mm)	2.3 ± 0.5	*	1.1 ± 0.7	*	1.9 ± 0.3	**
Vessel size (mm²)	12.7 ± 3.0	NS	14.5 ± 3.0	NS	15.1 ± 3.2	*
Stent area (mm²)	7.3 ± 3.2	NS	7.6 ± 2.9	**	9.0 ± 2.4	**
Lumen area (mm²)	7.3 ± 3.2	**	2.8 ± 1.4	**	5.4 ± 1.7	
Neotissue (mm²)	-		3.9 ± 2.3	NS	3.7 ± 2.4	

* = p < 0.05 and ** = p < 0.001

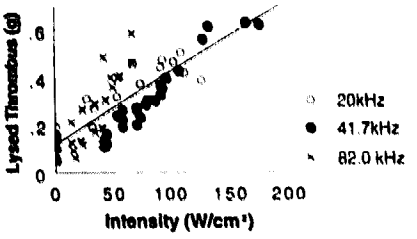
We conclude that the mechanism of balloon angioplasty in intrastent restenosis is mainly overexpansion of the stent, most of the neointimal tissue remaining within the stent.

1217-60 The Relationship Between Ultrasound Intensity and Thrombolysis

A. Oshima, A.F. Brisken[1], R.F. Zuk[1], V.E. Ghazarossian[1], M.R. Mooney, P.G. Yock, P.J. Fitzgerald. [1]*Pharmasonics, Sunnyvale, CA, USA; Stanford University, Stanford, CA, USA*

It has been demonstrated that high intensity, low-frequency ultrasound can accelerate thrombolysis. However, the relationship between ultrasound emission characteristics and efficiency of thrombus dissolution is not well understood. We performed ultrasound thrombolysis *in vitro* using a modified ultrasound generator (Misonix sonicator, Microtip probe) at frequencies of 20, 41.7 and 82 kHz and intensities ranging from 0 to 177 W/cm². Reduction of thrombus weight and fibrin release from thrombus were measured.

Result: The relationship between beam intensity and reduction of thrombus weight is shown in the figure below. Fibrin assay showed a similar linear relationship. (20 kHz: R = 0.83, 82 kHz: R = 0.84).



Conclusion: In the range between 20 to 82 kHz there is a linear relationship between ultrasound intensity and thrombus dissolution as assessed by the reduction of thrombus weight and fibrin release. These findings may play an important role in defining the specifications required for a catheter based ultrasound thrombolysis device.

1217-61 Detection of Fibrous cap in Atherosclerotic Plaque by Intravascular Ultrasound Using Color Mapping Technique of Angle-dependent Echo-Intensity Variation

T. Hiro, T. Fujii, H. Nakamura, M. Matsuzaki. *Yamaguchi University, Ube, Yamaguchi, Japan*

Background: The thickness of fibrous cap is a major determinant for instability of atherosclerotic plaque. It has been demonstrated that the intensity of intravascular ultrasound (IVUS) backscatter from fibrous tissue is strongly dependent on the ultrasound beam angle. This study investigated the feasibility of a new IVUS color mapping technique representing the angle-dependent echo-intensity variation especially in detecting fibrous cap in atherosclerotic plaque.

Methods: Nineteen formalin-fixed noncalcified human atherosclerotic plaques from necropsy were imaged in vitro with a 25 MHz IVUS catheter. The IVUS catheter was moved coaxially inside the lumen. Then, the degree of change in echo-intensity (maximum minus minimum) was colorized for each portion in the plaques. The plaque segments were also examined histologically by Masson's Trichrome stain.

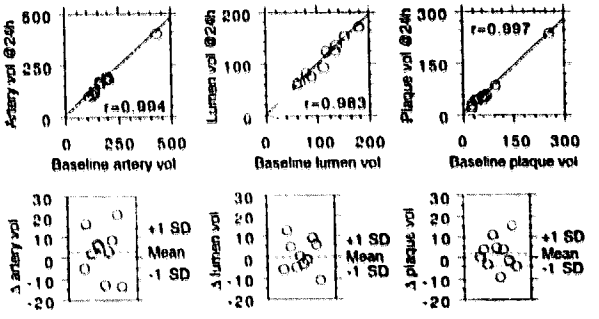
Results: A clearly-bordered area with large variation in echo-intensity was revealed for each plaque surface in the colorized IVUS image. The thickness (x:mm) of this area was significantly correlated with that of fibrous cap (y:mm) measured from histologic slides, as: $y = 1.0 \times -0.01$ ($r = 0.81$, $p < 0.0001$). The Bland-Altman analysis also supported the reliability of this method (the mean difference = 0.0 ± 0.1 mm).

