

Commentary: Dissection still a sticking point in the widespread use of DCB in PCI

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Key Points

- Dissection is judged as a major hurdle for a more widespread use of DCB
- Vessel stretching by either overdilatation or by straightening of very tortuous vessel segments are the predominant avoidable or modifiable risk factors for major dissection during predilatation or during DCB application.
- While aggressive (pre-)dilatation reduces the risk of elastic recoil, it increases the number of severe dissections. The known effects of positive vessel remodeling (1,2) might allow a more gentle angioplasty with residual stenosis of up to 30 % after DCB application without negative effects on long term results (3).

Coronary balloon angioplasty has developed stepwise since its introduction by Andreas Grüntzig in 1977. While initially quite successful, it soon turned out that two mechanisms compromised short- and long-term results. In the periinterventional time frame, the occurrence of major and flow-limiting dissections was a hurdle to this therapy, while in later follow-up, restenosis predominantly by vessel shrinkage and neointimal hyperplasia caused a reduction in success rate. While stenting was extremely helpful in severe dissections and drug-eluting stents prevented largely neointimal hyperplasia, stenting introduced new unfavorable disease modifications, namely late stent thrombosis and neoatherosclerosis, induced predominantly by foreign body reactions. Therefore the introduction of drug-coated balloons—with the concept of leaving nothing behind—achieving a

similar low restenosis rate as DES¹ was welcome to be a further step in the development of PCI to overcome late adverse events.² However, currently, dissection is still a sticking point why DCB PCI is not used in the majority of cases.

The paper by Ghetti et al. provides interesting insights from a single high-volume center into bailout stenting (BOS) after drug-coated balloon application. In contrary to the large BASKET SMALL Study¹ (5%), the rate of BOS was high (13.9%) in 168 patients with 216 stenoses. The main finding was that oversized DCB was the only modifiable risk factor for BOS, while parameters like vessel tortuosity, distal vessel, and complex lesions were regarded as not modifiable risk factors for BOS. Interestingly dissection was the predominant BOS indication, while recoil was the reason for BOS in only 2 of 30 cases, which is not the experience in other centers. The average drug-coated balloon-to-reference vessel diameter (DCB/RVD) ratio as high as 1.15 ± 0.10 and it was above 1.0 in almost all patients who experienced a type C lesion. Thus the predilatation or DCB application strategy was quite aggressive. Furthermore, in general, a clear definition on when a bailout stent has to be applied is missing, though consensus recommendations³ proposes—on an expert opinion basis and backed up by observational data—to stent in flow limiting (or AHA type C) dissection, in residual diameter stenosis >30% and in compromised TIMI flow rate, as was done in Ghetti's study.

The main conclusion of the authors is to recommend QCA before using the DCB. While QCA or IVUS/OCT might improve the predilatation process and the choice of the right drug balloon size, judicious predilatation regarding balloon to vessel ratio, speed of pressure rise, and peak pressure of predilatation in the hands of experienced interventionalists are further aspects that have to be relearned after a long period of stenting of almost all lesions. While

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aggressive (pre-)dilatation reduces the risk of elastic recoil, it increases the number of severe dissections. The known effects of positive vessel remodeling^{4,5} might allow a more gentle angioplasty with residual stenosis of up to 30% after DCB application without negative effects on long term results.¹ Further research work on how to optimally predilate, how to apply drug-coated balloons and how to deal with dissections of various types in DCB angioplasty is needed to allow more patients to be treated without metallic implants.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

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