RESEARCH CORRESPONDENCE

Optical Coherence Tomography Assessment for Percutaneous Coronary Intervention of the Left Main Artery

The IDEAL-LM Trial

Biodegradable polymer (BP)-coated drug-eluting stents (DES) were developed to try to accelerate vessel healing and potentially allow a shorter period of mandatory dual-antiplatelet therapy (DAPT) compared with patients treated with durable polymer (DP)-coated DES. The optimal duration of DAPT after percutaneous coronary intervention (PCI) of the left main (LM) coronary artery remains uncertain. The IDEAL-LM (Xience Versus Synergy in Left Main PCI) study is a multicenter, randomized clinical trial that enrolled 818 patients undergoing PCI of the unprotected LM coronary artery. Patients were randomly assigned to either the BP-platinum-chromium everolimus-eluting stent (PtCr-EES) followed by 4 months DAPT or a DP-cobalt-chromium everolimus-eluting stent (CoCr-EES) followed by 12 months DAPT (1). In the IDEAL-LM optical coherence tomography (OCT) substudy, we sought to evaluate vessel healing. At 3 months post-PCI, OCT assessment of the stented segment was performed in 100 patients and was analyzed by an independent core laboratory (Cardialysis B.V., Rotterdam, the Netherlands). The healing score was calculated according to previously published methods (2).

The mean age of the study population was 64 years, 79% were male, and 50% presented with acute coronary syndrome. Overall, 48% of LM stenoses were true bifurcation lesions, and 73% were treated by a single-stent approach. The healing score was similar at 3 months (BP-PtCr-EES vs. DP-CoCr-EES 0.93 [0.00 to 3.03] vs. 0.86 [0.00 to 2.67]; p = 1.00). The proportion of covered struts was high (>96% for both), and the incidence of strut malapposition was very low (<3%) in both groups, with no differences between proximal or distal segments of the bifurcation (**Table 1**).

The optimal duration of DAPT should maintain a balance between ischemic events and bleeding risks. Vascular healing assessed by OCT is considered to be a safety index for using a short duration of DAPT after DES implantation. The specific design of the BP-PtCr-EES has shown favorable vascular healing in a small series of non-LM stenoses (3), but not yet properly compared with DP-coated DES. However, in the IDEAL-LM OCT substudy, BP-PtCr-EES and DP-CoCr-EES had similar vascular healing responses at

TABLE 1 OCT Results at 3 Months

	BP-PtCr-EES			DP-CoCr-EES		
	Proximal (n = 49)	Bifurcation (n = 49)	Distal (n = 47)	Proximal (n = 42)	Bifurcation (n = 43)	Distal (n = 43)
Lumen measures						
Minimum lumen diameter, mm	3.6 (3.3-4.0)	3.9 (3.5-4.1)	3.0 (2.8-3.4)	3.6 (3.3-4.0)	3.8 (3.4-4.3)	2.8 (2.6-3.3)
Minimal lumen area, mm^2	10.4 (8.7-12.5)	11.7 (9.9-13.3)	7.3 (6.1-9.1)	10.2 (8.6-12.4)	11.2 (9.3-14.6)	6.3 (5.3-8.4)
Mean of intraluminal mass area, mm^2	0.04 (0.03-0.05)	0.03 (0.01-0.04)	0.03 (0.02-0.08)	0.09 (0.03-0.09)	0.00 (0.00-0.00)	0.00 (0.00-0.00)
Stent measures						
Mean stent area, mm^2	13.7 (12.0-15.6)	13.6 (11.8-15.8)	10.7 (9.5-11.9)	13.5 (12.5-15.3)	13.8 (11.3-15.6)	10.0 (8.3-12.2)
Neointimal hyperplasia measures						
Neointimal hyperplasia areas, mm^2	0.8 (0.6-1.1)	0.8 (0.4-1.2)	0.6 (0.5-0.9)	0.8 (0.6-1.1)	0.7 (0.6-1.1)	0.6 (0.6-1.1)
Strut malapposition measures						
Number of struts	64 (43-87)	25 (19-36)	151 (78-273)	71 (51-114)	25 (20-31)	138 (102-297)
Malapposed struts, %	0.0 (0.0-3.1)	0.0 (0.0-0.0)	0.2 (0.0-3.0)	0.0 (0.0-4.6)	0.0 (0.0-0.0)	0.4 (0.0-1.7)
Mean malapposed distance, mm	0.3 (0.2-0.4)	0.4 (0.3-0.5)	0.4 (0.3-0.5)	0.3 (0.2-0.4)	0.3 (0.2-0.7)	0.4 (0.3-0.5)
Mean malapposed area	0.0 (0.0-0.1)	0.0 (0.0-0.0)	0.0 (0.0-0.2)	0.0 (0.0-0.1)	0.0 (0.0-0.0)	0.0 (0.0-0.1)
Strut coverage measures						
Covered struts, >20 μm, %	97.7 (95.7-100)	100 (94.7-100)	96.9 (95.4-98.8)	98.0 (95.6-99.2)	100 (96.0-100)	97.7 (95.4-99.2)
Mal-apposed + covered, %	0.0 (0.0-3.1)	0.0 (0.0-0.0)	0.1 (0.0-2.9)	0.0 (0.0-4.6)	0.0 (0.0-0.0)	0.4 (0.0-1.7)
Uncovered struts, <20 μm, %	2.3 (0.0-4.23)	0.0 (0.0-5.3)	3.1 (1.2-4.6)	2.0 (0.8-4.4)	0.0 (0.0-4.0)	2.3 (0.8-4.6)
Healing score		0.93 (0.00-3.03)			0.86 (0.00-2.67)	

Values are median (interquartile range). All p > 0.05 between 2 groups in proximal, bifurcation, and distal segments.

CoCr-EES = cobalt-chromium everolimus-eluting stent; OCT = optical coherence tomography; PtCr-EES = platinum-chromium everolimus-eluting stent.

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3 months after implantation in the LM coronary artery. The main trial will report clinical outcomes after 2 years of follow-up.

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