Conclusions: This novel color mapping technique of the echo-intensity variation in IVUS provided an accurate representation of the thickness of fibrous cap in atherosclerotic plaque. This method may be useful in assessing the plaque instability in patients with acute coronary syndrome.

1217-62 Reproducibility and Biologic Variability of Volumetric Intravascular Ultrasound Measurements

A. Shiran, G.S. Mintz, T. Kimura, M. Nobuyoshi, B. Oljaca, K.M. Kent, A.D. Pichard, L.F. Satler, J.J. Popma, M.B. Leon. *Washington Hospital Center, Washington, DC, and Kokura Memorial Hospital, Kitakyushu, Japan*

Serial volumetric intravascular ultrasound (IVUS) measurements have been proposed for the detection of atherosclerotic plaque progression and regression. To assess the reproducibility and biologic variability of these measurements, untreated left main coronary arteries in 10 patients were studied 24 hrs apart. All IVUS studies were performed with automatic transducer pullback @ 0.5 mm/sec. An automatic contour detection algorithm was used to measure artery, lumen, and plaque (artery − lumen) volumes (vol, mm³) over 7.2 ± 2.5 mm long segments. Plaque burden (plaque/artery vol) was modest (33 ± 11%).



We Conclude: Serial volumetric IVUS analysis is reproducible, and there is only minor short term biologic variability. Serial volumetric IVUS analysis should prove useful for studying atherosclerosis progression and regression.

1217-63 Novel Multi-Manipulatable Functioned Percutaneous Transluminal Coronary Angioscope

K. Mizuno, S. Ohkuni, T. Imaizumi, T. Arai, M. Sakurada. *Chiba Hokusoh Hospital, Nippon Medical School, Chiba, Japan*

Background: Clinical use of coronary angioscope (CAS) is limited partly due to good coaxial view cannot be obtained in curved coronary artery. Therefore, we developed a new percutaneous transluminal CAS which has two novel functions (1) good torque control (one to one torque ratio) and (2) slant visual axial tip.

Methods: This angioscopic catheter composed of outer catheter and inner angioscope (1.5 mm, 0.6 mm in diameter, respectively). The inner angioscope is able to not only rotate 360 degrees but also move 50 mm along the coronary artery. The slant visual angle was 30 degrees to design to have the highest visualization success rate. We performed comparative study on visualization capability of new CAS and commercial available conventional monorail type CAS in 10 canine coronary arteries. CAS was inserted into left anterior descending artery (LAD) or circumflex coronary artery (CX) from right femoral artery through 8F guide catheter.

Results: Visualization of whole inner lumen of CX and distal LAD could not be obtained in all cases with conventional CAS. However, good visualization of inner lumen of both proximal and distal LAD and CX were obtained in all cases with new CAS. No complications were occurred during angioscopy. Pathological examination showed no thrombus or intimal exfoliation.

Conclusions: This new CAS is the first one which can observe coronary inner lumen in whole segments completely. This new CAS can remarkably improve the efficacy of angioscopic examination.

1217-64 Volumetric Plaque Quantification by Intravascular Ultrasound: Reproducibility, Variability and Validation

D. Hausmann, L. El-Ayoubi, M. Sturm, H.-G. Wolpers, H. Drexler. *Hannover Medical School, Hannover, Germany*

Background: Intravascular ultrasound (IVUS) visualizes plaque directly and may be used for quantification in interventions; the accuracy of IVUS requires further evaluation.

Methods: In vivo: IVUS imaging (2.9 F, 30 MHz) was performed in 95 coronary segments in 30 pts. (28 m, 2 f) with coronary disease. After pullback #1 (automated, 1.0 mm/sec), the catheter was removed and repositioned for pullback #2. IVUS images were digitized and cross-sections were analyzed visually. Parameters were: Plaque volumen and plaque surface area (vessel surface covered by plaque) within segments (marked by branches). *In*