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Impact of Calcified Plaque on Stent Strut Distribution of Bioresorbable Vascular Scaffolds Versus Metallic Everolimus-eluting Stents: An Optical Coherence Tomography Analysis
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Background: Non-uniform strut distribution (NSD) is an important factor predisposing to intimal hyperplasia through decreased local drug delivery and increased scaffold recoil after BVS implantation. The aim of this study was to evaluate, using optical coherence tomography (OCT), the impact of underlying plaque morphology on strut distribution of bioresorbable vascular scaffolds (BVS) versus metallic everolimus eluting stents (DES).

Methods: Among 39 patients who underwent elective percutaneous coronary intervention (PCI) (n=20 in BVS group, n=19 in EES group), a total of 1200 post-PCI OCT frames (BVS: 590 frames; EES: 610 frames) were analyzed. NSD was defined as a frame with maximum inter-strut angle ≤120°.

Results: The percentage of frames with NSD was significantly higher in the BVS group (26.1% [154/590] vs. 19.0% [116/610], p=0.003). In the EES group the calcium arc in frames with NSD was not significantly different compared to that in frames with uniform strut distribution (USD) (34.6±44.4° vs. 35.6±47.1°, p=0.83). However, in the BVS group the arc of calcium was significantly greater in frames with NSD as compared to those with USD (85.2±62.6° vs. 21.0±41.7°, p<0.0001). In multivariable analysis, after adjustment for post-dilatation balloon size and maximum inflation pressure, a calcium arc >75° was identified as an independent predictor of NSD after BVS implantation (odds ratio: 12.1, 95% confidence interval: 7.9-18.8, p<0.001).

Conclusions: The presence of calcified plaque behind BVS struts appears to be an independent predictor for NSD. For calcified lesions, meticulous lesion preparation, including use of dedicated devices, may help prevent NSD after BVS implantation.

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Clinical Outcome of Patients With Complex Lesion Treated With Bioresorbable Vascular Scaffold; Single Center Experience
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Background: There are limited data regarding clinical outcomes of patients with complex lesions treated with bioresorbable vascular scaffolds (BVS) compared to new generation drug eluting stents (DES).

Methods: We analyzed 1-year clinical outcome data of 432 consecutive patients treated with either new-generation DES or BVS between May 2008 and May 2014. Propensity score (PS) matching was applied prior to comparisons between the two groups. Primary outcome was major adverse cardiac events (MACE) which was defined as all-cause death, follow-up myocardial infarction (MI) and target-vessel revascularization (TVR).

Results: A total of 432 patients were included in this study. After PS matching, 96 patients treated with BVS (BVS group) and 96 patients treated with DES (DES group) were selected. Lesion characteristics were similar between two groups. Over 80% of lesions in both cohorts were ACC/AHA lesion classification type B2 and C (83.3% in BVS vs. 85.2% in DES, p=0.68). Pre- and post-dilatation in BVS group were performed more frequently compared to that in DES group (100% vs. 72.1%, p<0.01; 100% vs. 86.4%, p<0.01), and maximum inflation pressure after stenting in BVS group was higher than that in DES group (21.1±5.1 atm vs. 18.4±5.1 atm, p<0.01). There was no significant difference in the 1-year cumulative MACE incidence between the BVS and the DES group (10.8% vs. 12.7%, p=0.33). Similarly there was no significant differences in the composite endpoint of all-cause death and MI (3.6% vs. 4.5%, p=0.30), TVR (10.8% vs. 9.6%, p=0.80) or target lesion revascularization (9.2% vs. 5.6%, p=0.51). There was 1 episode of definite stent thrombosis in BVS group and 1 in DES group.

Conclusions: In swine coronary arteries, DM, atherosclerosis and inflammation do not affect BVS degradation or the vascular response to BVS. Both in DM and non-DM, the neointima was equally associated with calcification, lipid accumulation and inhomogeneous collagen deposition indicating early neo-atherosclerosis.

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Diabetes and Atherosclerosis Do Not Affect Early Degradation of Bioresorbable Vascular Scaffolds
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Background: While everolimus-eluting bioresorbable vascular scaffolds (BVS) were studied in healthy swine, effects of inflammation and atherosclerosis on degradation of BVS and vascular behaviour remain to be determined.

Methods: Of 15 farm-bred swine, 8 received streptozotocin to induce diabetes mellitus (DM), then a high cholesterol diet was given to all 15 swine. Nine months later, 32 coronary Absorb BVS (Abbott Vascular, Santa Clara, CA) were implanted under angiographic guidance. Histology, serology and polymer degradation analysis was performed.

Results: Degradation was similar in diseased and normal healthy swine and was determined only by implanted duration. It was not affected by DM, lipid accumulation in the neointima, or inflammation (Fig). Struts were completely covered at both 3 and 6 months follow-up, irrespective of DM and atherosclerosis. Likewise, DM did not affect histological scores. Importantly, all disease groups showed marked neointimal atherosclerosis, with focal lipid accumulation, irregular collagen distribution and neointimal calcifications. The latter was observed in various patterns, particularly towards the lumen.

Conclusions: In swine coronary arteries, DM, atherosclerosis and inflammation do not affect BVS degradation or the vascular response to BVS. Both in DM and non-DM, the neointima was equally associated with calcification, lipid accumulation and inhomogeneous collagen deposition indicating early neo-atherosclerosis.

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Abstract Withdrawn

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Is Visual Assessment of Lesion Dimensions Sufficient For Sizing Of Bioresorbable Scaffolds? Insights From The ASSURE Registry
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Background: Compared to drug eluting stents, for bioresorbable vascular scaffolds (BVS, Abbott Vascular Inc., Santa Clara, CA) sizing may be more important in terms of malapposition and fracture because of smaller expansion limits. The registry aims...