Title	PE-439 Tissue Characteristics at the Sites of Backward Attenuation of Ultrasound Signals Evaluated by Integrated Backscatter Intravascular Ultrasound((Fulltext))
Author(s)	OKUBO, Munenori; KAWASAKI, Masanori; ISHIHARA, Yoshiyuki; MORI, Urara; KUBOTA, Tomoki; YAMAKI, Takahiko; OJIO, Shinsuke; SAIO, Masanao; NISHIGAKI, Kazuhiko; TAKEMURA, Genzou; FUJIWARA, Hisayoshi; MINATOGUCHI, Shinya
Citation	[Circulation journal : official journal of the Japanese Circulation Society] vol.[72] no.[Suppl. 1] p.[470]-[470]
Issue Date	2008-03-01
Rights	The Japanese Circulation Society ( )
Version	(publisher version) postprint
URL	http://hdl.handle.net/20.500.12099/35091

PE-439

Tissue Characteristics at the Sites of Backward Attenuation of Ultrasound Signals Evaluated by Integrated Backscatter Intravascular Ultrasound

[1]Munenori Okubo
[1]Masanori Kawasaki, [1]Yoshiyuki Ishihara, [1]Urara Mori,
[1]Tomoki Kubota, [1]Takahiko Yamaki, [1]Shinsuke Ojio, [2]Masanao Saio,
[1]Kazuhiko Nishigaki, [1]Genzou Takemura, [1]Hisayoshi Fujiwara,
[1]Shinya Minatoguchi
[1]Regeneration & Advanced Medical Science, Graduate School of Medicine Gifu University, Gifu, [2]Department of Immunopathology, Graduate School of Medicine Gifu University, Gifu

Background: It is well known that coronary plaques that show backward attenuation of ultrasound signal (AT) often cause distal flow disturbance during percutaneous coronary intervention. However, tissue characteristics of such plaques have not been precisely investigated. The aim of this study is to clarify the relationship between tissue characteristics of coronary plaques and AT by use of Integrated Backscatter (IB) Intravascular Ultrasound (IVUS). **Methods**: Images were acquired from 200 segments of 15 coronary arteries from 10 cadavers obtained at autopsy. Twenty segments that showed AT (10%) were enrolled in this study. A total of 41 regions of interest (ROI) on histological images were compared with IB-IVUS color coded maps. Micro calcifications (MC) and cholesterol clefts (CC) were evaluated by von Kossa and Hematoxylin-Eosin staining. Percentage of CC area (area of CC/ area of ROI) and MC area were calculated by a personal computer. **Results**: The attenuation of IB values of CC and MC were 3.54 ± 1.61 dB/0.1 mm and 3.60 ± 1.80 dB/0.1 mm, respectively. As the % CC area (range: 1-31%;Av.11.2%) and % MC area (range: 3-59%;Av.18.7%) increased, the attenuation of IB values increased ($r = 0.62$ and 0.59, $P< 0.001$ and < 0.01, respectively). **Conclusion**: This study provides new clinical insights that micro calcification and cholesterol cleft that means cholesterol crystal contribute the attenuation of IB value.

PE-440

Coronary Plaque Heterogeneity in VH-IVUS and its Relation to Insulin Resistance and Diabetes Mellitus

[1]Hideo Amano
[1]Kenji Wagatsuma, [1]Mikihito Toda, [1]Hideo Nii, [1]Yasuto Uchida,
[1]Takayuki Kabuki, [2]Junichi Yamazaki
[1]Division of Intervensional Cardiology,Cardiovascular Center,Toho University Omori Medical Center, Tokyo, [2]Division of Cardiovascular Medicine,Department of Internal Medicine, Omori Medical Center,Toho University School of Medicine, Tokyo

Background:Calcification during the stage of insulin resistance is still remains unknown. we considered the difference in dense calcium within one lesion to signify heterogeneous plaque and studied its relation to insulin resistance and diabetes mellitus.Subjects:180 patients with 187 lesions who underwent VH study at the time of coronary stent implantation Methods:Dense calcium(DC) in plaque composition was measured by VH at 1 mm intervals in all lesions. Δ DC (%) was the difference between the sites of maximum and minimum ratio of dense calcium within one lesion. Those with HbA1c of 6.5% or more were classified the High-HbA1c group(n=59) and those under 6.5% the Low-HbA1c group(n=128). In addition, those with homeostasis model assessment-insulin resistance(HOMA-R) of 2.5 or more were classified the High HOMA-R group(n=42) and those under 2.5 comprised the Low HOMA-R group(n=75). Results:DC was significantly greater in the High-HbA1c group with High-HbA1c group $9.8 \pm 6.9\%$ and Low-HbA1c group $7.3 \pm 6.1\%$(p<0.01). Δ DC was significantly greater in the High-HbA1c group with High-HbA1c group $18.0 \pm 9.0\%$ and Low-HbA1c group $11.5 \pm 6.6\%$(p<0.01). Δ DC was significantly greater in the High HOMA-R group with High HOMA-R group$15.8 \pm 8.9\%$ and Low HOMA-R group $12.1 \pm 5.6\%$(p<0.05).Conclusion:VH studies suggested that heterogeneous calcification increases from the time of abnormal glucose tolerance and when the disease progresses to diabetes mellitus, in addition to heterogeneous calcification, calcification throughout the coronary artery increases

