

## Why a EuroIntervention supplement on bifurcation stenting?

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### Where we began

The first attempts to dilate a coronary bifurcation stenosis were carried out in the 1980s, with kissing balloon techniques being performed via two separate guiding catheters! This technique was associated with a poor outcome as well as high complication and restenosis rates.

A broad variety of bifurcation stenting techniques were described in the 90s during the bare metal stent (BMS) era, one of the initial strategies being the placement of the famous PS 153 Cordis stent bridge in front of a side branch. Most of these techniques originated in the creative mind of Antonio Colombo in an attempt to adapt the treatment strategies to the various types of coronary anatomy. Although the use of stents increased the safety of these techniques, high restenosis and re-intervention rates were still reported. Despite the absence of randomised trials, the first clinical and bench studies on stent deployment led to the idea of using a single stent to treat a coronary bifurcation whenever possible.

Since 2000, the use of drug-eluting stents (DES) has considerably decreased the risk of restenosis and re-intervention after bifurcation stenting, but this at the price of a potential higher risk of stent thrombosis as in non-bifurcated lesions. The improvement in outcome prompted the development of many new techniques which were designed to address the problem of side branch restenosis by achieving enhanced coverage of the whole bifurcation.

### The origins of the “Club”

The purpose of the European Bifurcation Club, created in 2004, was to propose a new vocabulary and tools for the treatment of this lesion, including revised definitions, further classification of bifurcation lesions by Medina, a compendium of descriptions, denominations and classification of stenting techniques, and also dedicated QCA software, etc. This is all done in order to improve analysis, not only of clinical and angiographic data from well

described registries and randomised controlled trials, but also to better understand the information generated by fundamental research on coronary tree anatomy, flow dynamics, atheroma promotion and distribution, as well as bench testing and simulation including the many new imaging techniques. One of the major objectives of the Club was to assist the interventional cardiology community in optimally implementing all available techniques.

### Synthesis of currently available data

The enormous amount of scientific, clinical and technical data currently available have been synthesised in this special supplement of EuroIntervention. In the issue, you will find many articles written by specialists from all over the world, divided into three sections.

The first six articles are dedicated to basic knowledge concerning the anatomy and function of coronary trees, branching laws of coronary arteries, the relationship between anatomy, flow, atheroma and restenosis in theoretical models as well as autopsy series. The last article in this section by Alexandra Lansky is very special, and it is uncommon for an article of this specific nature to be published for the first time in a supplement of EuroIntervention. And yet, this rare article, illuminating the various relationships between side branch occlusion and elevation of biomarkers after stenting, clearly finds its place here. Despite the fact that it is not showing a clear relation between occluded side branch diameter and the amount of elevated biomarkers, we chose to place this paper here to illustrate the continuing research – a quest for a definition of a bifurcation lesion as a lesion involving a side branch that we do not, and cannot, afford to lose (fundamentally there is a linear relation between the diameter of a branch and myocardial mass perfused). The second section deals with various aspects of bifurcation stenting from bench stenting and realistic stenting simulation, to the consensus on the provisional SB stenting strategy as the gold standard for bifurcation stenting in the majority of cases, the tips and tricks for this strategy, but also for the preservation of SB

patency and complex techniques. In this section you will find a description of the specific features of several new imaging and evaluation techniques which were developed to allow an objective assessment of the outcome of different bifurcation treatments. The last two articles are dedicated to left main trunk bifurcations which, though not fundamentally different from other types of bifurcations, are characterised by the presence of a different pattern of atheroma, different angles, bigger diameters, a larger volume of myocardium at risk and, subsequently, increased risks for patients treated with PCI and surgery. In addition, left main bifurcation lesions require better assessment, specific procedures and devices as well as improved guidance.

The third section provides a description of all available dedicated techniques and devices to treat bifurcation lesions. The underlying principles are also described, the available clinical data are reported, and, in many instances, the personal opinion of a well known operator familiar with the device or technique is proposed.

## **Today and tomorrow**

We hope that over the next few years, this special issue will act as a reference publication in the treatment of coronary artery bifurcation lesions, providing you with the insights, the advice and a certain clarity in providing better, quicker and safer treatments for your patients presenting with a bifurcation lesion.

We cannot thank enough the authors who contributed to this supplement and made all this possible. Faced, as we all are, with ever increasing workloads, they took the time from their busy schedules to offer us their best under the constraint of a very tight planning. The quality of this publication is found in these contributions, all accomplished in a spirit of cooperation to not only spur on the evolution of our practice and techniques, but also to stimulate your own interest in this field in order that –in the future– you as well can propose ever more elegant, practical and superior solutions to these complex problems facing our patients today.