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Relationship between Stent Expansion and Coronary Plaque Characteristics in culprit lesion -Integrated Backscatter Intravascular ultrasound analysis-

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Background: Some previous studies indicates that obtaining adequate stent expansion leads to decrease of stent thrombosis and target lesion revascularization. However, little is known about relationship between stent expansion and coronary plaque characteristics in culprit lesion. Methods: Forty patients treated with bare-metal stent were randomly divided into two groups (stent balloon group (SB), N=20, post balloon group (PB), N=20). In case of stent underexpansion in SB, additional post balloon was required. Volumetric IVUS analysis was performed at post-procedure. Additionally, volumetric quantitative tissue characterization analysis was performed using IB-IVUS in the 10mm segments including culprit lesion at pre-procedure. Results: Baseline characteristics showed no significant differences between groups. Final %stent expansion was similar in both groups (102 $\pm$ 17 in SB vs. 103 $\pm$ 16% in PB, p=NS). In SB, 50% of cases could acquire adequate stent expansion with stent balloon dilatation alone (106 $\pm$ 19%), whose cases had significantly larger average lumen area than NB (11.4 $\pm$ 2.5 vs. 8.9 $\pm$ 2.2 mm^2, p=0.01). IB-IVUS analysis revealed that those cases had significantly less calcification (1.4 $\pm$ 0.9 vs. 2.7 $\pm$ 0.9 mm^3, p=0.02) and dense fibrosis volume (4.1 $\pm$ 2.4 vs. 7.1 $\pm$ 1.9 mm^3, p=0.02) than NB. Conclusions: Tissue characterization of coronary plaque using IB-IVUS at pre-procedure could be useful to know how to obtain adequate stent expansion.