



**Position Statement**  
on  
**Stroke Center Volumes**

**Background**

Initial investigations into the administration of intravenous thrombolytic therapy for intracerebral arterial occlusion, demonstrated improvement in acute ischemic stroke (AIS) outcomes when these medications were provided within the 3 to 4.5-hour time window.<sup>1,2</sup> To maximize efficiency and meet this time window, organized “brain attack” teams were created and, subsequently, the “stroke center of excellence.” The resulting benefits to the patient suffering a stroke were similar to those realized when the system of care concept was applied to trauma and cardiac emergencies. This is timely, as in the United States alone, the incidence of AIS is approximately 750,000 patients annually, and this rate is expected to increase by 25% in the next 20 years.<sup>3</sup>

Further evolution in AIS systems of care occurred between 2014 through 2017. This evolution was catalyzed by improvements in endovascular devices. What followed were evidence-based data. These data demonstrated that patients with large vessel occlusions (LVO) of the anterior cerebral circulation were provided significant improvements in outcomes when access to endovascular care was possible. Extended time windows of up to 12 hours from symptoms onset were the result. The HERMES meta-analysis best summarizes the impact of mechanical thrombectomy — an interventional procedure to remove a blood clot from inside cerebral arteries — as “of benefit to most patients with acute ischemic stroke caused by occlusion of the proximal anterior circulation, irrespective of patient characteristics or geographical location.”<sup>4</sup>

The impact of mechanical thrombectomy was further emphasized through positive trials between 2017 and 2018 that demonstrated that acute imaging protocols could be applied to extend time windows beyond 16 and up to 24 hours.<sup>5,6</sup> These findings have resulted in a dramatic increase in the numbers of patients presenting to thrombectomy capable centers. Available data from the Centers for Medicare & Medicaid (CMS) suggests a 30% increase in Medicare thrombectomy claims from 2016 to 2017 (5905 in 2016 and 7649 in 2017). As a corollary, prior estimates of the patients eligible for mechanical thrombectomy may increase from 10% to near 40% of AIS patients.

Extended time windows and the maturation of stroke protocols have resulted in the propagation of stroke centers of excellence that are supported by organizations with a stake in the stroke space (e.g., American Heart Association, DNV-GL). These centers were created to purportedly direct patients to the most qualified facilities. While the increasing numbers of centers do improve access to stroke centers, the unintended consequence of this unregulated propagation is a diffusion of limited stroke volumes across an unlimited number of stroke centers. When a facility or practitioner experiences decreasing volumes, it is reasonable to anticipate an adverse effect on procedure successes and patient outcomes.

**Position Statement**

The timely, effectual and high-quality delivery of neurosurgical care remains the paramount mission of neurosurgeons involved in cerebrovascular care. To this end, the American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS) support facility and practitioner volume requirements to maintain high-quality standards in the management of endovascular large vessel occlusion. A volume requirement of 15 thrombectomies per practitioner is reasonable for each certified stroke center of excellence. The current literature also supports 50 procedures per year per facility.

## **Rationale**

Until recently, a core requirement of certified centers was participation in centralized quality registries and the maintenance of facility/practitioner volumes. Since 2018, the question of practitioner volume requirements has become a point of debate. The relationship between procedural volume and thrombectomy quality has been more strongly supported.<sup>7,8</sup> This growing evidence led to the publication of a multi-society consensus recommendation document in 2018, which recommended that centers performing stroke thrombectomy should perform at least 50 such procedures annually and that individual physicians should perform at least 15 thrombectomies annually.<sup>9</sup> Arguments for the maintenance of practitioner volume are thus supported by a large body of literature and societal consensus that directly correlates practitioner volume and expertise to outcomes regardless of the procedure performed. Contrary arguments are based on the fact that an established number will limit the access to care by limiting the number of practitioners. Unfortunately, there are political and financial influences on the discussion of center volumes that, at times, supersede patient care concerns.

It is important to emphasize that specialty referral centers with higher volumes were a key component of the overwhelmingly positive endovascular trials. The position of our organizations on this issue supports such a concept in the “real world” application of mechanical thrombectomy to the patient who suffers a stroke. Volumes drive facilities to commit to providing the resources, personnel, organization, and continuous quality improvement processes that support the provider. America’s neurosurgeons hope that through greater education initiatives, robust resource investment, and evolving quality-based certification processes, that the results demonstrated by these trials may be extrapolated to greater numbers of centers — in turn allowing patients greater access to high-quality, advanced stroke care.

## **References**

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