INTERVENTIONAL CARDIOLOGY

Biodegradable-polymer DES versus second-generation durable-polymer DES

Compared with bare-metal stents, first-generation drug-eluting stents (DES) have consistently been associated with a reduced risk of restenosis and target-vessel revascularization, but an increased risk of late and very late stent thrombosis. To try to overcome this safety issue, biocompatible durable-polymer DES (DP-DES) and biodegradable-polymer DES (BP-DES) were developed. Both have been compared favourably with bare-metal stents and first-generation DES; however, whether BP-DES or second-generation DP-DES are safer than the other was previously unknown. These DES have now been compared in three separate meta-analyses published online in early November 2013.

In a mixed treatment comparison meta-analysis of data from 106,427 patients enrolled in 126 randomized trials, multiple stents were compared, including various BP-DES (grouped together) and four types of second-generation DP-DES—cobalt chromium (CC) and platinum chromium (PC) everolimus-eluting stents (EES), and the Endeavor® and Resolute® (Medtronic Vascular, Inc., USA) zotarolimus-eluting stents (ZES). Over a mean follow-up of 2.3 years (range 0.5–5.0 years), the BP-DES were associated with similar rates of death, myocardial infarction (MI), and definite stent thrombosis as the PC-EES, Endeavor® ZES, and Resolute® ZES, but higher rates of MI and definite stent thrombosis than the CC-EES. For events after 1 year ('late

events'), the BP-DES did not differ from any of the second-generation DP-DES for the rates of MI or definite stent thrombosis, but were associated with a higher rate of death than the CC-EES.

In a comprehensive network meta-analysis, biolimus-eluting BP-DES were compared with the CC-EES, PC-EES, Endeavor® ZES, and Resolute® ZES using data for 85,490 patients involved in 89 randomized trials. At 1 year, the BP-DES were associated with similar rates of death, MI, and definite or probable stent thrombosis as all of the second-generation DP-DES assessed, but had a higher rate of definite stent thrombosis than the CC-EES. Similar findings were reported for 'late events'. In their trial report, the investigators highlight that most of the available CC-EES follow-up data are limited to 2 years. They say that the advantage of BP-DES over DP-DES "is expected to emerge in the late follow-up, and therefore whether the observed differences would change with more extended follow-up is unknown".

In another comprehensive network meta-analysis involving data from 63,242 patients enrolled in 60 randomized trials, biolimus-eluting BP-DES were compared with EES and the Endeavor® and Resolute® ZES. At 1 year, BP-DES were associated with similar rates of death and definite or probable stent thrombosis as all three types of second-generation DP-DES, but a higher rate of MI than the EES. No differences were found for

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the 'late' safety outcomes with the BP-DES and three second-generation DP-DES.

As only noninferiority trials have been initiated to date, the investigators of the mixed treatment comparison meta-analysis highlight that large, randomized trials designed to test the superiority of BP-DES over second-generation DP-DES, and especially over CC-EES, are needed. They believe that the results of their meta-analysis—which are similar to the results of the other two meta-analyses also published in November—suggest no advantage of BP-DES over second-generation DP-DES.

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Original articles Bangalore, S. *et al.* Bare metal stents, durable polymer drug eluting stents, and biodegradable polymer drug eluting stents for coronary artery disease: mixed treatment comparison meta-analysis. *BMJ* 347, f6625 (2013) | Palmerini, T. *et al.* Clinical outcomes with bioabsorbable polymer-based versus durable polymer-based drug-eluting stents and bare metal stents: evidence from a comprehensive network meta-analysis. *J. Am. Coll. Cardiol.* doi:10.1016/j.jacc.2013.09.061 | Navarese, E. P. *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* 347, f6530 (2013)