Malapposition, Underexpansion and Edge Dissection in Bioabsorbable Vascular Scaffolds (ABSORB™) and XIENCE™ stents-a comparison based on Optical Coherence Tomography

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Background

The everolimus-eluting bioabsorbable vascular scaffold (ABSORB™) is characterized by a greater strut thickness (152.4 μm vs. 81.3 μm), nevertheless, it has a greater flexibility compared to the XIENCE™ stent.

Different deployment strategies are required compared to metallic drug eluting stents, which may result in different post-implantation results.

Methods

23 patients who underwent Optical Coherence Tomography (OCT) after elective implantation of an ABSORB™ scaffold (n=30) were matched with 26 patients who underwent OCT after elective implantation of a XIENCE™ stent (n=30) according to age, gender, diameter and length of the device. Occurrence of malapposed stent-struts, stent-underexpansion and edge dissection was compared between groups.

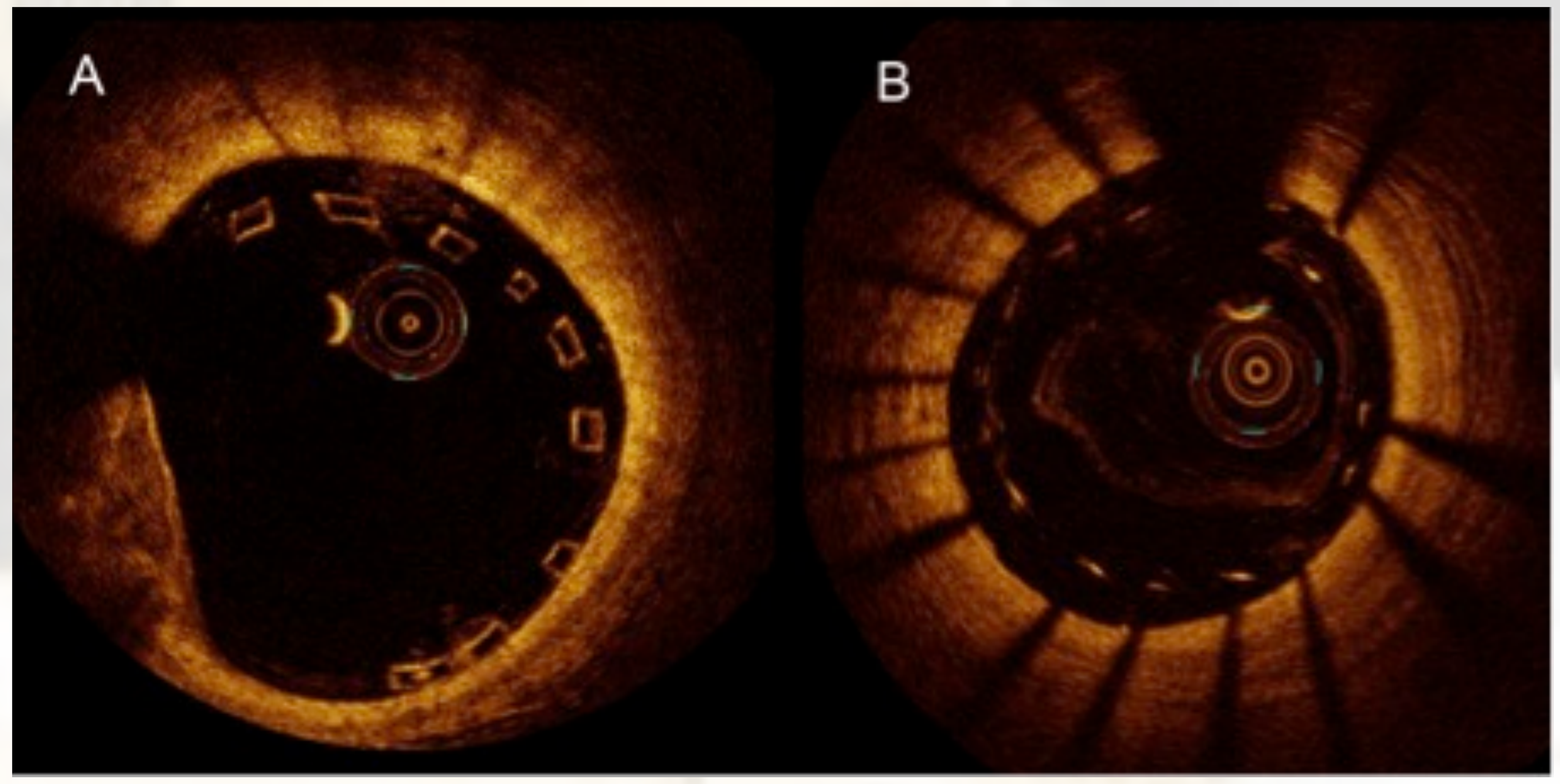

Figure 1. Malapposed struts of the ABSORB™ scaffold (A) and the XIENCE™ stent (B).

	ABSORB™ (n=30)	XIENCE™ (n=30)	p-value
Length, mm	21.13 ± 5.06	20.93 ± 7.90	0.907
Diameter, mm	3.23 ± 0.31	3.22 ± 0.54	0.884
Inflation pressure, atm	11 ± 3	14 ± 3	0.005
Inflation time, sec	44 ± 14	28 ± 9	< 0.001
Predilation , n (%)	28 (93)	19 (63)	0.010
Predilation diameter, mm	2.65 ± 0.51	2.54 ± 0.51	0.475
Postdilation, n (%)	20 (67)	15 (50)	0.295
Postdilation diameter, mm	3.38 ± 0.39	3.55 ± 0.58	0.310
Postdilation pressure, atm	17 ± 4	16 ± 3	0.797
Malapposition, # struts	11 ± 23	41 ± 59	0.011
Underexpansion, n (%)	14 (47)	12 (40)	0.795
Edge dissection, n (%)	6 (20)	12 (40)	0.158

Table 1. Device-, procedural characteristics and OCT analysis.

Results

Stent diameter and length were similar in ABSORB™ scaffolds (3.23±0.31mm and 21.13±5.06mm) and XIENCE™ stents (3.22±0.54mm and 20.93±7.90mm).

Predilation was more frequently done in the ABSORB™ group (n=28 vs. n=19, p=0.010) but the diameter of the predilation balloon was comparable between groups (2.65±0.51 vs. 2.54±0.51mm, p=0.475). Inflation pressure of the stent-balloon was lower and inflation time of the stent-balloon was longer in the ABSORB™ group, respectively (11±3 vs. 14±3atm, p=0.005; 44±14 vs. 28±9sec, p<0.001). Incidence of postdilation with a non-compliant (NC) balloon was similar (n=20 vs. n=15, p=0.295) as well as the inflation pressure of the used NC balloon (17±4 vs. 16±3atm, p=0.797). The count of malapposed struts was significantly higher in the XIENCE™ group (11±23 vs. 41±59, p=0.011). Incidence of stent-underexpansion was similar (n=14 vs. n=12, p=0.795) and edge dissections were, in trend, less frequently observed in the ABSORB™ group (n=6 vs. n=12, p=0.158).

Conclusion

Different characteristics of the devices require different deployment strategies. Therefore, the ABSORB™ shows less malapposed struts and, in trend, less edge dissections. Prolonged inflation protocols are recommended in order to improve implantation results and may improve clinical outcomes.