

QCA editorial

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In the current special edition of The International Journal of Cardiovascular Imaging, experts in the field describe the current state-of-the-art in quantitative coronary angiography (QCA). Overall, QCA remains the gold standard methodology for evaluation of coronary lesions [1]. Besides the great evolvement of QCA packages in order to simplify and facilitate its use in daily clinical practice and core laboratory work, its applicability has advanced into more complex subsets including multivessel (and “multicomplex”) disease and bifurcation lesions [2, 3]. In an era of complex percutaneous coronary intervention (PCI), the introduction and clinical validation of angiographic scores fully assessing coronary artery disease extent/complexity represent a significant contribution that helps PCI set its frontiers on a constantly developing field [4, 5]. This subject along with novel QCA methods are elegantly reviewed by Ng et al. in the manuscript entitled: “Novel QCA Methodologies and Angiographic Scores”.

Furthermore, since a number of years, bifurcation stenting has become of great interest, currently representing around 15–20% of all PCI performed worldwide [6]. Several technical approaches including the use of dedicated devices have been proposed recently; however, outcomes may turn suboptimal, especially in those lesions with complex anatomic features [7, 8]. Thus, a proper (and detailed) qualitative and quantitative assessment appears to be critical for interventionalists when planning bifurcation PCI strategy in order to achieve a successful procedure [9]. In association with the European Bifurcation Club (EBC), the QCA software has been extended to allow also the quantitative analysis of the bifurcating morphology [3, 10]. This has proven to be a lot more difficult, in particular in defining what the normal sizes of the vessels at the bifurcation should be, given the complexity of the anatomy and different disease patterns. Validated solutions have been created and are now being used in clinical trials [5, 11, 12]. The basis, developments and implications of “Dedicated Bifurcation QCA Analysis” are reported in a set of manuscripts including: “Basic Principles” by Tuinenburg et al., “Quantitative coronary analysis in the Nordic Bifurcation Studies” by Maeng et al., and “Dedicated Bifurcation Devices” by Collet et al.; also, some insights from intravascular ultrasound (IVUS) studies are depicted in the analysis: “Bifurcation Lesion Morphology and IVUS Assessment”.

Lastly, 3-dimensional (3D) QCA has been around for quite some time from one or two vendors, but it

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has never been applied on a wide scale in online situations for a number of reasons: segmentation not robust enough, too many user-interactions required, and no clinical need. However, with the increasing applications of bifurcation stenting, there may be new opportunities, in combination with improved segmentation approaches. In particular, proper sizing of the length of the interventional devices has a significant effect on the long-term effect of the intervention [13], optimal viewing angles are more important in bifurcation stenting, and last but not least, latest developments also allow for the registration with intravascular devices, such as IVUS and optical coherence tomography (OCT). This registration links the abnormalities as seen in the IVUS or OCT pullback sequences with the positions in either the 2D X-ray angiogram, or the 3D reconstruction. This software solution, which is now very robust and can be used on-line, provides accurate information, such that the interventionalist does not need to rely on his mental registration capabilities alone anymore [14]. In this issue, such feature is reported by Tu et al. in the manuscript: “Fusion of 3-D QCA and IVUS/OCT”.

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