

Drug-eluting stents vs bioresorbable stents (scaffolds) vs drug-eluting balloons: the advantages and drawbacks of new technologies

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KEYWORDS: coronary artery disease, drug-eluting stent, bioresorbable stents (scaffolds/), drug-eluting balloon.

CITATION: *Cardiol Croat.* 2016;11(3-4):124. | **DOI:** <http://dx.doi.org/10.15836/ccar2016.124>

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The introduction of bare-metal stents (BMS) significantly advanced the field of interventional cardiology by reducing the number of reinterventions. In order to reduce restenosis, drug-eluting stents (DES) were developed, and are further differentiated by stent platform, polymer type, and active substance. The first generation of DES, paclitaxel-eluting stents (PES) and sirolimus-eluting stents, are no longer used as the second generation of stents are superior: zotarolimus-eluting stents (ZES) and everolimus-eluting stents (EES). They are biocompatible, cause less inflammatory reactions, and become covered with endothelium more quickly. Resolute zotarolimus-eluting stents (R-ZES) and EES are comparable, and are superior in relation to other DES's. Meta-analyses of studies have proven DESs with bioresorbable polymer (biolimus and sirolimus) superior to 1st generation DESs (sirolimus) in their reduced revascularisation of target veins and reduced incidence of in-stent thrombosis in a 5-year period. However, if these stents are compared with the new generation of DESs, it becomes clear that the percentage of target vessel reintervention is comparable. DESs with resorbable polymer are comparable to R-ZES in their incidence of in-stent thrombosis and mortality rates, while they are inferior to EES. It is difficult to design a non-polymer DES due to problems in attaining a stable concentration of anti-proliferation drug necessary to prevent neointimal hyperplasia. The first studies are promising, and have shown no significant differences in the later loss of lumens, angiographic restenosis, or revascularization of target veins due to restenosis as compared to a standard DES with paclitaxel. The time necessary to release this drug is one month, and its application would reduce the length of dual antiplatelet therapy, thus completely eliminating rare indications for the application of BMS.¹⁻³

As opposed to the first generation, the new generation of bioresorbable stents (scaffolds) have been shown to be not inferior to the second generation of DESs (EES) as related to infarction, cardiovascular death, and ischemia-driven target vessel revascularization in a 1-year period. Drug-eluting balloons (DEB, all of which are impregnated with paclitaxel, differing only in the polymer type) are the subject of many studies, and have only been indicated for in-stent restenosis. However, results are expected from numerous studies of small blood vessels and bifurcation lesions.

RECEIVED:
February 3, 2016

ACCEPTED:
February 20, 2016



LITERATURE

- Navarese EP, Tandjung K, Claessen B, Andreotti F, Kowalewski M, Kandzari DE, et al. Safety and efficacy outcomes of first and second generation durable polymer drug eluting stents and biodegradable polymer biolimus eluting stents in clinical practice: comprehensive network meta-analysis. *BMJ.* 2013 Nov 6;347:f6530. **DOI:** <http://dx.doi.org/10.1136/bmj.f6530>
- Park DW, Kim YH, Yun SC, Kang SJ, Lee SW, Lee CW, et al. Comparison of zotarolimus-eluting stents with sirolimus- and paclitaxel-eluting stents for coronary revascularization: the ZEST (comparison of the efficacy and safety of zotarolimus-eluting stent with sirolimus-eluting and paclitaxel-eluting stent for coronary lesions) randomized trial. *J Am Coll Cardiol.* 2010;56(15):1187-95. **DOI:** <http://dx.doi.org/10.1016/j.jacc.2010.03.086>
- Alazzoni A, Al-Saleh A, Jolly SS. Everolimus-Eluting versus Paclitaxel-Eluting Stents in Percutaneous Coronary Intervention: Meta-Analysis of Randomized Trials. *Thrombosis.* 2012;2012:126369. **DOI:** <http://dx.doi.org/10.1155/2012/126369>