

Intravascular imaging and drug-coated balloons for unprotected left main percutaneous coronary interventions: Questions with a predictable or unpredictable answer? Author's reply

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We thank the authors [1, 2] for their interest in our publication [3], and we acknowledge their comments regarding the role of intravascular ultrasound (IVUS) and drug-coated balloons (DCB) in the left main bifurcation (LMB) treatment.

In our article, we cited IVUS and DCB as technologies with the potential to improve the outcomes of percutaneous coronary interventions (PCI) in LMB patients. We now take the opportunity to provide some more detailed comments on these important options.

So far, there has been no single strategy available and recommended for treating all types of distal LMB lesions. The decision to use one stent strategy, in preference to another, is mainly based on the distribution of the disease, as well as on the presence and the distribution of calcium and unfavorable bifurcation angles. IVUS is a valuable tool to assess LM disease significance, guide appropriate PCI techniques, and optimize outcomes. Although using IVUS is strongly associated with improved PCI outcomes and is currently highlighted as a class IIa recommendation [4], its use is still not widespread. According to the largest real-world outcome analysis from the British Cardiovascular Intervention Society database including 11 264 patients with unprotected LM, intracoronary imaging guidance significantly increased from 30% in 2007 to 50% in 2014 [5]. Such figures are still far from those collected in countries where

full reimbursement is available, like Japan (intravascular imaging is adopted in >85% of all PCI procedures). Thus, the variability in imaging use is probably influenced by economics. To change this status, large clinical trials assessing the true clinical impact of systematic intravascular imaging studies are awaited. Notably, not only IVUS but also optical coherence tomography can be considered, and one large trial [6] has been designed to include complex LMB bifurcations as targets. The results of this kind of trials are also expected to clarify which optimization protocols are effective beyond any doubt in achieving better LMB PCI outcomes when using intravascular imaging.

While waiting for solid clinical data and the consequent economic adjustment, intravascular imaging use is reasonably regarded as a piece of "must-have" equipment in a catheterization laboratory performing PCI on LMB. For instance, if not adopted since PCI start, intravascular imaging should be applied at any time during LMB PCI when a lack of optimal result achievement is suspected [7].

Moving from procedure planning/optimization to PCI device selections, DCBs are regarded as promising adjunctive devices to manage specific LMB anatomic subsets. Based on the results of the previous IVUS studies, we are aware that both isolated distal left main (LM) and isolated side branch (SB) disease are rarely seen [8]. Although considered

a “non-true” LMB, and apparently “simpler” to treat, ostial left anterior descending (LAD) or left circumflex (LCX) disease is one of the most challenging issues in LMB PCI. Current evidence supports either cross-over stenting or precise ostial stenting, depending on the bifurcation angle and discrepancy between main and side branch sizes. Although there are different techniques to facilitate precise ostial stenting, struts hanging in front of the SB ostium (at the polygon of confluence) are frequently seen, as well as carina shifting, influencing adverse events, mainly restenosis. Consequently, cross-over stenting is the treatment of choice, followed by kissing balloon inflation (KBI) for carina recentering (to avoid carina shifting). Whether DCBs may have a part in the ostial lesion treatment is still disputable. A recent small, prospective, and non-randomized study showed that DCB can be a valuable option to treat de novo Medina 0.1.0 and 0.0.1 lesions with the optical coherence tomography guidance [9]. For sure, we should be aware of possible early vessel recoil, complications including flow-limiting dissections, carina shifting if balloons are oversized, and more importantly, we should be ready for a bailout stenting strategy. These aspects are particularly relevant when dealing with isolated ostial LAD, where, due to the substantial amount of jeopardized myocardium, ostial LAD should be treated according to the current recommendation, by DES. For instance, a possible role for DCB is its combination with DES. A recent experience on combining DES for the MB with DCB for the SB in true LMB was reported to be associated with promising 1-year freedom from major adverse cardiac events [10].

In summary, clinical evidence supporting DCB use in LMB is not sufficient to give final recommendations.

As a final remark, we would like to add that no single technical improvement is expected to solve the dilemma of the best treatment for more complex patients with LMB. By itself, the simple SYNTAX score cannot be regarded as the only way to define LMB PCI complexity and risk. Accordingly, a comprehensive multidisciplinary team approach should be adopted to offer individual patients the best decision regarding the modality (surgical or percutaneous) and the planning (support and PCI adjunctive devices) of myocardial revascularization.

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