PE-441

Virtual Histology Assessment of Attenuation Image Detected With 40MHz Gray-scale IVUS

[1]Yoshihiro Takeda
[2]Jin Nariyama, [1]Jun Tanigawa, [1]Takahito Yuki, [1]Takafumi Shinmyo,
[1]Motonobu Murai, [1]Norihiko Miyazaki, [1]Taichi Okabe,
[1]Takahiro Nakakohji, [1]Masaaki Hoshiga, [1]Tadashi Ishihara,
[1]Toshiaki Hanafusa
[1]First Department of Internal Medicine, Osaka Medical College, Osaka, [2]Department of Cardiology, Osaka Railway Hospital, Osaka

<Background> Attenuation image (AttnI) with 40MHz intravascular ultrasound (IVUS) is defined as the image of atherosclerotic plaque lacking of intraplaque echo signals even without superficial calcifications. It has been reported that AttnI might be related to lipid-rich plaque and source of distal embolization following angioplasty. <Methods> From January to December 2006, elective 40MHz IVUS-guided (Atlantis Pro2) coronary angioplasty cases in 91 de novo lesions (78 patients) were also assessed with Virtual Histology (VH) -IVUS (Eagle Eye Gold, 20MHz). <Results> Clinical characteristics: Male 82.1%, Age 65.6 ± 9.4, stable angina 74.7%/ unstable angina 25.3%. Lesion characteristics: B2/C 47.3% and LAD:42.9%, LCx:23.1%, RCA:29.7% and others: 4.3%. AttnI was detected in 26 lesions (28.6%), and was more frequently observed in unstable angina than in stable angina (P=0.002). The vessel area and the percentage of fibro-fatty tissue were larger in lesions with AttnI compared to lesions without AttnI (P=0.02 and <0.001, respectively). Furthermore, the marble image of fibrous and fibro-fatty tissue with no dense calcification was more frequently detected in lesions with AttnI compared with lesions without AttnI (84.6% vs. 36.9%, P<0.001). <Conclusions> AttnI with 40MHz IVUS was correlated with larger vessel, fibro-fatty tissue and marble image of fibrous and fibro-fatty tissue with VH-IVUS. AttnI may be related to lipid rich plaque in the positively remodeled vessel, which is one of features of the vulnerable plaque.

PE-442

Intravascular Ultrasound Findings and Captured Materials by Filtrap™ Distal Protection Device

[1]Tetsumin Ri
[1]Tsunekazu Kakuta, [1]Taishi Yonetsu, [1]Keita Handa, [1]Asami Suzuki,
[1]Yuki Komatsu, [1]Takuo Kamibayashi, [1]Hiroshi Taniguchi,
[1]Kiyoshi Otomo, [1]Yasutoshi Nagata, [1]Kikuya Uno, [1]Yoshito Iesaka,
[1]Hideomi Fujiwara, [2]Mitsuaki Isobe
[1]Division of Cardiology, Cardiovascular Center, Tsuchiura Kyodo Hospital, Tsuchiura, [2]Department of Cardiovascular Medicine, Tokyo Medical and Dental University, Tokyo

Background and Purpose: Efficacy of distal protection device to reduce embolization is still controversial. A new filter-based distal protection device (Filtrap™) was investigated with respect to the relation between decreased and released plaque volume by PCI and angiographic outcome. Methods: Filtrap™ was used in 31 patients (AMI:10, UAP:11, SAP:10), and aspiration thrombectomy was performed before Filtrap™ insertion in ACS at the operator' s discretion. All patients underwent pre- and post-PCI IVUS, and qualitative and quantitative analyses were performed. The difference between pre- and post-PCI plaque volume was defined as the index of the decrease in plaque volume (Δ PV). Total volume of debris captured by Filtrap™ was semiquantitatively graded by visual inspection. Filtrap™ no reflow (FNR) was defined as a phenomenon showing final TIMI 3 flow after PCI with TIMI 0-2 flow before Filtrap™ retrieval. Results: Plaque volume was decreased in all lesions (41 ± 30.8mm^3). There was no difference in Δ PV among AMI, UAP, and AP (40.6, 45.6 and 46.2 mm^3), although presence of captured materials was more frequent, and total debris volume was significantly greater in AMI. FNR occurred in 12/31 patients, and IVUS signal attenuation was a predictor of FNR, whereas no difference in Δ PV was detected between FNR(+) and FNR(-) (34.8 ± 28.8, 44.9 ± 32.2 mm^3). Conclusion: Filtrap™ effectively captured released plaque materials, although Δ PV had no impact on captured volume by Filtrap™.