



COMPARISON OF IN VIVO OPTICAL COHERENCE TOMOGRAPHY DERIVED PLAQUE PHENOTYPE AND BURDEN WITH HISTOLOGY IN A PORCINE MODEL OF ADVANCED CORONARY ATHEROSCLEROSIS

Poster Contributions
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Background: *In vivo* validation of optical coherence tomography (OCT) against histology and the effects of plaque burden (PB) on plaque classification remain unreported. We investigated this in a porcine model with human-like coronary atherosclerosis.

Methods: Five female Yucatan D374Y-PCSK9 transgenic hypercholesterolemic mini-pigs were implanted with a coronary shear-modifying stent to induce advanced atherosclerosis. OCT frames ($n=151$) were obtained 34 weeks after implantation. Post mortem, the coronary arteries were perfusion-fixed, serially sectioned and co-registered with OCT using a validated algorithm. Lesions were adjudicated, using the Virmani classification and PB assessed from histology.

Result: OCT had a high sensitivity but modest specificity (92.0% and 69.0%), for identifying fibrous cap atheroma (FCA). The reduced specificity for OCT was due to misclassification of plaques with histologically defined pathological intimal thickening (PIT) as FCA (42.0% of the frames with histological PIT were misclassified). PIT lesions misclassified as FCA by OCT had a statistically higher PB than in other OCT frames (median 43.5% versus 13.5%; $p<0.0001$). Misclassification of PIT lesions by OCT occurred when PB exceeded 22.3%.

Conclusions: Compared with histology, *in vivo* OCT classification of FCA had high sensitivity but reduced specificity due to misclassification of PIT's with high PB.