

Bioresorbable vascular scaffold in chronic total occlusions



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We read with interest the article by Ming Fam et al¹ entitled “Everolimus-eluting bioresorbable vascular scaffolds for treatment of complex chronic total occlusions”, published recently in your journal. This study suggests the feasibility of bioresorbable vascular scaffold (BVS) implantation in complex coronary chronic total occlusion (CTO) with both good immediate angiographic results and six-month clinical outcome. We however have some comments to make.

It would have been interesting to have had a follow-up angiography in the patients. Indeed, angiographic in-stent restenosis, including total reocclusion, often remains clinically silent in patients after percutaneous coronary intervention (PCI) for CTO^{2,4}. It is therefore difficult to infer angiographic outcomes only from clinical symptoms. The rate of angiographic restenosis at six months after successful PCI for CTOs has been reported to be around 20% with drug-eluting stents^{3,4}. The study by Ming Fam et al¹ does not allow an assessment of the actual rate of in-stent restenosis in CTOs treated with BVS or to make a comparison with the rates of restenosis reported with drug-eluting stents

in this subset of lesions. In addition, the rate of stent thrombosis which may also remain clinically silent after CTO PCI^{3,4} is not known in the study by Ming Fam et al¹. As this latter complication has already been reported to be more frequent with BVS than with DES for simple non-CTO lesions⁵, one may fear even higher rates of stent thrombosis in CTOs treated by BVS, especially when the lesions are complex as in the work by Ming Fam et al¹. Indeed, in their study¹, lesion bending was present in 50%, calcifications in 70%, the mean total scaffold length was 60 mm and optical coherence tomography was performed in only 18% to ensure an optimal post-scaffold deployment. In the light of all the above-mentioned factors, one might have expected some cases of stent thrombosis that were not actually observed by the authors. This may have been due both to the lack of routine follow-up angiography and to the short duration of clinical follow-up. Also, the authors should have provided detailed information on the duration of dual antiplatelet therapy which is an important factor for late BVS thrombosis⁶. Finally, cases of coronary artery aneurysm after BVS have been described very

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recently^{7,8}. In their literature review, Chua et al⁸ found that four of the nine reported cases of coronary artery aneurysm occurred after BVS implantation for CTOs. Deeper artery wall injury, especially with dissection/re-entry techniques, may enable the development of coronary artery aneurysm in CTO after BVS implantation. Again, the lack of follow-up angiography does not allow detection of the occurrence of this type of complication in the study by Ming Fam et al¹. To conclude, the study by Ming Fam et al¹ has the great merit of being the first one to show the feasibility of BVS implantation in complex CTOs. However, we believe that a randomised trial including a control group treated by latest-generation drug-eluting stents with a routine angiographic follow-up in addition to a long-term clinical outcome evaluation is necessary before extending the indication of BVS in CTOs.

Conflict of interest statement

The authors have no conflicts of interest to declare.

References

1. Fam JM, Ojeda S, Garbo R, Latib A, La Manna A, Vaquerizo B, Boukhris M, Vlachoianis GJ, van Geuns RJ, Ezhumalai B, Kawamoto H, van der Sijde J, Felix C, Pan M, Serdoz R, Boccuzzi GG, De Paolis M, Sardella G, Mancone M, Tamburino C, Smits PC, Di Mario C, Seth A, Serra A, Colombo A, Serruys P, Galassi AR, Zijlstra F, Van Mieghem NM, Diletti R. Everolimus-eluting bioresorbable vascular scaffolds for treatment of complex chronic total occlusions. *EuroIntervention*. 2017;13:355-63.
2. Rubartelli P, Verna E, Niccoli L, Giachero C, Zimarino M, Bernardi G, Vassanelli C, Campolo L, Martuscelli E; Gruppo Italiano di Studio sullo Stent nelle Occlusioni Coronariche Investigators. Coronary stent implantation is superior to balloon angioplasty for chronic coronary occlusions: six-year clinical follow-up of the GISSOC trial. *J Am Coll Cardiol*. 2003;41:1488-92.
3. Isaza K, Mayaud N, Gerbay A, Sabry MH, Richard L, Cerisier A, Lamaud M, Khamis H, Abd-Alaziz A, Da Costa A. Long-term clinical outcome and routine angiographic follow-up after successful recanalization of complex coronary true chronic total occlusion with a long stent length: a single-center experience. *J Invasive Cardiol*. 2013;25:323-9.
4. Isaza K, Gerbay A, Terreaux J, Khamis H, Tammam K, Richard L, Cerisier A, Lamaud M, Da Costa A. Restenosis after percutaneous coronary intervention for coronary chronic total occlusion. The central role of an optimized immediate post-procedural angiographic result. *Int J Cardiol*. 2016;224:343-7.
5. Serruys PW, Chevalier B, Sotomi Y, Cequier A, Carrié D, Piek JJ, Van Boven AJ, Dominici M, Dudek D, McClean D, Helqvist S, Haude M, Reith S, de Sousa Almeida M, Campo G, Iñiguez A, Sabaté M, Windecker S, Onuma Y. Comparison of an everolimus-eluting bioresorbable scaffold with an everolimus-eluting metallic stent for the treatment of coronary artery stenosis (ABSORB II): a 3 year, randomised, controlled, single-blind, multicentre clinical trial. *Lancet*. 2016;388:2479-91.
6. Felix CM, Vlachoianis GJ, IJsselmuiden AJ, Onuma Y, van Geuns RJ. Very Late Scaffold Thrombosis in Absorb BVS: Association With DAPT Termination? *JACC Cardiovasc Interv*. 2017;10:625-6.
7. Nakatani S, Ishibashi Y, Suwannasom P, Grundeken MJ, Høj Christiansen E, Onuma Y, Serruys PW; ABSORB Cohort B Investigators. Development and receding of a coronary artery aneurysm after implantation of a fully bioresorbable scaffold. *Circulation*. 2015;131:764-7.
8. Chua SK, Cheng JJ. Coronary artery aneurysm after implantation of a bioresorbable vascular scaffold: Case report and literature review. *Catheter Cardiovasc Interv*. 2017;90:E41-5.