Abstract: Characteristics of non-culprit plaques in acute coronary syndrome patients with previous plaque disruption at the culprit lesion

Authors:
M Russo¹, O Kurihara¹, HO Kim¹, V Thondapu¹, T Yonetsu², T Soeda³, Y Minami⁴, H Lee⁵, F Fracassi⁶, R Vergallo⁶, G Niccoli⁶, F Crea⁶, JG Fujimoto⁷, V Fuster⁸, IK Jang¹, ¹Massachusetts General Hospital, Cardiology Division - Boston - United States of America,²Tokyo Medical And Dental University, Department of Interventional Cardiology - Tokyo - Japan, ³Nara Medical University, Department of Cardiovascular Medicine - Nara - Japan, ⁴Kitasato University School of Medicine, Department of Cardiovascular Medicine - Sagamihara - Japan, ⁵Massachusetts General Hospital, Biostatistics Center - Boston - United States of America, ⁶Catholic University of the Sacred Heart, Department of Cardiovascular and Thoracic Sciences - Rome - Italy, ⁷Massachusetts Institute of Technology, The Research Laboratory of Electronics, Department of Electrical Engineering and Computer Science - Cambridge - United States of America, ⁸Icahn School of Medicine at Mount Sinai, Zena and Michael A. Wiener Cardiovascular Institute - New York - United States of America,

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Background: Layered plaques represent signs of previous plaque destabilization. A recent study showed that acute coronary syndrome (ACS) patients with a layered plaque at the culprit lesion have more systemic inflammation and culprit plaque vulnerability. So far, characteristics of non-culprit plaques have not been studied in these patients.

Purpose: To compare the prevalence and characteristics of non-culprit plaques between patients with or without layering culprit plaque.

Methods: We studied 349 ACS patients undergoing pre-intervention optical coherence tomography (OCT) imaging. The number of non-culprit lesions was evaluated on coronary angiogram. Morphological characteristics of plaques were studied by OCT.

Results: In 349 patients, 99 (28.4%) had layered culprit plaque. The number of non-culprit plaques in patients with or without layered culprit plaque was similar (3.2±0.8 and 2.8±0.8, p=0.23). In 465 non-culprit plaques, 145 plaques in patients with layered culprit plaque showed greater macrophage infiltration (71.0% vs 60.9%, p=0.050) compared to those in patients without layered culprit plaque. Among 465 non-culprit plaques, 165 (35.5%) had a layered phenotype. Layered non-culprit plaques, analyzed irrespective of culprit lesion morphology, showed higher prevalence of lipid (93.3% vs 86.0%, p=0.028), thin cap fibroatheroma (29.7% vs 13.7%, p<0.001), and macrophage infiltration (82.4% vs 54.0%, p<0.001) than non-layered ones (N=300).

Conclusions: In ACS patients, those with evidence of previous plaque disruption at the culprit lesion demonstrated higher levels of inflammation in the non-culprit lesions. Layered pattern at the non-culprit lesions was associated with more features of plaque vulnerability.