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Title	FRS-114 Comparisons of Diagnostic Accuracies between Integrated Backscatter Intravascular Ultrasound and Virtual Histology Intravascular Ultrasound for Tissue Characterization of Coronary Plaques(本文(Fulltext))
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FRS-112**Optical Coherence Tomography Assessment of Thin-cap Fibroatheroma in Patients with Acute Myocardial Infarction and Stable Angina Pectoris in Vivo**¹Kenichi Fujii¹Motomaru Masutani, ²Daizo Kawasaki, ¹Takafumi Akagami,¹Takahiro Okumura, ²Tohru Masuyama, ¹Mitsumasa Ohyanagi¹Department of Internal Medicine, Division of Coronary Heart Disease, Nishinomiya, ²Cardiovascular Division, Department of Internal Medicine, Nishinomiya

Background: Thin-cap fibroatheroma (TCFA) is recognized as the precursor of plaque rupture. We evaluated the incidence and morphologic features of TCFA using optical coherence tomography (OCT) that is a high-resolution imaging modality in vivo. **Methods:** OCT examinations were performed using motorized pullback in all 3-coronary arteries for 15 acute myocardial infarction (AMI) and 8 stable angina pectoris (SAP) patients. OCT analyses for each focal atherosclerotic plaque were performed using the previously validated criteria. OCT criteria for TCFA was lipid-rich plaque with cap thickness <65microm. **Results:** OCT identified 23 culprit and 76 non-culprit focal plaques. The frequency of TCFA at culprit site was 60% in AMI and 0% in SAP patients (p=0.007). At least 1 TCFA was found somewhere other than on the culprit site in 73% for AMI and 25% for SAP patients (p=0.03). Multiple TCFA were identified in 67% for AMI and 13% for SAP patients (p=0.03). TCFA had greater vessel and plaque area and a higher remodeling index than non-TCFA (p<0.001, p<0.001, and p=0.002, respectively). In AMI patients, serum high-sensitive C-reactive protein (hs-CRP) level was significantly higher in patients with multiple TCFA than in patients without multiple TCFA (p=0.01). **Conclusions:** Pre-rupture TCFA were observed more frequently both at culprit and non-culprit sites in AMI than SAP patients. TCFA had large remodeling index, vessel area, and plaque burden compared with non-TCFA.

FRS-113**Two-dimensional Imaging of Lipid Deposition in the Coronary Plaques by a Novel Near-infrared Fluorescence Angioscopy**¹Yasumi Uchida¹Haruko Egami, ²Akimasa Matsuyama, ³Takeshi Sakurai¹Japan Foundation of Cardiovascular Research, Tokyo, ²Cardiology, Jikei University School of Medicine, Tokyo, ³Cardiovascular Center, Toho University Hospital at Sakura, Sakura

Background: Lipids are generally deposited diffusely in the coronary plaques and a part of them forms lipid core. Except lipid core, it is beyond any available imaging modalities to visualize lipid outside the lipid core. **Aim:** To visualize lipids deposited in the coronary plaques by a near-infrared fluorescence angioscope (NIR) developed by us. **Methods:** 1) NIR is composed of fluorescence exciter (710nm), emitter (780nm), fiberscope and ICCD, and it can visualize lipids conjugated to beta-carotene which co-exist with lipids in the vascular wall. 2) Removed human coronary arteries were perfused with saline and lipid deposition was observed by NIR and the obtained lipid images were compared with histology. 3) During CAG, coronary arteries were observed by both conventional angioscope and NIR in 15 patients. **Results:** 1) In the removed coronary arteries, the lipids outside the core deposited up to 700um in depth from the luminal surface were clearly visualized by NIR. The lipid in the core exhibited weak fluorescence surrounded by strong fluorescence. 2) In patients, lipids were visualized in 8 of 10 yellow plaques (5pts) and in 5 of 7 white plaques (3pts) and in 11 of 21 apparently normal coronary segments (7pts) by conventional angioscopy. **Conclusion:** NIR is feasible for two-dimensional imaging of coronary lipids which are hardly detectable by other imaging tools in vivo.

