

Thrombectomy Unveiled: Who's Behind The Life-Saving Procedure?

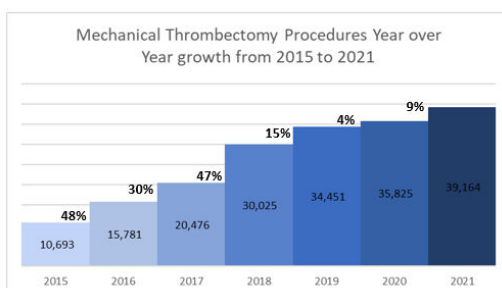
By Brad Kirkes & Jackie Shepard

Over the years, there have been significant advances in the prevention, diagnosis, and treatment of stroke, leading to a significant change in how stroke is managed. These improvements include increased community awareness, advances in imaging technology, better prevention, thrombolytic therapy, endovascular interventions, and rehabilitation. The shift to endovascular procedures, more commonly referred to as Mechanical Thrombectomy, for stroke, has been a significant development in the management of acute ischemic stroke for the past 8 years.

Prior to Mechanical Thrombectomy, the standard intervention for ischemic stroke patients with Large Vessel Occlusion, was IV thrombolytic therapy, such as Alteplase. However, the time frame for receiving these drugs remains limited to 3 to 4.5 hours after stroke symptom onset. Many patients are not eligible to receive tPA if they are on blood thinners or have other medical history contraindications. In addition, these drugs are not always adequate to “bust up” the clot restricting blood flow to the brain. According to the Society of Vascular and Interventional Neurology (SVIN) in their whitepaper published in October 2020, there is only a 10-25% chance of dissolving the clot for adequate blood flow to the brain with tPA alone.¹

Since the successful publication of five clinical trials in Mechanical Thrombectomy in 2015, the American Heart Association (AHA) has recognized mechanical thrombectomy as the gold standard in ischemic stroke care caused by a Large Vessel Occlusion (LVO)². According to SVIN, this procedure allows for the successful removal of the blood clot in 80-90% of appropriate LVO patients while reducing the rate of neurological disability by 40-60% when the Mechanical Thrombectomy is performed within 24 hours of symptom onset¹.

A study in the Journal of NeuroInterventional Surgery shows an increase in mechanical thrombectomy volumes from 2015 to 2021. The compound annual growth rate (CAGR) from 2015 to 2021 is around 24%³.



Time is a critical factor in mechanical thrombectomy, as the procedure is most effective when performed within a specific window of time after the onset of stroke symptoms. The initial window of time for mechanical thrombectomy eligibility was within 6 hours of the onset of stroke symptoms. However, in 2018, the American Heart Association (AHA) expanded the timeframe to 24 hours.

Mechanical thrombectomy, along with other endovascular procedures are typically performed in a catheterization lab or angiography suite, which has specialized equipment with advanced imaging technology and interventional tools for minimally invasive procedures⁴.

Behind The Procedure: Who Are The Skilled Professionals Performing Thrombectomy?

While Mechanical Thrombectomy became the new best practice for the treatment of ischemic stroke caused by an LVO in 2015, it was also recognized at that time there was an inadequate number of neuroendovascular proceduralists and facilities to meet the needs of the expanded stroke clinical protocol throughout the U.S. The clinical trials were conducted in Comprehensive Stroke Centers where high-volume mechanical thrombectomies were performed by experienced proceduralists. Three different specialties routinely perform these procedures including interventional neurologists, endovascular neurosurgeons, and neurointerventional radiologists⁵.

Neurology. Interventional Neurologist.

Neurology involves the diagnosis and treatment of conditions and disorders affecting the brain, the spinal cord, and the peripheral nerves. Neurologists do not perform surgical or endovascular procedures without additional specialized training. As with neurosurgery, rigorous endovascular training is conducted as part of a special fellowship program. Many neurologists that go on to pursue specialized endovascular thrombectomy training are already board certified in vascular neurology in addition to general neurology⁶.

Neurosurgery. Endovascular Neurosurgery.

