



## Debate: Percutaneous revascularization strategies for distal left main coronary artery disease. The EBC MAIN approach



### *A debate: Estrategias de revascularización percutánea para la enfermedad del tronco común distal. Abordaje según el EBC MAIN*

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**QUESTION:** What aspects do you think might explain the significant differences reported between the results from the EBC MAIN (European bifurcation club left main coronary stent study),<sup>1</sup> and the DKCRUSH-V (Double kissing crush vs provisional stenting for left main distal bifurcation lesions) clinical trials?<sup>2</sup>

**ANSWER:** Both studies differ in several aspects we could categorized into 4: those that are operator-related; study design-related; patient and lesion-related, and those associated with the results from the provisional stenting technique.

The double kissing (DK) is a complex technique where most of the evidence available in the medical literature (including the DKCRUSH-V<sup>2</sup>) comes from the same group of expert operators who have been using such technique for years now.<sup>3,4</sup> However, the operators from the EBC MAIN<sup>1</sup> belong to the European Bifurcation Club that has spent years promoting and refining the provisional stenting technique.

Regarding the study design, the group of patients randomized to 2 different stents is also different from one trial to the other: in the DKCRUSH-V only patients treated with the DK crush technique were while in the EBC MAIN most patients were treated with the culotte technique or the T stenting technique. Another different aspect between both trials is the use of systematic angiographic assessments at 1-year in the DKCRUSH-V trial (66% of the patients). It is precisely at this point when event curves separate, and significant differences arise. This strategy can introduce a bias in the study in favor of the double stenting technique that has better angiographic appearance.

The type of patients included is also different and can condition the results. The SYNTAX score was different between both studies being more complex the lesions of the of all DKCRUSH-V trial (31% vs 23%). Also, the length of the lesion in the collateral branch (usually the left circumflex artery) turned out to be longer in the DKCRUSH-V trial: 16 mm vs 7 mm. Therefore, these bifurcations with very long lesions in the side branch penalize the provisional stenting group.

Another aspect that calls our attention in the group of patients randomized to the provisional stenting technique in the DKCRUSH-V trial are the poor results obtained in this group. These results compare to the experience of many other groups and the results obtained on the EBC MAIN trial. Therefore, the rate of stent thrombosis (acute/subacute) in this group is high (2.5%) compared to the 0.8% reported from the EBC MAIN provisional stenting technique group. Also, the crossover rate to 2 stents is the highest of all in the provisional stenting group of the DKCRUSH-V trial compared to the EBC MAIN (47% vs 22%). These differences could be associated with the type of complexity of bifurcation (more complex in the DKCRUSH-V study).

**Q.:** In the light of the evidence available and based on your own experience, when do you recommend provisional stenting and when an early double stenting technique to treat distal left main coronary artery stenoses?

**A.:** According to the DKCRUSH-V trial<sup>2</sup> and a meta-analysis recently published,<sup>3,4</sup> if the provisional stenting technique does not give good results in complex bifurcation the recommendation of using «complex techniques (2 elective stents) for complex bifurcations» can be accepted. The problem consists of identifying this type of unfavorable bifurcations for a simple strategy. The DEFINITION trial (Definitions and impact of complex bifurcation lesions on clinical outcomes after percutaneous coronary intervention using drug-eluting stents)<sup>5,6</sup> proposes a score based on 2 major criteria and 6 minor ones to distinguish simple from complex bifurcations. On the contrary, such meta-analysis<sup>3</sup> identifies patients eligible who would benefit from the DK-Crush technique much easier: patients with long lesions > 10 mm in the collateral branch.

I'm more inclined towards easy rules and I'd make a slight modification of the Medina classification<sup>7</sup> by adding, at the end, a letter based on the length of the collateral branch: S (short) < 10 mm, and L (long) > 10 mm. Therefore, we'd be recommending the provisional stenting strategy in the presence of these bifurcations:

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- 1, 1, 1, S
- 1, 0, 1, S
- 0, 1, 1, S
- 1, 1, 0
- 0, 1, 0
- 1, 0, 0

However, in the following types of bifurcation we'd rather use the double stenting technique:

- 1, 1, 1, L
- 1, 0, 1, L
- 0, 1, 1, L

Special situations like bifurcations with wiring of the collateral branch are difficult or restenosis of a simple technique can also be considered indications for the use of the elective double stenting technique in the bifurcation.

**Q.:** In how many angioplasties performed on the distal left main coronary artery is the double stenting technique often used?

**A.:** As a matter of fact, I think that we'd be under the numbers reported in the EBC MAIN trial (around 10%). For example, in our participation in the OPTIMAL trial of 21 patients included to this date with left main coronary artery disease, none of them was treated with the double stenting technique.

**Q.:** What is your favorite double stenting technique in the distal left main coronary artery and why?

**A.:** According to the data published in the medical literature available, I'd have to say the DK crush technique since it's the most favored of all in the comparative studies conducted.<sup>3</sup> However, such studies have the limitations already mentioned here.<sup>4</sup> In its latest consensus document, the European Bifurcation Club<sup>8</sup> recommends the provisional stenting technique when planning to use 1 single stent. Also, when the use of 2 stents can be anticipated before the procedure. In my opinion, the T stenting technique is the best one when the left main coronary artery/left circumflex artery has a configuration of 90° more or less. In such a way that the implantation of the second stent can be performed precisely into the ostium of the collateral branch by covering it completely without causing significant invasion of the carina. In case of a narrower angle, the DK-culotte technique would be the preferred one since it is impossible to make a perfect adjustment of the second stent without invading the main vessel or leaving a space without «stenting» the collateral branch. This technique can be used starting with the main vessel (provisional stenting philosophy) or the collateral branch (inverted culotte). The most practical thing to do would be to start with the diseased branch and then move on with a combo of POT (proximal optimization technique) plus double kissing balloon. This technique has been described recently,<sup>9</sup> and we don't have comparative studies against the DK crush technique. However, when refined<sup>8</sup> it achieves an excellent stent expansion and apposition across all the bifurcation segments, which should lead to clinical outcomes.

**Q.:** In your opinion, do you think that the use of intravascular imaging modalities to guide these procedures on the left main coronary artery is important?

**A.:** The use of intravascular imaging—mainly the intravascular ultrasound (IVUS)—in the percutaneous treatment of left main coronary artery has been a constant recommendation over the last few years.<sup>10,11</sup> However, this recommendation is only based on the opinion of experts and observational studies. Therefore, in the latest European guidelines<sup>12</sup> the recommendation of using IVUS in the percutaneous management of the left main coronary artery is weak (only IIa B). To achieve recommendation I, a randomized clinical trial would be needed to confirm that there are fewer clinical events. That is the objective of the OPTIMAL trial we are involved with right now. Although a study of this magnitude could change the clinical guidelines, the recruitment of patients is sometimes difficult to see because of our conviction that IVUS is necessary to perform stenting properly, and operators don't want to leave randomized patients away from the benefits the technique has to offer. By describing this problem we face on a daily basis at the cath lab I think I have already answered to this question.

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## CONFLICTS OF INTEREST

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