IN VIVO MORPHOLOGIC ANALYSIS OF PLAQUE RUPTURE IN CULPRIT LESIONS OF PATIENTS WITH ACUTE CORONARY SYNDROMES. AN OPTICAL COHERENCE TOMOGRAPHY STUDY

Background: Plaque rupture is the most common pathology implicated in the pathogenesis of acute coronary syndromes (ACS), as shown in pathologic studies. However, limited data is available regarding the in vivo morphology of the ruptured plaque. The aim of this study was to assess the morphological characteristics of plaque rupture in culprit lesions (CLs) as evaluated by Optical Coherence Tomography (OCT).

Methods: Fifty-three consecutive patients with ACS that underwent OCT examination were enrolled. Thirty-one CL plaque ruptures (58.5%) were identified and used for analysis. The length of the rupture, the location of the rupture site in accordance with the site of minimal lumen area, and the distance between the two sites were recorded. We also studied whether the plaque was ruptured at the shoulder and measured the length of the missing fibrous cap. Minimal fibrous cap thickness and cross sectional area (CSA) of the lumen were measured at the site of the rupture and at the site of the minimal lumen.

Results: The plaque ruptures were located at the site of the minimal lumen in 38.7% of the cases, distally to the site of the minimal lumen in 38.7% and proximally in 22.6% of the cases. Mean length of the rupture was 2.32±1.82 mm and mean distance from the site of the greatest stenosis was 0.92±3.04 mm. Mean length of the missing fibrous cap was 0.54±0.30 mm. The majority of the patients (64.5%) presented with rupture at the plaque shoulder. The mean CSA of the site of the rupture was 3.98±2.77 mm2, while the mean CSA of the minimal lumen site was 1.73±1.64 mm2 (p<0.0001). Mean cap thickness at the site of plaque rupture was 56±19 um versus 89±48 um at the minimal lumen site (p<0.001).

Conclusions: Plaque rupture in the majority of ACS does not occur at the minimal lumen site, but also in other adjacent sites where the fibrous cap is thinner. This study underscores the significance of thorough evaluation of coronary arterial segments.