**IMPACT OF REACTIVE OXYGEN SPECIES ON CORONARY ARTERIAL REMODELING - A COMPARATIVE INTRAVASCULAR ULTRASOUND AND HISTOCHEMICAL ANALYSIS OF ATHEROSCLEROTIC LESIONS**

**M. Terashima**

Toyohashi Heart Center, Toyohashi, Japan

*Background*: Coronary arterial remodeling, which is a response to the growth of atherosclerotic plaques, is associated with plaque vulnerability. Oxidative stress induced by reactive oxygen species (ROS) via NAD (P)H oxidase in the vasculature also plays a crucial role in the pathogenesis of atherosclerosis-based cardiovascular disease. In this study, the relationship between coronary arterial remodeling and ROS generation was examined by comparing pre-interventional intravascular ultrasound (IVUS) findings of atherosclerotic lesions to the histochemical findings of corresponding specimens obtained by directional coronary atherectomy (DCA).

*Methods and Results*: Pre-DCA IVUS images of 49 patients were analyzed. The remodeling index was calculated by dividing the target-lesion external elastic membrane cross-sectional area (EEM-CSA) by the reference-segment EEM-CSA. Expansive remodeling was defined as a remodeling index of greater than 1.0. ROS generation and NAD(P)H oxidase p22phox expression in DCA specimens were evaluated using the dihydroethidium staining method and immunohistochemistry as the ratio of the positive area to the total surface area in each specimen, respectively. ROS generation and p22phox expression were significantly greater in lesions with expansive remodeling than in lesions without remodeling  (0.18  } 0.12 vs 0.03  } 0.02, p<0.0001, 0.10  } 0.08 vs 0.04  } 0.05, p=0.0039, respectively). Both ROS generation and p22phox expression significantly correlated with the IVUS-derived remodeling index (r=0.77, p<0.0001, r=0.53, p<0.0001, respectively).
*Conclusions*: Simultaneous examination with IVUS and immunohistochemistry analyses suggests that NAD(P)H oxidase-derived ROS is related to the coronary arterial remodeling process associated with plaque vulnerability.