

Highlights of the American Heart Association/American Stroke Association 2018 Guidelines Regarding Endovascular Therapies in Ischemic Stroke

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The ACEP Clinical Policies Committee regularly reviews guidelines published by other organizations and professional societies. Periodically, new guidelines are identified on topics with relevance to the clinical practice of emergency medicine. This article highlights recommendations related to endovascular therapy (EVT) in acute ischemic stroke, part of the new 2018 AHA/ASA stroke guidelines.

Early this year, the American Stroke Association and American Heart Association (ASA and AHA) published a comprehensive update to their guideline for the early management of acute ischemic stroke (AIS). Within this massive over 300-page guideline, the recommendations for EVT are some of the biggest and most practice-changing recommendations relevant to emergency physicians. EVT has been revolutionized in the past decade by the development of stent retrievers, devices used to mechanically treat large vessel occlusions (LVOs) such as in middle cerebral artery (MCA) strokes. For the purposes of this review, “EVT” will be used specifically to refer to mechanical thrombectomy with stent retrievers, as this technology is the one for which the strongest evidence exists. Numerous landmark randomized controlled trials evaluating EVT were published in 2015, showing a clear benefit to select stroke patients within a 6-hour window from time of onset. Two randomized controlled trials published in late 2017 and early 2018, the DAWN and DEFUSE-3 studies respectively, have shaken up the landscape further by demonstrating that EVT may benefit select patients up to 16 or 24 hours after onset of AIS. With this new landmark evidence fueling the latest AHA/ASA guideline, here we focus on a few key points about the emergency department management of AIS with EVT.

- 1. Cerebrovascular imaging such as CT or MR Angiography (CTA or MRA) should be obtained as soon as possible for AIS patients in the ED who:**
 - a. Are within 24 hours of last known normal (LKN)**
 - b. Are suspected to have a LVO**
 - c. Are otherwise eligible for EVT**

Eligibility criteria (point 1c.) will be summarized below, but the major takeaway here is that many patients should now get STAT cerebrovascular imaging (usually CTA) up to as far out from LKN as 24 hours. In the past, aggressive interventions for AIS were limited to the 3-hour or 4.5-hour t-PA windows, so this will mean aggressive imaging and management for scores of patients that in the past would have been managed conservatively. CTA allows providers to confirm that an AIS is caused by a LVO, which is a prerequisite for EVT eligibility regardless of other factors. Moreover, CTA should be gotten as quickly as possible, but should not delay other basic stroke diagnostics and management like a non-contrast head CT or administration of tPA.

- 2. LVOs should be suspected when the NIH Stroke Scale (NIHSS) is high, and are uncommon with a low NIHSS**

Smaller vessel occlusions (eg, lacunar infarcts) are not amenable to EVT, and multiple screening tools have been looked at for identification of LVO based on clinical factors alone. Luckily, the NIHSS is probably the most effective screening tool for LVO and is already routinely obtained by emergency physicians in any AIS. While the AHA/ASA guideline is not prescriptive on when NIHSS should prompt getting a CTA, they do cite two commonly used cutoffs to guide the policies made at individual stroke centers. A cutoff of NIHSS ≥ 6 is 88% sensitive for LVO but only 52% specific, while NIHSS ≥ 10 is 73% sensitive and 74% specific.

- 3. Adults with LVO should receive immediate EVT if the time from LKN to groin puncture is <6 hours and they meet all of the following:**
 - a. LVO is in internal carotid artery (ICA) or MCA segment 1 (MCA M1)**

- b. NIHSS ≥ 6**
- c. Modified Rankin Scale (mRS) of 0-1 at baseline**
- d. Alberta Stroke Program Early CT Score (ASPECTS) ≥ 6**

Patients who can get EVT within 6 hours of their LKN have the broadest inclusion criteria at this time as compared with those within the 16 or 24-hour windows (discussed below). Of the four criteria above, items 3c. and 3d. are the ones most likely to be unfamiliar to emergency physicians (3a is discovered based on the CTA results, and 3b is part of standard ED stroke evaluation).

The mRS is a simplistic grading of neurologic functional status on a scale of 0 to 6, where 0 to 1 represents a person who functions completely independent while 2 and above represent increasing levels of reliance of the patient on outside caregivers. While this can be a rough and subjective metric, a standardized set of questions for ascertaining the mRS does exist and can be referenced from online sources when discussing prestroke functional status with the patient's family at the bedside.

The ASPECT score is based on the patient's CT findings as interpreted by a neuroradiologist and calculating it is outside the scope of practice of the typical emergency physician. As such, stroke centers that have the capabilities for EVT will necessarily also have radiologists trained in this scoring system.

Additionally, EVT within 6 hours may be considered if some criteria are not met (eg, if NIHSS is < 6 , pre-stroke mRS is > 1 , ASPECT is < 6 , LVO is in an area other than the ICA or MCA M1). However, the AHA/ASA grades these as weak recommendations given a relative lack of evidence, so the use of EVT in these situations is likely to vary based on an individual stroke center's policy.

4. Patients with LVO in the anterior circulation and LKN within 16 to 24 hours of groin puncture should receive perfusion imaging to determine if they meet eligibility for EVT.

This is the most radical change, and is based on the DAWN and DEFUSE 3 trial results. In these studies, patients outside the 6-hour window but within 16 (DAWN) or 24 (DEFUSE) hours got perfusion imaging to determine eligibility for EVT. Perfusion imaging can include CT perfusion scans or diffusion-weighted MRI, with the modality of choice likely being at the discretion of the individual stroke center. Patients who meet the appropriate radiological criteria on this imaging should get emergent EVT all the way out to 24 hours after LKN. Other eligibility criteria are similar to the 6-hour window (eg, NIHSS ≥ 6). Only anterior circulation LVOs are considered at this time however, without the leeway to consider posterior circulation LVO in the guidelines regarding the 6-hour window.

5. Other important recommendations to remember in patients being considered for EVT:

- a. Only treat blood pressure if $> 180/110$**
- b. Administering t-PA does not preclude EVT, and it is not recommended to delay t-PA to get additional imaging for a possible EVT**
- c. Recommendations are lacking on indications regarding transfer of patients to a facility with EVT-capabilities from one that lacks these capabilities**

Overall, the complexity of the new recommendations indicates that any stroke center capable of EVT must develop robust protocols for standardized implementation. However, emergency physicians should be aware of the key points: namely that patients with severe (NIHSS ≥ 6) strokes may need emergent CTA and emergent consultation with a neurologist even if their LKN was 16 to 24 hours ago. While protocols are likely to vary from center to center, a well-defined protocol developed by invested parties (eg, EPs, neurologists, radiologists) can potentially make an efficient and streamlined process similar to the more familiar action of activating a cardiac catheter lab for percutaneous coronary intervention. Overall, the new capabilities and indications for EVT represent an exciting advancement in the standard of stroke care and are sure to continue developing for years to come.

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