Intravascular Imaging and PCI

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TCT-554

Long Stents are Likely to be Under-expanded with Stent Delivery Balloon, Post-stent Optimal Coherence Tomography Assessment

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Background: The 2nd generation DES improved the clinical outcome, however, stent underexpansion and malapposition should be avoided to prevent stent restenosis and subacute stent thrombosis (DES failure). Previous study showed that stent length was strongly associated with DES failure.
Methods: We investigated 172 de novo coronary lesions without calcification treated with single 2nd generation DES (Xience Prime, Promus Element, Nobori, and Resolute Integrity) under optical coherence tomography (OCT) guidance. After deployment of DES with stent delivery balloon by 2 or 3 times inflations, minimum stent area (MSA) and distance between the strut and vessel wall of malapposed struts were analyzed by OCT. We also calculated a ratio of measured MSA to estimated stent area (M/E ratio) obtained by compliance chart in each DES. Long stent was defined that stent length was 28-38mm and short stent was less than 28mm. We compared long stent group (N=46) with short stent group (N=126).
Results: Baseline and lesion characteristics were similar between two groups. However, M/E ratio of MSA in long stent group was significantly smaller than that in short stent group (0.59 vs. 0.66 p=0.001). The distance between the strut and vessel wall of malapposed struts in long stent group was larger than that in short stent group (0.319 vs. 0.245mm, p=0.015).
Conclusions: Long stent did not achieve optimal stent expansion with delivery balloon even in non-calcified lesion. After stent deployment, we should perform OCT to evaluate stent under expansion and stent malapposition, and assess whether another post dilatation balloon is needed or not, especially in long stenting.

	Long stent (≥28mm) N=46	Short stent (<28mm) N=126	p value
Age	66.4	68.5	0.289
Male, %	72.7	71.3	0.860
Diabetes Mellitus, %	56.5	43.6	0.136
Hypertension, %	78.3	73.8	0.553
Dyslipidemia, %	65.2	57.9	0.391
Stent size, mm	2.70	2.82	0.095
Stent Inflation pressure, atm	10.7	11.5	0.038
Minimum stent area, mm^2	3.66	4.58	0.002
Maximum stent area, mm^2	6.16	6.66	0.174
Estimated stent area,mm^2	6.18	6.86	0.056
Ratio of measured / Estimated stent area	0.59	0.66	0.001
Ratio of minimum / maximum stent area	0.63	0.73	<0.0001
Distance of stent malapposition, mm	0.319	0.245	0.015

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Comparative incidence of optical coherence tomography features indicative of uncorrected stent deployment in patients with and without major adverse cardiac events in the OCT guided arm of the CLI-OPCI study

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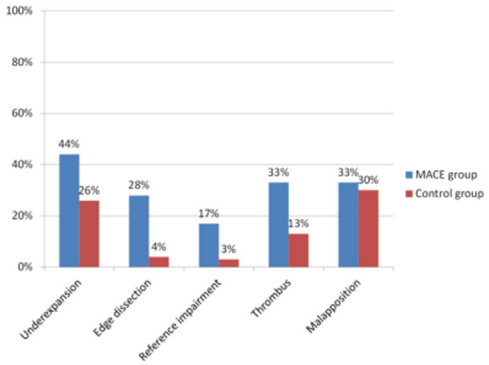
Background: The Centro per la Lotta contro l'Infarto-Optimisation of Percutaneous Coronary Intervention study suggested that the use of optical coherence tomography (OCT) can improve the clinical outcome in patients undergoing PCI. The aim of this study was to compare the incidence of the OCT-features predicting adverse events in patients who suffered from cardiac death or myocardial infarction (MACE group) respect to patients who had no MACE (Control group).
Methods: 22 patients out of 335 had a MACE at 1 year of follow-up (MACE group) vs the remaining 313 without complications (Control group). Stents were assessed by OCT to address the features indicative of non-optimal stent deployment such as stent under-expansion, malapposition, edge dissection, thrombus burden and reference lumen narrowing. OCT images were analysed applying the quantitative thresholds of the CLI-OPCI study.
Results: The OCT features indicative of non-optimal stent deployment were observed more frequently in the MACE group compared to the Control group (figure 1). Excluding malapposition, that did not differ in the 2 groups, the percentage of cases which had at least one of the OCT missed criteria was significantly higher in the MACE group (89% vs 39%, P<0.001).



Conclusions: Patients with MACE in the CLI-OPCI study despite the use of OCT guided strategy were found to have more often an uncorrected stent deployment based on the OCT criteria. These results further emphasizes the role of OCT in optimizing stent implantation.

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Differences in neointimal coverage among bare-metal stent, zotarolimus-eluting stent, everolimus-eluting stent and biolimus–eluting stent at 9 months after implantation using optical coherence tomography in patients with ST-segment elevation myocardial infarction

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Background: Percutaneous coronary intervention with drug-eluting stents for patients with ST-segment elevation myocardial infarction (STEMI) reduces target lesion revascularization, but drug-eluting stents have an increased risk of very late stent thrombosis. Endothelial coverage of stents is a key factor in stent thrombosis. This study examined neointimal coverage of bare-metal stent (BMS), and 3 types of second-generation drug-eluting stents [zotarolimus-eluting stent (E-ZES), everolimus-eluting stent (EES) and biolimus-eluting stent (BES)] in STEMI patients using optical coherence tomography (OCT).
Methods: Eighty-eight STEMI patients underwent follow-up coronary angiography and OCT at 9 months after stent implantation (BMS, n=22; E-ZES, n=21; EES, n=22; BES, n=23). Using OCT, we measured thickness inside every strut and area between struts and vessel wall, and evaluated neointimal coverage and malapposition of stents. The relationship of strut condition to remodeling index before Percutaneous coronary intervention by intravascular ultrasound was also examined.
Results: As shown in the table 1, restenosis rate, neointimal coverage thickness and area rate were significantly lower with EES and BES than with BMS and E-ZES, while the malapposed rate was significantly higher in EES and BES. Uncovered struts were most frequently observed in EES. In addition, evagination/strut rate was highest

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