IS PLAQUE RUPTURE CAVITY SIZE RELATED TO PLAQUE COMPOSITION? A LAYERED ANALYSIS WITH INTRAVASCULAR ULTRASOUND VIRTUAL HISTOLOGY RADIOFREQUENCY DATA

Poster Contributions
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Background: Plaque rupture (PR) correlates with fibrous cap thickness. Using Virtual Histology Intravascular Ultrasound (IVUS-VH), we could not demonstrate a similar relationship with plaque type, and therefore we investigated whether IVUS-VH features are associated with PR cavity size.

Methods: 82 patients with stable (S, n = 31), unstable (U, n = 26) and accelerated (A, n = 25) angina underwent preprocedure IVUS-VH. 14 PR were identified in 14 patients (4 S, 3 A, 7 U). Each automated pullback was analyzed with commercial software before expert-reader adjudication. IVUS-VH plaque type was determined in the frame with the largest intraplaque cavity for each patient and adjacent non-PR distal and proximal reference frames. The PR cavity was split into lumen and cavity to yield cavity area. The relationship between plaque depth and PR cavity size was examined by layered analysis in rings emanating from the lumen border with adaptive radii from 10-100% of the lumen-EEM distance.

Results: PR area correlated positively with necrotic core (NC)% within the 20-40% adaptive rings \( (r = 0.76, p < 0.01, 30\% \text{ ring}) \) and negatively with fibrous (F) plaque % in all rings \( (r = -0.79, p < 0.01, 30\% \text{ ring}) \). In 30-50% rings NC area was lower in the PR compared to non-PR frames \( (p = 0.015, 30\% \text{ ring}) \).

Conclusion: PR cavity size is directly associated with NC% and inversely related to F% in near-lumen adaptive rings. When comparing PR to adjacent non-PR frames, the diminished NC area in the near-lumen rings suggests NC embolization at the time of PR.