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Reply:

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REPLY:

We would like to comment on the letter to the Editor regarding our article "Flow-Diverter Stents for the Treatment of Saccular Middle Cerebral Artery Bifurcation Aneurysms."[1] We thank Dr Iosif and colleagues for their interest in our work, and we welcome the opportunity to comment on some of their remarks. First, we agree that there are multiple mechanisms involved in thromboembolic complications when using flow-diverter stents (FDSs) and that in some cases, the mechanisms can be unclear. However, we would strongly assert that in our study, complications were almost exclusively related to hemodynamic effects and not due to any technical issues, as suggested in the letter of Dr Iosif and colleagues.

No cases of thrombosis related to ineffective antiaggregation therapy were encountered because all patients were tested for any potential aspirin or clopidogrel resistance with the VerifyNow P2Y12 assay (Accumetrics, San Diego, California) and hematologic lab tests, as performed by Saleme et al.[2] We admit the possibility that even without biologic resistance to clopidogrel, this medication may be insufficient in those cases in which the covered branch is at very high risk of occlusion due to sudden flow restriction in the first hours after FDS delivery. Therefore, we as a department are considering a switch from clopidogrel to ticagrelor.[3]

Stent apposition is much easier to obtain at sites of middle cerebral artery bifurcation aneurysms than at sites of carotid siphon aneurysms due to less tortuosity. In addition, in our study, stent apposition was always confirmed with postoperative VasoCT (Philips Healthcare, Best, the Netherlands). If required, FDSs were ballooned to achieve a perfect opening.

Using diffusion-weighted MR imaging, we did not detect any distal emboli in the FDS branch provoked by mechanical manipulations during FDS delivery. In fact, in most cases branch catheterization and FDS positioning were quite simple at these locations.

In addition to these points, blood pressure was strictly controlled during treatment and in an intensive care unit for 12 hours after treatment.

We apologize for any eventual inaccuracies in the analysis of the complication ratio in the study by Saleme et al.[2] Because we tried to focus only on MCA saccular aneurysms, we excluded all blister aneurysms; this exclusion may have resulted in an overestimation of the morbidity rate from the available data in this study. However, we remain convinced that the use of FDS for the treatment of saccular MCA bifurcation aneurysms carries a risk of complications. As reported and discussed by Saleme et al, in some cases, ischemic complications will occur in the covered branch territory because the corticopial anastomosis is unable to fully meet the needs of the brain area. However, how to predict this phenomenon from digital subtraction angiography data (even with balloon test occlusion) is not yet clearly understood. Moreover, in our studies, DWI ischemic findings are seen in 43% of cases.

We wish to encourage Iosif and colleagues in their research to clarify the mechanisms of branch modifications with flow diversion; there may be a place for FDSs in the management of lesions that are challenging for surgical clipping and endovascular treatment such as blood blister-like, fusiform MCA aneurysms or difficult, dysplastic, extremely broad-based aneurysms. However, in the case of saccular MCA bifurcation aneurysms, because a meta-analysis from published studies with FDSs showed permanent deficit rates in 10.3% of cases (7/68),[1,2,4,5] we consider that under the conditions described in the different studies, FDSs are indeed not a "suitable solution" and other endovascular or surgical strategies should be preferred. Therefore, we encourage the rigorous evaluation of last-generation braided stents and new innovative devices that are increasingly becoming available on the market.

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