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Editorial

Make Perfection More Perfect

Coronary artery bypass graft (CABG) is the standard of care for unprotected left main coronary artery disease (ULMCAD) [1], largely because repeat revascularization is required after implantation of a drug-eluting stent (DES) [2,3]. Recently, double kissing(DK) crush stenting has been reported to be associated with a lower rate of clinical events than have either culotte [4] or provisional stenting [5] for patients with ULMCAD with Medina 1,1,1 or 0, 1, 1 true bifurcation lesions. Furthermore, the DKCRUSH-V study [5] provided the trend that provisional stenting is effective for simple bifurcation lesions (~70% of entire bifurcations). However, several key issues in provisional side branch (SB) stenting remain to be understudied.

Technically, provisional stenting needs another jailed wire in the SB before stenting the main vessel (MV). Carina shift is the major mechanism correlating with SB comprise. As a result, ballooning the SB is recommended over open ostial SB. Unfortunately, SB angioplasty will certainly induce distortion of the MV stent, for which kissing balloon inflation (KBI) is critical to repair the distorted stent. On the other hand, the diameter of the MV stent is usually adjusted according to the diameter of the distal MV and, therefore, is undersized for the proximal MV. Accordingly, proximal optimization technique (POT) is the preferred strategy to achieve good apposition of MV stent struts [6]. In addition, POT expands the stent cells overlying the SB ostium. Finally, KBI commonly leads to the proximal edge of the MV stent becoming an oval pattern and malapposed, for these, POT is still mandatory to make the MV stent edge perfect. Obviously, there will be multiple choices of sequences using POT with KBI and SB ballooning [7]. Compared to KBI alone, the POT – SB ballooning – re-POT strategy reduced the proximal overexpression and significantly reduced global strut malapposition, particularly with the tremendous reduction of the SB ostium stent-strut obstruction [7]. What should be kept in mind is that there is a lack of clinical data to confirm the advantages of POT. Most importantly, the NORDIC III trial denied the routine use of KBI without POT after stenting MV [8]. In that study, cardiac mortality was significantly higher in the routine KBI group (4.2 % versus 0.8 %, p=0.02), which addresses the importance of POT to facilitate re-wiring the SB through the true lumen of the MV stent. Clearly, the POT-KBI-re-POT strategy has been extensively accepted by most interventional cardiologists, with another remaining question that the POT-KBI strategy has not been fully studied.

In the current issue of *Cardiovascular Revascularization Medicine*, Dr. Gianluca Rigatelli and colleagues [9] reported the impact of different final optimization techniques on long-term clinical outcomes in 128 patients who had an isolated distal left main bifurcation lesion treated by cross-over stenting from two centers. The authors concluded that POT resulted in a slightly better survival rate than did POT-side-POT or KBI, in consistent with previous reports [5,7]. However, readers should be very cautious when translate this study into clinical relevance. First, the observational nature of this study, along with small sample size, is the key limitation. Second, indications for SB inflation or KBI were not clearly provided. In the DKCRUSH V study [5], the residual diameter stenosis of the SB >75%, dissection ≥type B, or TIMI flow <3, was the major criterion for ballooning SB. The others had different criteria [7]. Third, the influence of bifurcation angle on the use of KBI or SB ballooning has not yet been consistently defined. Even so, severe carina shift has been reported in Y Type bifurcation lesions compared to T Type bifurcations. As a result, SB ballooning or KBI is commonly used after provisional stenting for bifurcation lesions after stenting the MV. Fourth, the authors from the current study wrote that classical KBI was defined as kissing inflation (sequential inflation was not mentioned) followed by deflation started from SB (here, it is left circumflex). KBI has different mechanisms for rebuild carina after two-stent and provisional stenting. In the latter, a stent in the MV results in severe carina shift, which subsequently leads to narrowing SB ostium. Accordingly, KBI with sequential inflation (starting from the SB) and simultaneous deflation plays a crucial role in re-modeling a “normal” carina [5,7,8]. Fifth, POT-KBI or POT-KBI-re-POT was not studied in this study, maybe because of the small number of patients. However, the fact that not even one case for which POT-KBI-POT was performed in this analysis reflects the inconsistency of procedural protocol. Finally, peri-procedural myocardial infarction (PMI) also was not clearly introduced. From the DKCRUSH-V study, PMI was more often reported in ULMCAD patients who underwent provisional stenting with SB inflation, supported by another study [8].

Acknowledging the contributions by Dr. Rigatelli et al, this analysis further underscores the urgent need of a randomized clinical trial to compare the difference in outcome between provisional stenting with and without KBI after POT for patients with ULMCAD. Notably, DEFINITION has introduced new criteria to differentiate simple from complex bifurcation lesions [10]. The impact of POT with or without KBI on clinical outcomes for complex bifurcation lesions remains to be the topic of next trial.

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Shao-Liang Chen
Nanjing First Hospital, Nanjing Medical University, Nanjing, China