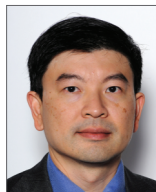


## Biodegradable or durable polymer: more data required



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In this issue of AsiaIntervention, Wan Azman Wan Ahmad reports on the final five-year results of the BEACON II clinical registry, a 497-patient real-world, all-comers registry conducted at 12 Asia Pacific sites<sup>1</sup>. This single-arm study followed up patients in whom BioMatrix (Biosensors Europe SA, Morges, Switzerland) Biolimus A9-eluting stent(s) were implanted. Biolimus A9 is an analogue to sirolimus, and is released from a biodegradable polymer, polylactic acid (PLA), applied to the abluminal surface of the stent.

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This trial was predominantly conducted in Asia with nine sites, with the remaining three sites located in the Pacific. Historically, most drug-eluting stent trials were US-centric and/or Eurocentric, mirroring the headquarters of the drug-eluting stent companies. Companies, for regulatory purposes or otherwise, have recognised that Asian patients may be different from Caucasian patients: therefore, information regarding their response to drug-eluting stents may provide new insights<sup>2</sup>. To date, company-sponsored stent trials in Asia have generally been registries. This is the second contemporary report to be published in AsiaIntervention, after the RESOLUTE ASIA Registry<sup>2</sup>. As the specialist interventional cardiology journal of the region, it is a privilege for both the authors and the journal to be able to publish trials pertinent to the audience and the patients in this region.

Remarkably for a registry, clinical follow-up was available for 94% of the population at five years. The most striking finding in this registry is the low definite stent thrombosis rate of 0.8% at one

year, and a cumulative incidence of 1.2% at five years, with an incidence of 0.4% from years one to five<sup>1</sup>.

The authors emphasise the biodegradable polymeric system as being the principal reason for the low observed rate of very late stent thrombosis. As we move into the second decade of drug-eluting stents, the use of biodegradable polymers in drug-eluting stent systems has become a popular choice over durable polymers (**Table 1**). This move was an industry response to the clinical and pathological findings of the first generation of drug-eluting stents, in which a significant inflammatory response was associated with the use of durable polymers<sup>3</sup>. It is worth noting that human post-mortem studies of second-generation systems utilising durable polymers demonstrate a lack of the inflammatory response seen with earlier stents<sup>4</sup>.

The largest trial utilising the BioMatrix stent was the LEADERS trial. The five-year results demonstrated a lower incidence of definite stent thrombosis when compared to the durable polymer-coated sirolimus-eluting stent (2.6% vs. 4.5%, respectively,  $p=0.06$ )<sup>5</sup>. When a landmark analysis was performed at one year, there was a significant reduction in late stent thrombosis (0.66% vs. 2.5%, respectively,  $p=0.003$ ). A meta-analysis of biodegradable versus durable polymers also suggested that there was a benefit of the former in the reduction of late stent thrombosis<sup>6</sup>.

One must interpret the results with the utmost caution, as the devices compared were completely different. It is well understood that the efficacy of a particular device is a triangular synergy among the platform (the stent), a carrier (usually a polymer), and an agent (a drug)<sup>7</sup>. As such, any valid comparison would have to differ in only

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**Table 1. List of drug-eluting stents from the major manufacturers.**

Biodegradable polymer	Durable polymer
BioMatrix (Biolimus A9™)**	Promus PREMIER™/Element™ (everolimus)
SYNERGY™ (everolimus)	Resolute Onyx™/Integrity™ (zotarolimus)
Orsiro™ (sirolimus)	XIENCE Xpedition® (everolimus)
Nobori® (Biolimus A9)	
Ultimaster® (sirolimus)	
Absorb*/Absorb GT1* (everolimus)	

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the carrier. To date, the largest randomised trial to compare the efficacy of a biodegradable versus durable polymer utilising the same drug (everolimus) has been the EVOLVE II trial, in which 1,648 patients were randomised to receive either the SYNERGY everolimus-eluting biodegradable polymer stent or the PROMUS Element Plus everolimus-eluting durable polymer stent (both Boston Scientific Corporation, Marlborough, MA, USA). This study is scheduled to report results up to five years. However, to date, only 12-month results have been reported. These demonstrated no difference in outcomes: in particular, the incidence of definite stent thrombosis at one year was 0.4% vs. 0.6%, respectively,  $p=0.5^8$ .

The interventional community awaits the long-term results of this trial, with the same company providing both stents, as it will provide the scientific validity to demonstrate the benefit, if any, of biodegradable polymers over second-generation durable polymers. Until then, in the absence of any other trials where the difference is only the polymer, one should only comment on the safety and efficacy of the entire device (drug, polymer and stent) over another, and not of its individual components.

### Conflict of interest statement

The author has no conflicts of interest to declare.

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