

Association between side branch angle and neointimal coverage of drug-eluting stent in coronary bifurcation lesions: an optical coherence tomography study

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Background: Previous experimental studies indicated that side branch angle (SBA) influences the local flow turbulence and wall shear stress. The purpose of this study was to investigate the relation between SBA and the neointimal coverage of drug-eluting stent (DES) which were implanted in coronary bifurcation lesions.

Methods: 47 bifurcation lesions treated with DES were evaluated with FD-OCT in 39 patients at follow-up angiography. Each lesions were divided into the bifurcation lesions without kissing balloon technique (KBT) after stent implantation (non-KBT group; 28 lesions) and those with KBT (KBT group; 19 lesions). Neointimal coverage was assessed based on cross-sectional OCT images containing SB at 0.4mm interval, and separately evaluated in terms of jailing struts over the SB ostium (SO) and non-jailing struts attaching to the vessel wall (VW). SBA was measured on the longitudinal reconstruction images of FD-OCT before stent implantation. Incidence of uncovered struts and neointimal thickness were measured.

Results: In non-KBT group, the percentage of uncovered struts was significantly higher in lesions with SBA<60 degree compared with those with SBA>60 degree at both SO and VW region (56.9±39.8% vs. 25.6±26.8%, p<0.05; 10.6±7.6% vs. 3.3±4.4%, p<0.01, respectively). In KBT group, the percentage of uncovered struts was not significant difference between lesions with SBA<60 degree and those with SBA>60 degree at both SO and VW region (36.7±35.3% vs.36.6±34.8%; 10.9±10.4% vs. 8.6±12.7%, respectively).

Conclusions: The neointimal coverage of DES was affected by SBA in bifurcation lesion without KBT, but is not affected in bifurcation lesion with KBT.