New Endovascular Devices for Acute Ischemic Stroke: Summarizing Evidence by Multiple Treatment Comparison Meta-Analysis

In patients with acute ischemic stroke, mechanical endovascular revascularization has been assessed in a large number of single-arm studies\(^1\)–\(^3\) and in a more limited series of controlled trials.\(^2\),\(^3\) In August 2012, 2 multicenter trials (TREVO\(^2\) and SWIFT\(^5\)) were published evaluating 2 innovative stent-like devices (namely TREVO Retriever [TR] and Solitaire Flow Restoration Device [SFRD]). Compared with the first device receiving FDA approval (Merci Retriever), the newest devices proved to be more effective and could therefore be proposed as the new standards. On the other hand, no head-to-head controlled study is underway to directly compare TR and SFRD.

The TREVO\(^2\) and SWIFT\(^5\) trials were based on a randomized design and included patients with very similar characteristics (TREVO trial: patients with angiographically confirmed large vessel occlusion strokes and US National Institutes of Health Stroke Scale scores of 8–29; SWIFT trial: acute ischemic stroke with moderate to severe neurologic deficits, respectively). The trials’ primary end points were similar but not identical (TREVO trial: thrombolysis in cerebral infarction scores \(\geq 2\) reperfusion assessed in an unmasked core laboratory; SWIFT trial: thrombolysis in myocardial ischemia grade 2 or 3 flow in all treatable vessels without symptomatic intracranial hemorrhage, after up to 3 passes of the assigned device, as assessed in an independent core laboratory masked to study assignment). The definitions of favorable outcome at 90 days were nearly the same (TREVO trial: Modified Rankin Scale score of 0–2; SWIFT trial: Modified Rankin Scale score of 0–2 or equal to the prestroke value if the latter was >2). This overall information indicates that these 2 trials were sufficiently homogenous so that they can be indirectly compared using multiple treatment comparison (MTC) meta-analysis.\(^6\)

MTC meta-analysis,\(^6\) which is also referred to as network meta-analysis or mixed treatment comparisons, uses both direct (head-to-head) and indirect evidence from randomized clinical trials to compare the relative effectiveness of all included interventions. The quality of MTC analyses depends on whether the primary studies are sufficiently homogeneous to combine and whether the different interventions are sufficiently similar in their populations, study designs, and outcomes.

The analysis presented herein was aimed at including the 2 recent trials mentioned earlier (evaluating TR and SFRD) and all randomized studies in which the Merci stent was tested as an experimental intervention. Because no studies of this latter type were found (based on PubMed and EMBASE searches launched on August 31, 2012), this analysis consisted of a simple triangular comparison. An unfavorable outcome at 90 days

---

No conflicts of interest declared. The authors have performed this study in the context of their activity at ESTAV Toscana Centro, which belongs to the Italian National Health System.
(defined according to the trials’ criteria\(^4,5\)) was the end point used for this triangular comparison (comparators: TR, SFRD, and Merci). The meta-analytic methods were as previously described\(^7,8\); in particular, the statistical calculations for indirect comparisons were based on the ITC software (Canadian Agency for Drugs and Technologies in Health, Indirect Treatment Comparison software, Ottawa, Canada), whereas the OMA software (Open Meta-Analyst, version 4.16.12, Tufts University; http://tufscaes.org/open_meta/) was used for estimating the relative risk (RR) for all direct comparisons according to the random effect model.

Figure 1 shows the results of this analysis. With respect to the Merci system adopted as the common comparator and using the traditional meta-analytic parameter of RR, the indirect comparison between the 2 new-generation devices (Fig. 1A) shows nearly identical effectiveness (RR for SFRD versus TR: 0.82; 95% confidence interval [CI], 0.54–1.25). The significance level of this comparison (\(P = 0.35\)) indicates that the chance that one of these 2 devices is superior is unlikely.

However, if one applies a more innovative meta-analytic approach\(^8\) based on the number needed to treat (NNT), the same comparisons offer a different perspective. In the 2 direct comparisons, the graph in Figure 1B shows that the values of NNT are favorable to the 2 new devices for the treatment of acute ischemic stroke: state of the evidence. Ann Intern Med 2011;154(4):243–52.

Andrea Messori
Valeria Fadda
Dario Maratea
Sabrina Trippoli

HTA Unit, ESTAV Toscana Centro, Regional Health Service, 50100 Firenze, Italy
E-mail: andrea.messori.it@gmail.com or andrea.messori@estav-centro.toscana.it

REFERENCES

7. Fadda V, Maratea D, Trippoli S, Messori A. Network meta-analysis. Results can be summarized in a simple figure. BMJ 2011;342:d1555.

http://dx.doi.org/10.1016/j.avsg.2012.10.010

Comment on Aortic Dissection in the Presence of an Aberrant Right Subclavian Artery

To the Editor:

Guzman and Eagleton\(^1\) reported on their experience with the hybrid treatment of patients affected by acute type B aortic dissection associated with aberrant right subclavian artery (ARSA) with or without Kommerell’s diverticulum. Congratulations on their experience. They conclude that “the hybrid approaches described here effectively address the aortic dissection and degenerative changes associated with an ARSA while minimizing the need for extensive open repair.”

Various surgical techniques have been used; however, a specific strategy for the surgical treatment of ARSA with or without Kommerell’s diverticulum has not yet been established. We agree on the usefulness of hybrid procedures or an endovascular procedure because the mortality associated with open surgery in these complex cases is close to 16%. Moreover, although the mortality has been reduced in recent years to 21% (from 40%), there is still significant morbidity and mortality after the surgical repair of complicated acute type B aortic dissections.

Guzman and Eagleton\(^1\) report 3 cases in the published literature of endovascular management of aortic dissections in the presence of ARSAs, and only in 1 case the use of stent graft alone.

We would like to mention our short report published in 2007 describing the first case of a successful stent graft of an acute type B aortic dissection with involvement of an ARSA aneurysm (Kommerell’s diverticulum).\(^2\) At 5 years of follow-up, this patient is alive and well without signs of symptomatic subclavian steal and, surprisingly, computed tomographic scans reveal complete retraction of the Kommerell’s diverticulum with remodeling of the aortic arch.\(^3\)