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Stent diameter and type matters in the decision of 6 FR or 7 FR guiding catheter selection during simultaneous kissing stent technique in bifurcation lesions



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We read with great interest the manuscript by Gregory A. Sgueglia, et al. [1]. In this case report, they presented a successful transradial simultaneous kissing stent (SKS) technique application with two drug-eluting stents (DES) via a 6 FR guiding catheter in a bifurcation lesion. We think that this case report is an important sample that guides the interventional cardiologists in applying transradial SKS technique in lesions with similar size and with similar devices. Additionally, we would like to make some comments.

To our classical knowledge, at least a 7 FR guiding catheter is needed for two stents approaches in bifurcation lesions if both of the stents are put into the guiding catheter simultaneously, as SKS, V stent and crush stent (excluding double kissing crush stent) techniques. However in their case report, the authors referred that they had been able to implant 2.5/38 mm and 2.5/48 mm Xience Xpedition LL everolimus-eluting stents (Abbott Vascular) in obtuse marginal and left circumflex artery, respectively, with SKS technique via the 6 Fr ADROIT guiding catheter (Cordis, Fremont, CA) instead of a 7 FR guiding catheter. As the authors cited, stent delivering catheters are typically advanced to the target coronary arteries one by one. So, the second stent can be advanced into the guiding catheter if its crossing profile plus maximum shaft outer diameter of the first stent ($CP_2 + MSOD_1$) is equal to or smaller than the

inner diameter (ID) of the guiding catheter. In the manuscript, the authors declared that $CP_2 + MSOD_1$ was $0.042 + 0.032 = 0.074$ in. which was marginally greater than the ID of the guiding catheter that was 0.072 in. In conclusion, they concluded that their case report convincingly showed that innovative and widely available devices, i.e. new 6 FR guiding catheters and last generation DES delivery systems, would allow to perform transradial SKS in *virtually any patient*, including those with small radial arteries.

We agree with the authors in lesions with *similar sizes* and with *similar types* of stents that have low crossing profiles, however to our experience, it might be difficult or impossible to use 6 FR guiding catheters for greater stent sizes and/or some different types of widely used last generation DESs when performing SKS technique. In their case, the authors were able to pass, although long, two *small* diameter (2.5 mm) Xience Xpedition LL everolimus-eluting stents, as, the $CP_2 + MSOD_1$ was approximately equal to the ID of the 6 FR guiding catheter, however, when the diameters of the same type of both stents (Xience Xpedition) increase to 3 mm with similar length, the $CP_2 + MSOD_1$ value increases to 0.078 in. (Table 1) which suggests that the ID of the 6 FR guiding catheter (0.072 in.) is not enough for the SKS technique. Apart from this, other most used last generation DESs have relatively large or small crossing profiles, marginally different maximum shaft outer diameters (always the distal shaft for rapid exchange systems) and thus different $CP_2 + MSOD_1$ values which are shown in the table. As seen from the table, when two stents have relatively small diameters as 2.25 to 2.75 mm, and also 3.0 mm diameter, some types of DESs can be used for the SKS technique in the 6 FR guiding catheter as $CP_2 + MSOD_1$ values are approximately equal to the ID of that catheter, whereas, some others cannot. In addition, when two stents have 3.5 or larger diameters, *no type* of DESs can be used for SKS technique in the 6 FR guiding catheter. In light of these data, we think that the interventional cardiologist should be aware of the crossing profiles, maximum shaft outer diameter of the stents, and thus the $CP_2 + MSOD_1$ value which might vary with the stent type and might increase marginally or substantially with escalating diameters of the stents, in the decision of the 6 FR or 7 FR guiding catheter selection when using the SKS technique.

Finally, to our experience, if two stents have much different diameters during the application of SKS technique in bifurcation lesions, we think that the larger one should be advanced first into its target

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Table 1

Crossing profiles, maximum shaft outer diameters and crossing profiles plus maximum shaft outer diameters (= CP₂ + MSOD₁) for simultaneous kissing stent technique (SKS) of commonly used drug-eluting stents with rapid exchange delivery systems according to the diameters and lengths.

Stent type (in alphabetical order)	Diameter (mm)	Length (mm)	Crossing profile (inch)	Maximum shaft (distal) outer diameter (inch)	Crossing profile + maximum shaft outer diameter (CP ₂ + MSOD ₁)(if the same type of stents are used for SKS) (inch)	Reference
Biomatrix flex (Biosensors)	2.25	8–28	0.044	0.034	0.078	[2]
	2.5–3.0	8–28	0.045	0.034–0.037	0.079–0.082	
	2.5–3.0	33–36	0.047	0.037	0.084	
	3.5	8–28	0.048	0.037	0.085	
	3.5	33–36	0.050	0.037	0.087	
	4.0	8–28	0.050	0.037	0.087	
Nobori (Terumo)	2.25–2.5	8–28	0.041	0.033	0.074	[3,4]
	2.75	8–28	0.043	0.033	0.076	
	3–3.5	8–28	0.044–0.045	0.033	0.077–0.078	
Orsiro (Biotronik)	2.25–2.5–2.75–3	9–40	0.040–0.041	0.034	0.074–0.075	[5,6]
	3.5	9–40	0.047	0.034	0.081	
	4	9–40	0.047	0.037	0.084	
Promus Premier (Boston-Scientific)	2.25–2.5–2.75	8–38	0.038–0.041	0.035	0.073–0.076	[7,8]
	3–3.5	8–38	0.043–0.046	0.035	0.078–0.081	
	4	8–38	0.049–0.050	0.035	0.084–0.085	
Resolute integrity (Medtronic)	2.25–2.5–2.75	8–30	0.040–0.041	0.036	0.076–0.077	[9,10]
	3.0–3.5–4.0	9–38	0.044–0.048	0.036	0.080–0.084	
Xience Xpedition (Abbott) ^a	3	18	0.042	0.034	0.076	[11]
	3	38	0.044	0.034	0.078	

Note that the CP₂ + MSOD₁ is for the same type of stents for SKS.

^a Only the information of crossing profile of 3.0–18 and 3.0–38 mm stents could be obtained from the manufacturer.

coronary artery, unless otherwise necessary. Because, while the maximum shaft outer diameters of the stents with different diameters are marginally different (Table 1), the smaller crossing profile of the second stent would cause a lesser CP₂ + MSOD₁ value that eases the passing of itself into the guiding catheter. By using this method in this situation, instead of 7 FR, the 6 FR guiding catheter selection might be more possible for SKS technique in bifurcation lesions.

Conflict of interest

The authors report no relationships that could be construed as a conflict of interest.

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