CABG and PCI—just as we said it!

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Let me preempt any presumption of the reader of my being a surgical hawk—I am not decrying percutaneous coronary interventions (PCI), but to the very contrary, I acknowledge, loud and clear, that PCI is one of the greatest boons to the society—albeit with a caveat. Just akin to salt in food, in right amounts—an elixir, but a little more or less and it messes up the taste—PCI too has its rightful place in the armamentarium for coronary artery disease (CAD), but only when optimally used. Cardiac surgeons have never challenged PCI, but have been bemoaning the fact that PCI has been overused over the last decade or so. That “intuitive wisdom” is now being given the wind of “evidence” as acknowledged by the recent European Society of Cardiology (ESC)/European Association of Cardiothoracic Surgeons (EACTS) guidelines released during the recent meeting in Munich in August 2018 [1]. That clinical profile matters has been acknowledged by the Clinical / Functional SYNERgy between PCI with TAXus and Cardiac Surgery (SYNTAX) Score, which was shown to be superior in risk prediction than the anatomical SYNTAX Score. But now, even in anatomical SYNTAX scores less than 23, in patients with diabetes, coronary artery bypass graft (CABG) surgery has been shown to have superior outcomes to PCI. Left ventricular (LV) dysfunction and heart failure are other major clinical phenotypes with surgical superiority [1]. Further recent guidelines prioritize completeness of revascularization as the “raison d’être” of the decision making process and that surgery provides more complete revascularization than PCI is a “given.” So moving forwards, with better understanding of the indications and outcomes of the two major modalities of treatment of CAD, viz PCI and CABG, without giving a short shrift to the third modality—the medical treatment—which in fact may supersede the other two, especially in stable CAD, CABG is likely to re-discover itself.

The recent publication of the SYNTAX II [2] and the SYNTAX III Revolution [3] trials too serves the surgical community well, as the gatekeeper role seems to be slipping out of the cardiologist’s domain into the radiologist’s. Time is not far, when the latter would sit on jury, as a neutral ombudsman, adjudicating on the optimum mode of treatment in an index case. This chutzpah emanates from the ever refining accuracy of the coronary computed tomography (CT) angiography—bordering, but not yet quite, challenging cine angiography. The evidence generated by the Fractional Flow Reserve Versus Angiography for Multivessel Evaluation (FAME) and the FAME 2 studies on physiological assessment of coronary stenosis has been given further impetus and a thumbs up by the SYNTAX III Trial, which clearly showed that the outcomes were better with Fractional Flow Reserve Computed Tomography (FFR CT)-based PCI over classical cine angiography-based myocardial revascularization [3]. SYNTAX 3 Revolution Study thus provides evidence base and a window of opportunity for incorporating the radiologist in the Heart-Team. The surgeon may thus serendipitously find an ally in the Heart-Team.

The concept of physiological guidance to myocardial revascularization is now extended to CABG too and has been validated with a lower rate of all-cause mortality or myocardial infarction (16% vs 25%, $p = 0.02$) [4]. The results of the ongoing Graft patency after FFR-guided Versus Angio-guided CABG (GRAFFITI) trial too are keenly awaited and are likely to add weightage to this recommendation. To make it more user friendly, hyperemia-based FFR is being supplanted by instantaneous wave-free ratio, calculated without the use of adenosine to achieve maximum hyperemia and which has been demonstrated to be non-inferior to FFR in at least two major trials—the SWEEDHEART [5] and the DEFINE-FLAIR [6].

The SYNTAX II Trial has shown that PCI has improved outcomes over the previous version PCI used in the SYNTAX I Trial [2]. However, it falters in comparing the newer PCI techniques with archaic CABG of the SYNTAX I Trial. CABG too has marched pari-passu with PCI with advances in techniques and technologies. Our soon to be released special issue on “Surgical Myocardial Revascularization” sits in

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testimony of the improved outcomes with these new techniques. Therefore, a valid trial will be one which compares apples to apples and not peaches—And even there, not the “Red Williams” to the “Granny Smiths!”

The main take away from the SYNTAX II Trial to me is that the anatomy has to be paired with the clinical profile, which the 2018 European Guidelines too emphasize, but more often than not ignored in the real-world practice. The *Arjuna* in our cardiology colleagues focuses entirely on the anatomy, ignoring the comorbidities, and oblivious to the final results of being peril to the patients. The Heart-Team thus needs to have an integrated approach to selecting the patients, using not the anatomical SYNTAX Score I, but correcting it based on the physiological assessment of the stenosis (SYNTAX Score II or functional SYNTAX Score) and then, further complementing it with the clinical profile, including comorbidities, to a further refined score called the SYNTAX Score III, to be better informed of the valid choices for an index patient [7]. It may even warm the cockles of a cardiac surgeon that Modolo et al. [7] explore the feasibility of planning CABG relying only on coronary CT angiography.

However, all this discussion and debate would get “put-paid” to, if some form of polygenic risk score predicting outcomes of PCI/CABG could be formulated, as crystal-gazed by Hui and Ruel et al. [8]. A “platonic” landscape for management of CAD shall then emerge.

Hopefully, exciting times ahead!

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