9:15 a.m.

832-4 **Relationship Between Patterns of Calcification and Arterial Remodeling of Culprit Lesions: Comparing Patients With Acute Coronary Syndromes With Those With Stable Angina**

Shoichi Ehara, Yoshiki Kobayashi, Takao Hasegawa, Toru Kataoka, Hiroki Nishioka, Koichiro Asawa, Kimio Kamimori, Minoru Yoshiyama, Kazuhide Takeuchi, Junichi Yoshikawa, Makiko Ueda, Osaka City University, Osaka, Japan

Background: There is conflicting evidence for the link between calcification and plaque instability. Intravascular ultrasound (IVUS) studies have shown that calcified plaques are associated with stable plaques. In contrast, recent histopathological studies have revealed that plaque calcification is present in 69% of ruptured plaques in sudden coronary death. Furthermore, studies using electron-beam computed tomography have reported that calcium score relates to acute coronary events. The purpose of this study is to investigate the relationship between patterns of calcification and arterial remodeling of culprit lesions, comparing patients with acute coronary syndromes (ACS) with those with stable angina (SAP). **Methods and Results**: Preinterventional intravascular ultrasound (IVUS) images of 178 patients were studied; 61 with acute myocardial infarction (AMI), 70 with unstable angina pectoris (UAP) and 47 with SAP. The presence of calcifications within an arc of less than 90° for all calcifications was significantly higher in patients with either AMI or UAP than in SAP (P<0.0001). Moreover, the average number of calcium deposits within an arc of less than 90° per patient was significantly higher in AMI than in SAP (P<0.0005) (AMI: 1.4±1.3, SAP: 0.5±0.8, mean±SD). Conversely, the length of the calcium deposits was significantly longer in SAP patients (P<0.0001) (AMI: 2.2±1.6, UAP: 1.9±1.8, SAP: 4.3±3.2, mean±SD). In AMI patients, the typical pattern was spotty calcification, associated with a fibrofatty plaque and positive remodeling. In ACS patients showing negative remodeling, no calcification was the most frequent. Conversely, in SAP patients, the frequency of extensive calcification was the highest. **Conclusion**: These findings show that IVUS allows the identification of vulnerable plaques in coronary arteries, not only by identifying a large lipid core and positive remodeling, but also by identifying a spotty pattern of calcification.

9:30 a.m.

832-5 **Multiple Plaque Ruptures Are Not Frequent in Acute Coronary Syndrome: A Three-Vessel Intravascular Ultrasound Study**

Satoru Sumitsuji, Yoshio Kobayashi, Hiroyuki Okura, Mitsuyasu Terashima, Kenei Shimada, Motomaru Masutani, Mitsumasa Ohyanagi, Toru Kataoka, Kojiro Awano, Haruyuki Taguchi, Yuji Yasuga, Kenichi Fujii, Gary S. Mintz, Cardiovascular Research Foundation/Lenox Hill Heart and Vascular Institute, New York, NY, Heart Center of Rinku General Medical Center, Osaka, Japan

Background: Systemic inflammation plays an important role in plaque rupture in acute coronary syndrome (ACS). Thus, ruptured plaque may be observed not only in culprit lesions, but also in non-culprit lesions in ACS patients.
Methods: A total of 46 patients with a first ACS (<4 weeks from onset, 37 acute myocardial infarction and 9 unstable angina) were included in the present study. Pre-intervention intravascular ultrasound (IVUS) was attempted in all 3 major coronary arteries (at least 2/3 segment of each artery) in each patient. Remodeling index was calculated as lesion divided by average reference (Ref.) external elastic membrane (EEM) cross-sectional area (CSA). Eccentricity index was calculated as the ratio of minimal to maximal plaque thickness.
Results: Pre-intervention IVUS could be performed in 41 culprit and 81 non-culprit arteries. Plaque rupture was observed in 20 culprit lesions (49%). Conversely, there were only 7 non-culprit lesion ruptured plaques (15%) – 6 in a non-culprit artery. Thrombi were more common, plaque burden larger, and minimum lumen CSA smaller in culprit lesions – whether or not plaque rupture was present.
Conclusions: Multiple plaque ruptures may occur in ACS patients. However, it is not a frequent finding.

	Culprit (n=41)	Culprit w/ rupture (n=20)	Non-culprit w/ rupture (n=7)	P Value
Thrombus (%)	71	90	43	<0.01
Ref. lumen CSA (mm^2)	8.6±2.9	9.0±3.1	9.8±2.9	NS
Lesion EEM (mm^2)	16.0±4.7	17.2±5.2	22.0±3.1	NS
Min. lumen CSA (mm^2)	2.9±1.6	3.9±1.4	8.0±0.3	<0.001
Plaque burden (%)	82±6	76±7	63±4	0.03
Cavity area (mm^2)		2.1±1.2	3.0±2.8	NS
Remodeling index	1.08±0.25	1.02±0.25	1.35±0.35	0.02
Lesion length (mm)	19.0±6.1	20.0±4.5	12.3±6.5	<0.01
Eccentricity index	0.35±0.23	0.39±0.20	0.37±0.31	NS
Arc of calcium (degree)	23±42	24±52	16±23	NS

9:45 a.m.

