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Editorial

Optimization of proximal optimizing technique and re-proximal optimizing technique: Let us re-heat the POT!

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Some of the unresolved problems concerning percutaneous coronary intervention (PCI) are related to coronary bifurcation lesions involving the left main distal bifurcation lesion. An issue with bifurcation lesions is that the vessel diameter, bifurcation angles, and locations of stenotic lesions are varied. Single-stent implantation is better than two-stent implantation. Rewiring through the distal side of the jailed side branch (SB) ostium followed by SB dilation is better than proximal-sided rewiring, and the proximal optimizing technique (POT) and the re-POT are effective [1,2].

Usually, in coronary bifurcation stenting, a stent diameter corresponding to the vessel diameter at the distal main vessel is selected and deployed as crossover to the SB. Stent expansion at the proximal main vessel is insufficient, and the POT is a technique to sufficiently expand the stent at the proximal main vessel with a balloon in accordance with the diameter of the proximal main vessel. The POT decreases SB obstruction, and facilitates the re-cross of wires and balloons to the SB as well as the stent apposition at the proximal main vessel [1]. In some cases, jailed struts on the SB ostium may disappear only via the POT and the SB inflation may not be necessary. Even if the main vessel stent is deformed by expanding the SB ostium, the subsequent POT (re-POT) will improve stent deformation at the proximal main vessel [1,2].

Bifurcation PCI is often studied using the bench test. The stent is deployed and evaluated in an artificial bifurcated tube. Although the use of a fractal model is usually recommended in bench studies of bifurcation lesions, there are some cases where the morphology of bifurcations may be not fractal because of the presence of coronary plaque in actual clinical practice [3]. The prognosis, intimal coverage, and thrombus formation cannot be evaluated, but the degree of the stent dilation, stent deformation, and stent apposition are evaluated. It is difficult to evaluate the clinical prognosis of the bifurcation PCI because of their variety, and the parameters which are the same as those of the bench test are often evaluated in clinical studies [4,5].

It goes without saying that POT and re-POT are effective [1,2,4], but there are some issues related to their clinical application. One is the position of the POT balloon. In clinical practice, the position of the POT balloon is adjusted under fluoroscopic imaging guidance. The RePOT study [4] demonstrated that good control of the balloon position is possible, but the viewing angle is not always optimal. It is reported that the optimal viewing angles can only be obtained in half of the cases [6]. It is difficult to get the viewing angle facing vertically to the bifurcation by the fluoroscopic image guide in a clinical case and, therefore, shoulder positioning cannot be adjusted in millimeters. The distal shoulder of the POT balloon should be positioned just at the carina cut plane. If the angle observed perpendicular to the SB cannot be obtained, the error in the position of the balloon may increase. As observed by Dérimay, proximal-sided positioning fails to improve the SB obstruction and distal-sided positioning over-dilates the distal main vessel ostium. Intravascular ultrasound marking or optical coherence tomography (OCT) co-registration may be useful in guiding the balloon into position [7]; however, as a result, the optimal viewing angle is required. In daily practice, we sometimes experience the gap in positioning.

The second problem is the types of balloons. The balloon expands in parallel between the radiopaque markers and also dilates the vessel a little via the outside of the balloon shoulders. Using the balloon whose shoulder is out of position with the radiopaque marker, the shoulder of the balloon is difficult to fit to the carina. Using balloons with lengthy outside of the shoulder, to fit the marker to the carina may cause unwanted dilation. A balloon with shorter outside of the shoulder may be better. The post-dilation usually involves high pressure dilation with a non-compliant balloon adapted to the vessel diameter. Many countries have a limited number of balloons that can be used in one PCI case. Which is more practical—high-pressure expansion with non-compliant balloon or over-expansion with semi-compliant balloon? In addition, some balloons have a longitudinal elongation during dilation. Even if SB inflation is performed, the re-POT may increase the jailed strut at the SB ostium [3]. The effects of the POT and the re-POT may or may not differ depending on the type of stents [3,8].

Abbreviations: OCT, optical coherence tomography; PCI, percutaneous coronary intervention; POT, proximal optimizing technique; SB, side branch.

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Furthermore, with regard to the dilation of the jailed SB ostium, according to the reports using three-dimensional OCT [9,10], there are some cases wherein distal rewiring is not suitable in consideration of stent apposition at the main vessel. In those cases, it may be necessary to examine the relationship between the SB dilation method and the re-POT.

Coronary bifurcation PCI involves several factors and is still challenging, and the POT is one those pieces/factors. To extend discussions for better outcome of the bifurcation PCI, let us re-heat the POT!

Declaration of Competing Interest

The author declares no conflict of interest.

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