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EDITORIAL

Does prior percutaneous coronary intervention influence the outcome of coronary artery bypass grafting? One size does not fit all

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Article Bugajski et al., see p. 953

Percutaneous coronary intervention (PCI) is often used as first-line therapy for coronary artery disease (CAD) when coronary anatomy is suitable due to non-extensive disease, while coronary artery bypass grafting (CABG) is the mainstay of revascularisation therapy for patients with more advanced multivessel and left main diseases [1, 2]. However, recent trials demonstrated a favourable outcome of PCI performed with newer-generation drug-eluting stents (DESs) also in more complex CAD (including left main disease) [3]. As a consequence, the number and the complexity of patients treated with PCI is constantly growing, while the number of CABG procedures is progressively declining [4, 5].

Nevertheless, patients undergoing PCI may still experience, early or late after revascularisation, the occurrence of adverse events related to stent implantation (namely in-stent restenosis or stent thrombosis) or progression of CAD in non-stented segments, thus requiring further revascularisation procedures. In this context, several retrospective studies performed in the pre-DES era demonstrated that prior PCI affected the clinical outcome of subsequent CABG. In particular, a large report from two Canadian centres comparing outcomes in 6032 patients undergoing CABG between 1996 and 2000 showed that patients with prior PCI had greater in-hospital mortality (odds ratio 1.93, p = 0.003), despite fewer morbidities [6]. Another single-centre report demonstrated a higher risk of in-hospital mortality after CABG in patients with prior PCI, and a subgroup analysis showed that this risk was particularly high in diabetic patients [7]. Finally, a post hoc analysis of the Ischaemia Management with Accupril post-bypass Graft via Inhibition of the coNverting Enzyme (IMAGINE) study found that in patients with left ventricular ejection fraction (LVEF) > 40% and a history of PCI before surgery there was a worse outcome post-CABG than in those with no prior PCI [8]. However, more recent retrospective studies failed to demonstrate that prior PCI represents a risk factor for short- or mid-term mortality after CABG [9]. Thus, whether prior PCI is really associated with a worse clinical outcome after CABG is still a matter of debate.

In this issue of the journal, Bugajski et al. [10] assessed the influence of previous PCI on CABG outcome. They prospectively enrolled 211 consecutive patients undergoing CABG. Patients with a history of previous PCI (n = 99) were compared with patients without previous PCI (n = 112) in terms of operative data (cardiopulmonary bypass [CPB] time and cross-clamp time [CCT]) and in terms of in-hospital and one-year mortality. Patients in the previous PCI group had a worse angina status at baseline and were more symptomatic for dyspnoea, despite similar LVEF. Of interest, the authors found that patients with previous PCI had longer CPB and CCT (also adjusted for the number of implanted grafts) compared with patients without previous PCI. However, a more complex surgical revascularisation did not translate to a worse periprocedural clinical outcome because in-hospital mortality and morbidity were similar. On the other hand, mortality at a median follow-up of 12 months was higher in the group of patients with previous PCI, despite similar graft patency. Unfortunately, the authors did not report the cause of death of these patients, so we can speculate that probably the deaths were not related to late adverse events following surgical procedure. It is well-known that patients requiring CABG after previous PCI procedures are often more complex patients with more advanced CAD, and usually not suitable for further PCI attempts [11]. This is also reflected by the higher number of implanted grafts in the previous PCI group. In accordance, patients with previous PCI had a worse angina status at baseline. Moreover, patients with previous PCI had a higher New

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York Heart Association class at baseline, despite similar LVEF, probably related to higher incidence of diastolic dysfunction or other respiratory conditions.

Unfortunately, the authors did not report the percentage of patients treated with DES nor the number of patients who had previous multivessel PCI or long-stented lesions (the so-called "full-metal jacket"). Further studies are needed to identify procedural characteristics of previous PCI that may portend a higher risk for long-lasting and complex CABG procedures and a worse clinical outcome at follow-up. Indeed, long-stented lesions (especially in the left descending coronary artery), making CABG either impossible or suboptimal due to the necessity of placing the graft so distally in a vessel, may deny the benefit deriving from surgical revascularisation. Moreover, it is well-known that DES may induce endothelial dysfunction [12, 13]. However, whether previous PCI with DES is related to an increased risk of graft failure is unknown.

Finally, despite recent concerns about bioresorbable vascular scaffolds (BVS) [14], it is unknown if PCI with BVS may portend some benefit in terms of less complex surgical CABG procedures.

In conclusion, the authors should be congratulated for their study. However, as characteristics of patients with a previous history of PCI are completely different also according to the type of index PCI procedure, it is evident that when we talk about patients with prior PCI, "one size does not fit all." Thus, further studies are needed to clarify if there are specific clinical and procedural characteristics eventually associated with a worse clinical outcome after CABG.

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