832-6 **Diabetes Mellitus Might Be Associated With Multiple Vulnerable Plaque in 113 Patients With Stable Angina: A Prospective Study of Three-Vessel Intravascular Ultrasound**

Myeong-Ki Hong, Cheol Whan Lee, Young-Hak Kim, Seung-Whan Lee, Tae-Hyun Yang, Sung-Joo Oh, Jong-Min Song, Ki-Hoon Han, Duk-Hyun Kang, Jae-Kwan Song, Jae-Joong Kim, Seong-Wook Park, Seung-Jung Park, Asan Medical Center, Seoul, South Korea

We investigated prospectively the relation between multiple occurrence of VP and DM in 113 patients (DM: 34 vs. non-DM: 79) with SA. Intravascular ultrasound (IVUS) was performed in all 3 epicardial arteries that were suitable for IVUS after coronary angiogram. Plaque rupture, tiny linear dissection, plaque with lipid-pool like images or plaque containing with thrombus by IVUS were defined as a VP. Existence of VP that was located on the non-culprit segment of a same artery or on the different arteries was regarded as multiple VP (total number of VP≥2). Multiple VP was observed in 29 patients (25.7%). Multiple plaque rupture was also observed in 7 patients (6.2%). **Table** shows the comparison of predictors between patients with vs. without multiple VP. DM is an only independent predictor of multiple VP (p=0.001, OR=5.025, 95% CI=2.0-12.658). **Conclusion:** DM might be associated with multiple VP in patients with SA.

Comparison of predictors

	No Multiple VP	Multiple VP	P-value
Number of patients	84	29	
CRP (mg/dl)	0.4 ± 0.5	0.7 ± 1.3	0.219
Total cholesterol (mg/dl)	178 ± 32	176 ± 35	0.719
Triglyceride (mg/dl)	139 ± 73	177 ± 105	0.034
HDL-cholesterol (mg/dl)	42 ± 9	40 ± 9	0.142
DM	18 (21%)	16 (55%)	0.001

POSTER SESSION

1120

Microvascular Function, Myocardial Blush Kinetics, and Fractional Flow Reserve

Tuesday, March 09, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

1120-41 **Relationship of Ultrasound Plaque Characteristics to Thrombolysis in Myocardial Infarction Myocardial Perfusion Grade Following Intracoronary Stenting**

Zhen-Guo Zheng, So-Yeon Choi, Seung-Jea Tahk, Myeong-Ho Yoon, Tae-Young Choi, Byoung-Joo Choi, Hyuk-Jae Chang, Gyo-Seung Hwang, Joon-Han Shin, Byung-il W. Choi, Ajou University School of Medicine, Suwon, South Korea

Background: Impaired myocardial perfusion has been related to increased incidence of major adverse cardiac events even after successful percutaneous coronary intervention (PCI), but the relationship of ultrosound plaque characteristics to myocardial perfusion has not been examined. This study was designed to evaluate the relationship of intravascular ultrasound (IVUS)characteristics of plaque to myocardial perfusion.
Methods: IVUS image was performed before and post PCI, a simple angiographic method, TIMI myocardial perfusion (TMP) grade was used to assess the filling and clearance of contrast in the myocardium before and after intracoronary stenting in patients with coronary artery disease. Acute myocardial infarction was excluded in this study. Patients were divided into 2 groups, group A is reduction of TMP grade, group B contains no change and increased TMP grade after stenting compare to pre-PCI. Clinical, angiographic and ultrasound plaque characteristics were compared between these 2 groups.
Results: 122 patients (mean age 59±10, male 93) with 132 lesions (left anterior descending coronary artery 91, left circumflex coronary artery 19, right coronary artery 22) were included in this study. Group A contains 15 lesions (11.4%) when group B contains the other 117 lesions (88.6%). Clinical and angiographic characteristics were similar between 2 groups. Pre-PCI plaque area in group A was lager than group B (group A 12.4±6.3, group B 9.9±4.1, p=0.047). No significant different for lumen area, vessel area and percent of plaque area, also no significant different for change of lumen area, vessel area, change of plaque area and percent of plaque area during procedure. Pre-procedure soft plaque was more prevalent in group A (group A 86.4%, group B 56.4%, p=0.049), group A had more lipid core (group A 33.3%, group B 6.8%, p=0.002). Positive vessel remodeling was more common in group A (group A 33.3%, group B 6.0%, P=0.003).
Conclusion: Soft plaque and presence of lipid core found by IVUS during procedure