FRS-114**Comparisons of Diagnostic Accuracies between Integrated Backscatter Intravascular Ultrasound and Virtual Histology Intravascular Ultrasound for Tissue Characterization of Coronary Plaques**¹Munenori Okubo¹Masanori Kawasaki, ¹Yoshiyuki Ishihara, ¹Shohei Sumi,¹Urara Mori, ¹Masamitsu Iwasa, ¹Shinji Yasuda, ¹Tomoki Kubota,¹Shinichiro Tanaka, ¹Takahiko Yamaki, ¹Shinsuke Ojio,¹Kunihiko Tsuchiya, ¹Kazuhiko Nishigaki, ¹Genzou Takemura,²Masanao Saio, ¹Shinya Minatoguchi, ¹Hisayoshi Fujiwara¹Regeneration & Advanced Medical Science Graduate School of Medicine Gifu University, Gifu, ²Department of Immunopathology Gifu University Graduate School of Medicine, Gifu**Background:** We recently developed the commercially available Integrated

Backscatter (IB) Intravascular Ultrasound System for tissue characterization of coronary plaques. However, comparisons between IB-IVUS and Virtual Histology (VH) IVUS images for tissue characterization have not been precisely investigated. **Methods:** Images were acquired from 150 segments of 46 coronary arteries from 25 cadavers obtained at autopsy. One hundred fifty diseased coronary arterial segments were examined for comparison of IB-IVUS and VH-IVUS images at the same exact sites. Histological examinations were also performed. Only the segments in which the diagnoses were identical between the two IVUS readers were used for comparison with histology. **Results:** The two IVUS readers made identical diagnoses in 138 segments using the IB-IVUS and in 133 segments using the VH-IVUS. The interobserver agreements of IB-IVUS and VH-IVUS for characterization of plaque type were excellent (Cohen's $\kappa = 0.90$ and 0.85). According to the definition of atherosclerotic lesions by the AHA Council on Atherosclerosis (III, IV, Va, Vb, Vc), the overall agreement between histological and IB-IVUS diagnoses was higher ($\kappa = 0.81$) than that of VH-IVUS diagnoses ($\kappa = 0.66$) in the same segment. **Conclusion:** The commercially available IB-IVUS system provides high diagnostic potential for analysis of tissue characteristics of coronary plaques.

Regeneration (M)**FRS21**

March 16 (Fri)

Room 16 (The International Conference Room of the International Conference Center Kobe)

11 : 00—12 : 40

Keynote Lecture:**Human Heart-Derived Stem Cell Therapy for Cardiac Repair**

Hiroaki Matsubara

Department of Cardiovascular Medicine, Kyoto Prefectural University of Medicine, Kyoto

The potential for endogenous stem cells to restore the function of damaged cardiovascular tissues gives the hope for clinical applications to overcome the restricted capacity of self-repair in the mammalian heart. The recent advances in stem cell biology have paved the road to the development of a new regenerative medicine to treat the injured heart. Initial clinical studies of myoblast transplantation have been much better documented in animal models, but translating to the clinical setting faces a variety of unexpected side effects. Although the safety and feasibility of bone marrow cells for myocardial angiogenesis has been well established in randomized clinical-trials, their ability to induce functional improvement in long-term remains uncertain. Recent studies have suggested that several subpopulations of stem cells resident within the adult heart can be isolated and induced to develop into cardiac muscles and vascular tissues. Beyond directly repopulating damaged-myocardial tissue, cardiac stem cells seemed to activate regenerative program through stimulating angiogenesis and improving survival of host myocardium by paracrine effectors secretion. A number of questions require answers to achieve a maximal effect on cell therapy, such as the best cell source and optimal conditions for therapeutic intervention. Integrated biotherapy involving tissue engineering technology is emerging as promising approach to create new cardiac muscle as a result by growth factor supplementation to enhance the stem cell survival and plasticity. Intensive basic-research is underway to understand the mechanistic insights of adult stem cell biology and development. The current status and the future challenges of myocardial regeneration by human heart-derived adult stem cells involving tissue engineering will be discussed.