Editorial

Endovascular Thrombectomy and Stroke Physicians
Equity, Access, and Standards

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In medicine, we are traditionally wary about using the term breakthrough, much loved by the media. However, the dramatic benefits of endovascular thrombectomy actually justify the use of this term. Based on the landmark clinical trials, only 2.6 patients need to be treated to improve functional outcome, and in expert hands, the intervention is remarkably safe.[1] The challenge is enormous, given that ≈11% patients with ischemic stroke have large artery occlusion.[2] This is now even more pressing, given that the time window for intervention is likely to be substantially extended in patients selected with advanced imaging, with small ischemic cores and salvageable tissue.[3]

Within months of the evidence becoming available from the landmark trials in 2015, new treatment guidelines were published.[4–6] At the clinical coalface, we are now seeing many patients treated with large artery occlusion and moderate to severe neurological deficits, who can actually be discharged home within days of their intervention.

The key issues addressed in these articles[7–9] relate to patients being able to speedily access this therapy, a major challenge in metropolitan, but particularly rural settings. Of crucial importance, the standards in interventional centers in terms of reperfusion rates, safety, and clinical outcomes need to mirror the trial results. Stroke treatment clearly mandates a specialized multidisciplinary team in an adequately resourced center, led by a stroke specialist. We prefer the term stroke physician rather than vascular neurologist so that an appropriately trained physician is not excluded although most stroke specialists will have a neurological training. Clearly, the stroke physician must be trained and expert in all aspects of stroke management, including acute reperfusion therapies and secondary prevention, also with a good knowledge of rehabilitation. They are trained and equipped to lead a multidisciplinary team in stroke units, deliver intravenous tissue-type plasminogen activator, and facilitate speedy access to endovascular thrombectomy. They ideally should be active in stroke research or at least facilitate research and audit activities.

We agree that training standards for neurointerventionists must be rigorous. The credentialing requirements detailed in the Training Standards in Neuroendovascular Surgery[8] involved interventional experts from neurosurgical, neuroradiological, and neurological backgrounds. The 12-month fellowship training not only specifies expertise in all aspects relevant to acute ischemic stroke but also mandates the full spectrum of other vascular interventions. This follows on from prerequisite training, including at least 200 catheter-based procedures as the primary operator. Our guidelines in Australia are similarly comprehensive and rigorous.[10] Clearly, procedural volume and complexity correlate with efficacy and safety. Procedural outcomes should be audited independently. Many of us well remember the alarm bells ringing in the 1980s when some less experienced centers were reporting worrying stroke rates with carotid endarterectomy.[11]

There is an undoubted shortage of neurointerventionists. Given the need for speedy recanalization of large artery occlusion and the current workforce problems, we agree that training of a significant proportion of stroke physicians to undertake interventional work should be a priority. Grotta et al[7] propose that endovascular thrombectomy should be more readily available, particularly in regional centers, by appropriately trained stroke physicians. They suggest that while training of stroke physicians needs to meet the standardized requirements for all neurointerventionists and that stroke physicians working outside major comprehensive stroke centers could limit their practice to thrombectomy and stenting, rather than the full range of vascular interventions, including aneurysm coiling and treatment of arteriovenous malformations. The caveats should be that the center generates sufficient volume of procedures to maintain competency of the interventionists (noting that a single interventionist is insufficient to maintain a 24/7 roster) and that outcomes are audited. This model is consistent with the subspecialized set of procedures undertaken by many interventional cardiologists.

Quoting the Amartya Sen analogy with famine, Goyal et al[9] emphasize the importance of maldistribution of neurointerventionists, not just the overall numbers. Given the striking time is brain relationship with thrombectomy (as with tissue-type plasminogen activator),[12,13] they favor the strategy of direct transport to comprehensive stroke centers, bypassing primary stroke centers. They point out that various clinical scoring systems are useful predictors of large-vessel occlusion and, together with stroke ambulances (computed tomography angiography in the field) and other technological advances, triage directly to endovascular centers should be facilitated, when transport within agreed timeframes is possible. Sparsely populated remote regions with insufficient workload to support neurointerventionists remain a challenge. They argue that

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neurointerventionists need to work in an expert and multidisciplinary stroke setting, with significant throughput of patients and all the backup systems in place.

In some health settings, a top-down approach has been utilized. In our State of Victoria (Australia), with 6.2 million people (4.7 million in Melbourne), we have a state-wide approach that has chosen 2 comprehensive interventional centers in Melbourne able to provide 24/7 service, with a drip-and-ship approach for outer metropolitan and regional centers. This involves a coordinating on-call stroke physician using telestroke technology. However, we foresee that the cardiology paradigm may be followed over time, with some large rural centers equipped for direct neurointervention, depending on case volumes. This state-wide approach is difficult in the less structured US system, where, for example, there are 5 active interventional centers in metropolitan Boston, yet few in remote and more deprived regions of many States.

Different solutions will therefore depend on the health system, but we can make some general conclusions at this early stage of stroke neurointervention. The neurointerventionist performing the procedures must be expert, work in a multidisciplinary team led by a stroke physician, ideally in a setting with all the backup resources and a 24/7 model. We agree that a core requirement for a neurointerventionist is a clinical neuroscience background, whether in neurology, neurosurgery, or neuroradiology. A full understanding of cerebrovascular disease, the cerebral circulation, other brain disorders and cerebral eloquence, is vital for case selection and management. Speedy delivery of patient to an endovascular center is critical. Access is a huge challenge. It should be a priority to attract neurointerventionists to large rural centers. Desirably, they should be able to manage all neurovascular interventions, but we do see a role for a more limited practice focused on clot retrieval and stenting. Stroke physicians have an ideal background and should be encouraged to take up this training. Our neuroradiological colleagues, who are usually the gate keepers of the imaging, and particularly angiographic facilities, need to recognize the workforce challenge and be receptive to the training and integration of stroke physicians in the neurointerventional team.

Although the presence of large artery occlusion can often be predicted by scoring scales, these tools are imperfect. It will take years to roll out large numbers of stroke ambulances with onboard computed tomography scans allowing computed tomography angiography as a triage tool.

We suggest that we need less primary stroke centers and more comprehensive centers, with large volumes of patients with stroke and endovascular capability. Outcomes relate to case volumes. This has been a successful innovation in London, United Kingdom, with the National Health System setting up smaller numbers of strategically located Hyperacute Stroke Units and in fact closing many primary stroke centers.[14]

This discussion relates chiefly to stroke practice in high-income settings. In the developing world, the major challenge is speedy access to stroke unit care, embodied in the World Stroke Organization Global Stroke Guidelines and Toolkit.[15] Given the major benefits of endovascular thrombectomy, serious attention has to be given to the risk benefit ratio when performed by those with less procedural experience. A more pragmatic approach to credentialing may be needed until formally trained neurointerventionists are present in larger numbers.

To conclude, we face a huge challenge to make endovascular thrombectomy rapidly accessible in different health systems, duplicating the results of the landmark clinical changes that have revolutionized stroke practice. Stroke physicians must lead the charge. To paraphrase Jerry Garcia of the Grateful Dead, "Someone has to do something and the amazing thing is that it has to be us."

Disclosures

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