Background: Coronary plaque rupture is shown to be an important contributor in the pathogenesis of atherosclerosis and acute coronary syndromes. The present study investigated lesion morphologies associated with plaque rupture at pre-interventional intravascular ultrasound (IVUS).

Methods: This is a retrospective analysis of 119 patients (119 de novo coronary lesions) with pre-interventional IVUS from our database. Coronary vessels examined were LAD (46%), LCX (23%), and RCA (31%). Analysis aimed at identification of lesions showing plaque rupture (RP) versus none (nRP). Further IVUS qualitative analysis were performed to assess the dominant plaque tissue type (fibrous=F, fibrofatty=FF, calcific=CaF), absolute presence of calcium (Ca), presence of intraluminal thrombus (THR), plaque eccentricity (ECCCE), vascular remodeling index based on average of two references (Remod, %), and involvement of side-branch(es) in lesion (SB).

Results: Fifty-two of 119 (43%) examined lesions were RP. Intraluminal THR was identified following the experiment. Histology of the grafts is pending.

Conclusions: This is the first demonstration of an animal model for imaging of human coronaries, reproducing conditions of flow, motion, and pathology that are encountered in humans. We propose that this human-to-porcine xenograft model is ideal to evaluate technologies to diagnose and treat coronary artery disease.

832-3 Independent Predictors of Multiple Vulnerable Plaque in 143 Patients With Acute Coronary Syndrome: A Prospective Study of Three-Vessel Intravascular Ultrasound

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We evaluated prospectively the predictors of multiple occurrence of VP in 143 patients with ACS. The study population composed of ST-elevation MI (STEMI) in 91 patients, non-STEMI in 31 patients and unstable angina (Braunwald class IIIb) in 21 patients. 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 was defined using motorized pullback.

Conclusions: CRP level and HDL-cholesterol level were associated with multiple VP in patients with ACS (p=0.027, OR=1.768, 95% CI=1.068-2.929 and p=0.043, OR=0.962, 95% CI=0.927-0.999, respectively). Conclusion: CRP level and HDL-cholesterol level might be associated with multiple VP in patients with ACS.

832-4 Morphological Characteristics of De Novo Coronary Lesions Presenting With Plaque Rupture: An Intravascular Ultrasound Study

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Background: Coronary plaque rupture is shown to be an important contributor in the pathogenesis of atherosclerosis and acute coronary syndromes. The present study investigated lesion morphologies associated with plaque rupture at pre-interventional intravascular ultrasound (IVUS).

Methods: This is a retrospective analysis of 119 patients (119 de novo coronary lesions) with pre-interventional IVUS from our database. Coronary vessels examined were LAD (46%), LCX (23%), and RCA (31%). Analysis aimed at identification of lesions showing plaque rupture (RP) versus none (nRP). Further IVUS qualitative analysis were performed to assess the dominant plaque tissue type (fibrous=F, fibrofatty=FF, calcific=CaF), absolute presence of calcium (Ca), presence of intraluminal thrombus (THR), plaque eccentricity (ECCCE), vascular remodeling index based on average of two references (Remod, %), and involvement of side-branch(es) in lesion (SB).

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Conclusions: This is the first demonstration of an animal model for imaging of human coronaries, reproducing conditions of flow, motion, and pathology that are encountered in humans. We propose that this human-to-porcine xenograft model is ideal to evaluate technologies to diagnose and treat coronary artery disease.

832-5 An Animal Model for In Vivo Imaging of Human Coronaries: A New Tool to Evaluate Emerging Technologies to Detect Vulnerable Plaques

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Background: Preclinical testing of imaging technologies to detect coronary vulnerable plaques is difficult given the lack of adequate animal models of human atherosclerosis and the challenges posed by coronary motion and blood flow. We developed an animal model to evaluate human coronaries under physiologic conditions.

Methods: Adult cadaver human hearts were obtained at autopsy. Prior to explantation from the heart, coronary patency was determined angiography. Coronary segments (4-5 cm) were prosected en-block with surrounding muscle and epicardial fat to preserve architecture. All major sidebranches were ligated. In anesthetized Yorkshire pigs (45-50 kg), the chest was opened and the exposed aorta and right atrium were cannulated and attached in an end-to-end fashion to the human coronary xenograft, forming an arterial conduit. The xenograft was fixed to the anterior wall of the heart along the course of the left anterior descending coronary artery to mechanically couple the graft to the beating heart. Flow through the graft was regulated with a torque clamp and measured with a flow meter, both connected distally. Graft angiography was performed via a sideport in the proximal part of the conduit. Intravascular ultrasound (IVUS) of each graft was performed using motorized pullback.

Results: Seven human coronary xenografts were successfully implanted in 3 animals. Blood flow through the graft exceeded 100 cc/min in all 7 grafts. Arterial pressure remained constant. Graft angiography demonstrated motion comparable to native coronaries. IVUS was performed successfully in all 7 grafts, demonstrating motion and imaging characteristics indistinguishable from native human coronaries. Atherosclerotic lesions were detected in 5 of 7 grafts by IVUS. The animals tolerated the procedure and were euthanized following the experiment. Histology of the grafts is pending.

Conclusions: This is the first demonstration of an animal model for imaging of human coronaries, reproducing conditions of flow, motion, and pathology that are encountered in humans. We propose that this human-to-porcine xenograft model is ideal to evaluate technologies to diagnose and treat coronary artery disease.