Negative impact of ultra-thin strut on neointimal coverage condition within one year after implantation as compared to thin sturt in biogradable-polymer sirorimus eluting stents

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Funding Acknowledgement: Type of funding source: None

Background: BIOSCIENCE randomized trial which compared biodegradable-polymer sirolimus-eluting stents with ultra-thin (60μm) strut (ultra-thin BP-SES) and durable-polymer everolimus-eluting stents with thin (81μm) strut (thin DP-EES) have reported that definite stent thrombosis within 1 year had more frequently occurred in ultra-thin BP-SES (0.9%) than in thin DP-EES group (0.4%) although it was not statistically significant. It suggests that neointimal coverage after stent implantation within 1 year might be different between ultra-thin BP-SES and thin DP-EES. Recently, two types of biogradable-polymer sirorimus eluting stents, thin (80μm) strut type (thin BP-SES) and ultra-thin (60μm) strut type (ultra-thin BP-SES), can be available in clinical settings.

Purpose: We compared neointimal coverage conditions between ultra-thin BP-SES and thin BP-SES by optical coherence tomography (OCT).

Methods: Consecutive Forty-six patients who underwent 21 ultra-thin BP-SESs or 25 thin BP-SESs implantation were enrolled. We compared incidences of acute coronary syndrome, type B2/C lesion, atherectomy device use, stent size, stent length, maximum inflation pressure, and 8-month follow-up OCT parameters including proportions of uncovered struts (%Uncovered), malapposed struts, (%Mallaposed) and mean neointimal hyperplasia thickness (mean NHT) between the two groups.

Results: %Uncovered and %malapposed were significantly higher and mean NHT was significantly lower in ultra-thin BP-SES than in thin BP-SES (Table). The other parameters were similar between the two groups.

Conclusion: Ultra-thin BP-SES showed worse neointimal coverage as compared to thin BP-SES within 1 year after stent implantation, which may increase stent thrombosis.

	Thin BP-SES (n=25)	Ultra-thin BP-SES (n=21)	p value
Acute coronary syndrome	24%	43%	0.17
Type B2/C lesion	28%	19%	0.48
Atherectomy device use	8%	10%	0.86
Stent size (mm)	2.87±0.49	2.93±0.39	0.44
Stent length (mm)	22.5±1.7	18.9±5.2	0.25
Maximum inflation pressure (atm)	17±4	18±4	0.86
% Uncovered (%)	5.9±1.6	10.2±1.7	0.04
% Malapposed (%)	1.3±0.9	5.0±1.0	0.03
Mean NHT (μm)	121±8	70±9	≤0.01