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The trade-off of a long drug-eluting stent

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The definition of what constitutes a long stent has been a matter of discussion. A length more than 20 mm in the SYNTAX score was considered to be a significant predictor of adverse events[1]. This empiric cut-off was then redefined as 30 mm in several registries and contemporary trials and appeared to have a better correlation with outcomes[2-4]. In this issue of EuroIntervention, Kong et al, in a large Korean registry, have surmised that stents longer than 40 mm are associated with less favourable outcomes as compared to shorter ones[5].

Article, see page 1318

Notably, all three lengths have been studied in drug-eluting stents (DES). Nevertheless, whatever definition of the cut-off value is used in different studies, longer stent length has consistently been associated with poorer outcomes.

Complex coronary lesions requiring long stents are associated with diffuse atherosclerotic burden and activated smooth muscle cells[6]. These in turn prove instrumental in provoking an exaggerated neointimal proliferative response to coronary interventions. Restenosis rates up to 58% have been reported after balloon angioplasty on long lesions and bare metal stents (BMS) did not significantly change this[7]. DES came on the scene as a solution for the treatment of such lesions. Though associated with lower restenosis rates than BMS, the problem of stent thrombosis (ST) became an issue especially with the first-generation DES. In a pooled analysis including 10 randomised studies, Moreno et al[8] reported that, in patients with DES, the mean stented length was longer in those suffering ST (23.4±8.1 mm vs 21.3±4.1 mm, p=0.025). The second-generation DES boasted thinner metal struts and biocompatible durable polymers which translated into better clinical results. Choi et al[3] reported that stent lengths greater than 32 mm were associated with poor clinical outcomes in patients with first-generation DES but not in those with second-generation DES. Bouras et al[9] also reported favourable outcomes at one year with everolimus-eluting stents in very long lesions (>35 mm) versus long lesions (>25 and <35 mm). Honda et al[10] compared target lesion revascularisation (TLR) and ST rates in patients receiving ultra-long (UL) DES (>50 mm), long (20-50 mm) and short DES (<20 mm). TLR rates were significantly higher in the UL-DES group relative to other groups during follow-up (p<0.001).

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The authors have reported the clinical outcomes of long DES based upon the patient-level pooled analysis of 9,217 patients from the GRAND-DES registry[5]. The incidence of target lesion failure (TLF) was much higher in the long stent (≥40 mm) than in the shorter stent group, both during the first 30 days and beyond (TLF 8.1% vs 4.5%, log-rank p-value=0.010). The rates of ST were higher in the long stent group in the first 30 days only and not thereafter. They propose that the baseline characteristics of long lesions (greater complexity, left main disease, bifurcation disease, tortuosity and calcification) along with high plaque burden could be responsible for worse outcomes. It was the stent length alone, irrespective of the use of intravascular imaging or even overlapping, which was responsible for poorer outcomes. The comorbid conditions affecting the results such as older age, diabetes and renal dysfunction more often seen in this cohort are a part of the problem. They concluded that stents longer than 40 mm have not been able to cut the Gordian knot and continue to have high TLF. Refinements in stent technology such as the newer-generation ultra-thin-strut DES may further improve the clinical outcomes[11] in comparison with contemporary thicker-strut second-generation DES, which were the stents predominantly used in the Korean registry[5]. It is clear that there is still room for improvement in DES technology. The final word is still awaited.

"The biggest room in the world is the room for improvement"
Helmut Schmidt

Conflict of interest statement

The authors have no conflicts of interest to declare.

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