Understanding and Applying the Endovascular Trials

Dawning of a New Era for Acute Stroke Therapy

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The results of the 4 recently presented/published trials for acute ischemic stroke herald the dawn of a new era in the treatment of patients with large vessel occlusion amenable to endovascular intervention. Additional trials are underway or have been stopped earlier because of the positive results observed in the initial trials. Hopefully, the ongoing trials will largely amplify and build on the results observed in the Multicenter Randomized Clinical Trial of Endovascular Treatment of Acute Ischemic in the Netherlands (MR CLEAN), Endovascular Treatment for Small Core and Anterior Circulation Proximal Occlusion With Emphasis on Minimizing CT to Recanalization Times (ESCAPE), Extending the Time for Thrombolysis in Emergency Neurological Deficits-Intra-Arterial (EXTEND-IA) and Solitaire With the Intention for Thrombectomy as Primary Endovascular Treatment (SWIFT-PRIME) trials. At this time, it is important for the medical community, healthcare planners, and policy makers to have interpretation and guidance from experts about the trial results currently available for help in steering them as to how the trial results should be used in daily practice and for the local organization of acute stroke care. To accomplish this goal, Stroke invited a panel of experts with a wide range of backgrounds to provide insights. Drs Grotta and Hacke provide a detailed overview of the organization and results of the 4 trials from the perspective of senior stroke neurologists with extensive experience in acute stroke therapy trial design and execution. Additionally, they suggest how the trial results should be implemented and state the need for additional information about the utility of endovascular therapy in patients not included in the trials. Drs Pierot and Derdeyn provide insights about the trials from the perspective of experienced neurointerventionists, with a detailed analysis of patient selection, the devices, and techniques used. They also comment on reasons for failed previous endovascular trials and the need for future trials to answer questions about patient subtypes not studied in the currently available trials. Further improvements of the technical approaches and introduction of newer technologies are discussed as well. The 3 papers by Drs Schwamm, Smith, Tatlisumak, and Toyoda focus on how the results of the 4 trials will need to lead to efforts to maximize the efficiency of currently available acute stroke care trial systems in North America, Europe, and Asia and the need in many cases to reorganize these systems to treat as many patients as efficiently and effectively as possible with the now proven efficacy of endovascular treatment in appropriately selected patients. Each region and locales within that region have their own advantages and challenges, so we encourage the readers to analyze the suggestions of these experts and carefully consider how to best use them in their own practice. The final paper by Dr Campbell, Goyal, Menon, and Levi focuses on the important issue of acute ischemic stroke imaging and the imaging modalities used in the 4 trials. All of the trials used computed tomography angiography to identify an occlusion amenable to endovascular treatment as an appropriate prerequisite for inclusion. Only the MR CLEAN trial did not require demonstration by either an ASPECTS score using plain computed tomography or computed tomography perfusion scan that the ischemic core was not extensive. Additionally, the ESCAPE trial required before endovascular intervention that good/excellent collaterals be present on multiphase computed tomography angiography. Practical advice as to how to safely and cost-effectively obtain the necessary imaging is provided. It is noteworthy that the rate of favorable 90-day outcomes was more favorable in the other 3 trials than in MR CLEAN, which did not require demonstration of a small core or a favorable collateral pattern before treatment, thus emphasizing the importance of proper imaging for patient selection. This radiology-focused article also provides considerations for the use of imaging in future trials.

The other endovascular trials beyond the 4 analyzed by the papers in this issue of Stroke will likely provide additional insights related to the topics covered by these invited overviews. The readers can anticipate that Stroke will then update the current critiques and recommendations as necessary. However, at this time, we determined that the timely and impactful information from the 4 available trials needed to be analyzed and discussed from several different perspectives. The new era of endovascular therapy for large vessel ischemic stroke likely will have many challenges for its successful implementation to replicate the trial results in both the developed and developing world. At long last, progress is being made to substantially improve the outlook for patients with large vessel ischemic stroke, but the translation from positive trials to a widely used and similarly effective therapy in as many locations as possible worldwide will be a difficult and challenging task. This new era of acute stroke therapy should not be viewed as an end point but as a promising step along the continuum to developing treatments that maximally improve as many patients...
with all types of ischemic stroke as possible. Many challenges remain and the need for future trials of many types is obvious to achieve this goal. Stroke encourages the readership to be stimulated and inspired by the results from these endovascular trials and affirms that it will be a beacon for the dissemination of knowledge related to ischemic stroke therapy development in the future, as well as for therapies targeted at preventing ischemic stroke and enhancing poststroke recovery.

**Disclosures**

None.

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