INTRAVASCULAR ULTRASOUND PREDICTORS OF MACROPHAGE ACCUMULATION AND INTRAPLQUE HEMORRHAGE IN VULNERABLE PLAQUE

ACC Poster Contributions
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Background: Both macrophage infiltration and hemorrhage into coronary atheromatous plaque are associated with the development of vulnerable plaque. During percutaneous coronary intervention (PCI), mechanical plaque disruption exposes potentially embolic atheromatous contents from culprit plaque. Filter-based distal embolic protection device can retrieve this atherothrombotic debris. We investigated the relationship of macrophage accumulation and intraplaque hemorrhage to vulnerable plaque morphology evaluated by ultrasonic tissue characterization.

Methods: In 26 patients with acute coronary syndrome, plaque burden and absolute and percentage of each plaque component (fibrous, fibrofatty, dense calcium (DC), and necrotic core (NC)) of culprit lesion were evaluated by virtual histology intravascular ultrasound (VH-IVUS). Coronary atherothrombotic debris were collected during PCI using filter-based distal protection device, Filtrap (NIPRO, Japan). We immunohistochemically determined CD14- (proinflammatory macrophage marker) and CD163- (hemoglobin scavenger receptor, a marker of intraplaque hemorrhage) positive macrophages in the debris.

Results: Total counts of CD14 cells had positive correlation with lumen (r=0.404, p<0.05), vessel (r=0.429, p<0.04) and plaque area (r=0.422, p<0.04) and remodeling index (RI, r=0.449, p<0.03). Similarly, total CD163 counts were correlated with lumen (r=0.433, p<0.04), vessel (r=0.488, p<0.02) and plaque area (r=0.461, p<0.03). Multiple regression analysis showed that CD14 counts correlated only with RI (p<0.03). Percentage of CD163 cells to whole cells (%CD163) showed positive correlation with remodeling index (r=0.402 p<0.05) and NC area (r=0.487 p<0.02) and negative correlation with DC area (r=-0.375, p=0.07), but percentage of CD14 cells had no correlation with IVUS parameters. Multiple regression analysis showed that %CD163 correlated positively with NC area and negatively with DC area.

Conclusions: Positive remodeling is associated with macrophage infiltration into the plaque. Plaques with large necrotic core without calcification by VH-IVUS are related to intraplaque hemorrhage.