00292 A Study on the Impact of Strut Thickness on Acute Stent Thrombogenicity in BRS Using an in Vitro Benchtop Perfusion Model.

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Aims: Stent thrombosis is currently one of the most feared complication in percutaneous coronary intervention (PCI). Current polymeric bioresorbable scaffolds (BRS) with larger strut thickness have been shown to have a higher rate of stent thrombosis compared to the metallic drug eluting stents (DES). Newer generations of BRS have reduced strut thickness but the impact of thinner strut on stent thrombogenicity remains unclear. The aim of this study was to compare the thrombogenicity between thick strut BVS and thin struct BRS to understand the effect of strut thickness on acute stent thrombogenicity.

Methodology: Three types of 3.0mm scaffolds/stents: Xience (81µm), Absorb BVS (156µm) and ArterioSorb™ BRS (95µm) were deployed in silicone vessel models. The models were perfused with porcine blood for 4 minutes at a flow rate of 200ml/min. Perfused models were analyzed using optical coherence tomography (OCT) to compare the average cross sectional thrombus area between the different scaffold types. Immunofluorescence confocal images of the samples were used to compare the longitudinal thrombus area as well as the average fluorescence intensity between the different scaffolds/stents.

Result: Results from the in vitro perfusion model indicate a direct correlation between stent strut thickness with acute stent thrombogenicity. Comparison of the immunofluorescence image showed that BVS had significantly larger longitudinal thrombus area than the thin strut BRS (0.005 vs 0.046mm2/mm, $p<0.0001$) while there is no significant difference between BRS and Xience (0.005 vs 0.006mm2/mm, $p=0.99$). A similar trend is observed for average fluorescence intensity (BRS vs BVS: 4.45 vs 15.78, $p<0.001$ and BRS vs Xience: 4.45 vs 3.57, $p=0.90$) and OCT cross sectional thrombus area (BRS vs BVS: 0.06 vs 0.13, $p<0.001$ and BRS vs Xience: 0.06 vs 0.04, $p=0.68$).

Conclusion: In vitro perfusion models have demonstrated that thicker stent strut thickness increases the acute thrombogenicty of the scaffold.