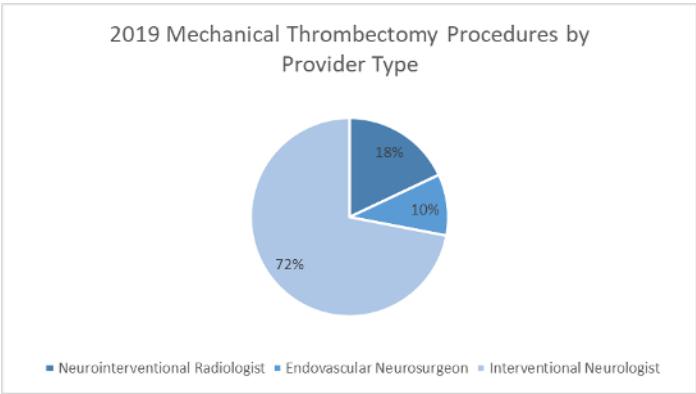
Neurosurgery as a profession is known for surgically treating brain, spinal, and nervous system diseases, and conditions. For a neurosurgeon to be deemed qualified and competent in minimally invasive clot retrieval of an LVO, the

neurosurgeon must do a specialized fellowship in endovascular neurosurgery.⁷

Interventional Radiology. Neurointerventional Radiologist.

Interventional Radiology is known for performing endovascular procedures throughout the body. However, trained neurointerventional radiologists that were qualified to remove LVO's in the brain were in short supply. As a result, the Society of Interventional Radiology were early adopters of endovascular thrombectomy training programs that created a pathway to competency within Interventional Radiology. The endovascular thrombectomy training was tailored for those in Residency, those just coming out of Residency, as well as seasoned practicing Interventional Radiologists with limited to no mechanical thrombectomy experience. Proctoring from a practicing neurointerventional radiologist along with education courses focused on neurosciences are the cornerstone of this formal training program. An Interventional Radiologist can be board certified in neuroradiology following a specialized fellowship⁶.

According to a 2019 study published in the Journal of NeuroInterventional Surgery, interventional neurologists were the most common providers performing mechanical thrombectomy procedures in the United States, accounting for 72% of procedures. The study also found that interventional radiologists performed 18% of procedures, and neurosurgeons performed 10% of procedures⁸.



Consensus On Who Is Qualified To Perform Mechanical Thrombectomy

In 2016 there was a multi-societal consensus statement endorsed by neurology, neurosurgery, neuroradiology, and neurointerventional societies which identified key training guidelines for endovascular procedures for ischemic stroke intervention. The goal was to standardize training and competency across all proceduralists performing mechanical thrombectomy and other endovascular procedures. They recognized several components but felt the following were core to the success of endovascular interventional procedures for ischemic stroke patients, regardless of surgical specialty. The table below highlights key training areas for competency. This paper does not address ongoing competency requirements.⁶

Table 1: Standardized Thrombectomy Training for Competency	
Formal Training	Neurosciences cognitive and neuropathophysiological focus, along with vascular processes and clinical syndromes.
Procedural Skills	Performing various techniques with the management of complications. Proctoring (direct and indirect) including pre, peri, and postprocedural care.
Diagnostic and Therapeutic Acumen	Recognizing procedural and angiographic complications. Assessing an adequate number of diagnostic and interventional/endovascular procedures with proper proctoring.

The Future of Mechanical Thrombectomy

While the number of neurointerventionalists continues to expand to meet the needs of patients who qualify for mechanical thrombectomy, there continues to be a significant opportunity to emergently get ischemic stroke patients to thrombectomy-capable centers. Stroke recognition and timely treatment for stroke continue to lag in the U.S. as compared to heart attacks or other cardiac conditions.

One proceduralist group that was not discussed in this article is interventional cardiology performing mechanical thrombectomy. While to some, this is a controversial topic, there is a growing number of cardiologists that are seeking additional training to perform these neurointerventional procedures. The study, “Mechanical Thrombectomy in Acute Ischemic Stroke— The Role of Interventional Cardiologists,” provided evidence that acute stroke intervention can be performed safely and successfully by interventional cardiologists with the appropriate training¹⁰. While this is a singular study, there is a growing body of clinical research and outcomes of interventional cardiologists with mechanical thrombectomy being published in Europe. While U.S. publications related to interventional cardiologists and mechanical thrombectomy training programs and patient outcomes are limited to date, there is growing support within cardiology professional societies to support such procedures with proper training and oversight.

Due to the aging population, the expansion of trials to treat distal and medium vessel occlusions, the improved efficiency in hospital and EMS stroke workflows, and continued advancements in stroke treatment outcomes, the upward trajectory for increased use of mechanical thrombectomy is anticipated to be up 5-10% over the next 10 years³. This will require continued community education on recognition of the signs and symptoms of stroke and the

importance of utilizing EMS, while at the same time expanding the number of thrombectomy-capable centers to assist with early identification and treatment of LVOs to limit stroke disability and mortality⁹. While considerations to expand to thrombectomy-capable can be overwhelming, Corazon's national experience in Neurosciences can provide the planning and implementation services you need while bringing differentiating interventional stroke care to patients. Contact us today to take your stroke program to the next level of performance.

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