

# Long-term outcomes of provisional strategy versus two-stent with culotte for non-left main bifurcation lesions: "less is more"?

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Complex percutaneous coronary intervention (PCI) for bifurcation lesions is frequently associated with an increased incidence of procedural complications, angiographic or clinical restenosis, and major adverse cardiovascular events<sup>1,2</sup>. Therefore, in contemporary PCI practice, bifurcation lesions still present a challenging scenario in PCI, with two primary interventional strategies commonly used: 1) a provisional stenting strategy, or 2) an upfront 2-stent strategy. Various stenting techniques for the treatment of bifurcation lesions have been proposed, and several randomised controlled trials (RCTs) have been conducted to evaluate these strategies. Most prior RCTs demonstrated that the provisional stenting technique (cross-over stenting in the main branch [MB] with optimal kissing balloon or additional stenting for side branches [SB]) was associated with better clinical outcomes as compared with the more complex 2-stent strategies<sup>1,3</sup>. Nevertheless, the optimal approach for bifurcation lesions, especially for true complex bifurcation or left main bifurcation lesions, remains a matter of debate. The EBC TWO Trial (European Bifurcation Coronary Trial Two-stent Versus One-stent Technique for Large Bifurcation Lesions) was designed to compare an upfront culotte technique versus

provisional stenting (with T-stenting in case of SB compromise) for true non-left main bifurcation disease<sup>4</sup>. At 1 year, the culotte technique was associated with an increased procedural time, X-ray dose, cost, and rate of periprocedural myocardial infarction (MI) without a significant difference in the primary composite endpoint of all-cause mortality, MI, or target vessel revascularisation. There are scant data regarding very long-term outcomes of bifurcation trials.

In this issue of EuroIntervention, Arunothayaraj et al<sup>5</sup> report the 5-year long-term follow-up data from the EBC TWO Trial. This trial targeted patients with true non-left main bifurcation disease, where all limbs of the bifurcation had a diameter  $\geq 2.5$  mm, and an SB ostial disease length  $\geq 5$  mm. Among 197 patients who completed the 5-year follow-up, SB stenting was performed in 16% of the provisional stenting cohort, final kissing balloon inflation was performed in approximately 95% of cases, and the procedural success rate was approximately 97%. At 5 years, the incidence of the primary composite outcome was numerically lower in the provisional group than in the upfront culotte group (18.4% vs 23.7%; hazard ratio 0.75, 95% confidence interval: 0.41-1.38). No significant differences were

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observed for the individual components of the primary outcome nor for the incidence of stent thrombosis (1.9% vs 3.1%). Interestingly, the length of SB disease (<10 or ≥10 mm) did not impact the primary findings. Despite inherent limitations, such as a limited number of patients, few major adverse events, and unrecorded use of imaging- or physiology-guided PCI, the long-term results of EBC TWO were concordant with the primary 1-year results, highlighting the lack of superiority of the culotte technique compared to provisional stenting for true non-left main bifurcation lesions.

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When considering the complexity of bifurcation lesions and the functional significance of coronary vessels, especially the SB, it is crucial to acknowledge the impact of various anatomical or clinical variables on the outcomes of bifurcation PCI. In the EBC TWO Trial, only 16% of patients in the provisional cohort underwent additional stenting of an SB, suggesting that the majority of upfront SB stenting was unnecessary. Moreover, it might be noteworthy that the overall findings were consistent regardless of SB severity or SB lesion length. These findings were inconsistent with those from a large-sized network meta-analysis, in which a clinical benefit of 2-stent techniques was observed over provisional stenting in bifurcations with an SB lesion length of more than 10 mm<sup>1</sup>.

In summary, in this 5-year follow-up of the EBC TWO Trial, the systematic 2-stent technique (culotte strategy) did not offer any long-term clinical benefit over the provisional strategy in true non-left main bifurcation lesions regardless of SB lesion length. Given that the labour-intensive, systematic 2-stent approach did not provide any additional clinical benefit over the simple provisional strategy for true non-left main bifurcation lesions during the long-term follow-up, such results could be interpreted to mean that

a "less is more" concept is reasonable for bifurcation PCI (i.e., the stepwise provisional approach should be considered preferable for the majority of true coronary bifurcation lesions).

## Conflict of interest statement

The authors have no conflicts of interest to declare.

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