Clinical outcome after coronary bifurcation stenting: a systematic review and network meta-Analysis of PCI bifurcation techniques comprising 5572 patients

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Background: The optimal PCI technique for bifurcation lesions remains a matter of debate. Several RCT have compared different bifurcation PCI techniques. Provisional stenting has been recommended as the default technique for most bifurcation lesions. However, emerging data suggests that double-kissing crush technique can be considered in true left main bifurcation lesions and has been endorsed by the European Society of Cardiology Guidelines.

Purpose: To compare the clinical outcome between different bifurcation PCI techniques.

Methods: We searched MEDLINE for randomized clinical trials (RCT) comparing PCI bifurcation techniques for coronary bifurcation lesions. Outcomes of interest were major adverse cardiovascular events (MACE) defined as the composite of cardiac death, myocardial infarction (MI) and target vessel or lesion revascularization (TVR/TLR), and the individual components of MACE. Stent thrombosis was assessed as defined by the ARC. Stratification based on left-main or distal bifurcations was performed. We evaluated the studies' risk of bias in accordance to the Cochrane Handbook for Systematic Reviews of Interventions, and certainty of evidence using the Grading of Recommendations Assessment, Development and Evaluation framework. We estimated summary odds ratios (ORs) using pairwise and Bayesian network meta-analysis.

Results: We identified 263 studies and of these included 19 RCT including 5572 patients treated with 5 bifurcation PCI techniques namely provisional stenting, systematic T-stenting, crush, culotte and double-kissing crush. Median follow-up was 12 months (IQR 8 to 36). When all bifurcation lesions were combined, double-kissing crush technique reduced the occurrence of MACE (OR 0.42; CrI 0.28 to 0.61) compared to provisional stenting. This difference was driven by a reduction in TVR/TLR (OR 0.39; CrI 0.25 to 0.65). No differences were found in cardiac death, MI or stent thrombosis among analyzed PCI techniques. No differences in MACE were observed between provisional stenting, systematic T-stenting, crush. In distal bifurcations (n=17 studies, 4634 patients), double-kissing crush also showed to reduce MACE (OR 0.48; CrI 0.29 to 0.67 vs. Provisional). In left-main bifurcations (n=3 studies, 938 patients) no differences in MACE were found between PCI techniques.

Conclusions: In this network meta-analysis, PCI bifurcation techniques were similar with respect to the occurrence of cardiac death, myocardial infarction and stent thrombosis. When all coronary bifurcations were combined, an advantage of double-kissing crush was observed in terms of MACE driven by lower rate of repeated revascularization. Further studies are required to define the best PCI bifurcation technique for left main coronary artery disease.