ACCURACY AND REPRODUCIBILITY OF A NOVEL IN VIVO AUTOMATIC BORDER DETECTION SOFTWARE FOR THE ANALYSIS OF STENT NEOINTIMAL RESPONSE COMPARED TO HISTOLOGY IN A FAMILIAL HYPERCHOLESTEROLEMIC SWINE MODEL

i2 Poster Contributions
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Background: OCT (C7-XR) emerged as a promising endovascular imaging tool for the evaluation of stent outcomes. We aimed to study the accuracy of a novel automatic border detection software for the analysis of stent neointimal response in the familial Hypercholesterolemic Swine Model (FHS).

Methods: 26 coronary arteries underwent stent implantation using a 20% overstretch ratio. C7-XR imaging was done at 30 days after implantation and stent samples sent for histological analysis. The automatic border detection software provides automatic lumen detection and neointimal thickness calculation. The automatic features were compared to the standard manual morphometric analysis of OCT and histology by two independent operators.

Results: 26 OCT frames were analyzed per operator. Lumen area showed high correlation (r=0.96, p < 0.001) and no significant difference between automatic (A; 4.93±2 mm²) manual (M; 4.94±2 mm²) or histological assessment (H; 5.27±2.4 mm², p=0.58). Similar results were obtained on neointimal thickness (A=0.5±0.2 mm; M=0.5±0.2 mm and H=0.6±0.3 mm, p=0.39). The OCT-histology correlation for neointimal thickness was also very high (r=0.95, p<0.001). Stent area showed no statistical difference between both OCT techniques (A=9.3±1.4 mm² vs M=9.3±1.3 mm², p=0.99). However, the OCT-histology correlation for stent area was lower (OCT= 9.3±1.3 mm² vs histology= 10.6±1.3 mm², r=0.89, p < 0.001) than seen in the other analyzed variables.

Conclusions: The morphometric evaluation of neointimal response using a novel in-vivo automatic border detection software highly correlated with the data obtained by histology. Although still high, the evaluation of stent areas by OCT appears to have a lower degree of correlation in comparison to the other analyzed variables.