



**Medical Direction and Practices Board
White Paper
2023 Maine EMS Protocols-Clinical Update
Posterior Circulation Stroke**

During the last twenty-five years, stroke care has evolved significantly. Strokes are the fifth leading cause of death in the United States with an annual incidence of greater than 795,000 cases occurring on a yearly basis¹. Of these, approximately 87% are ischemic, the result of an acute cerebral arterial occlusion in the head or neck, while the remaining 13% are a result of hemorrhages and aneurysms (subarachnoid bleeds)¹. Despite a national decrease in the annual number of strokes, the sequelae of patients who suffer from these events remains a significant burden to the healthcare system. The incidence of strokes is decreased due to increased education around vascular health and stroke education. In 1995, the Food and Drug Administration approved IV alteplase (tPA or tissue plasminogen activator) for use in patients with ischemic stroke after the NINDS trial demonstrated significant morbidity benefit². Subsequent trials then expanded the use to either IV alteplase or IV tenecteplase (TNKase) for the treatment of acute ischemic stroke as well as extending the window for the use of these medications in selected patient populations^{3,4}. Additionally, literature has also emphasized the use of mechanical thrombectomy for some acute stroke patients up to 24 hours after presentation⁵. While inpatient management of strokes has evolved, there has been acknowledgment that EMS clinicians play a critical role in the initial identification and treatment of this diagnosis as well.

The latest version of the American Heart Association's Get with the Guidelines Stroke registry (AHA GWTG), noted that EMS advanced notification increased the likelihood that patients with an ischemic stroke would get advanced treatment within the three-hour window by reducing door-to-imaging times, thus reducing door-to-treatment times⁶. Maine is no exception. Maine EMS has adopted tools and protocols to aid in the rapid identification of an acute stroke. In the last several iterations of the stroke protocol, Maine EMS recommended the use of screening tools in the rapid identification of stroke. Initially, the Maine EMS Medical Direction and Practices Board (MDPB) recommended the use of the Cincinnati Pre-hospital Stroke scale. However, in addition to this tool, it is the recommendation of the MDPB and the [Maine Stroke Alliance](#) (MSA) to use not only this tool, but also the FAST-ED scoring system to identify acute strokes who may benefit from care of a comprehensive stroke center capable of managing a large vessel occlusions (LVO).



With the sophistication and the advanced practice of EMS clinicians in Maine increasing, it is imperative that all types of strokes and stroke mimics be identified. A challenging population of patients are those with posterior circulation strokes. Unlike patients who present with acute occlusions to the middle cerebral artery (MCA), patients with posterior circulation strokes can present with more varied signs and symptoms⁷. The posterior circulation of the brain consists of two vertebral arteries, the basilar artery, and two posterior cerebral arteries which provide oxygen and nutrients to the brain stem, thalamus, cerebellum and portions of the occipital / medial temporal lobes. Because of the anatomy and circulation, posterior circulation strokes can have a variety of presentations from subtle cranial nerve findings to the devastating “locked in” syndrome⁷. It is imperative to note that posterior circulation strokes account up to 20% of all stroke presentations⁸.

The most common presentation of posterior circulation strokes are patients who complain of acute onset of vertiginous symptoms including dizziness, ataxia, and nausea/vomiting. Other signs and symptoms and their reported frequency are reported in Table 1. Posterior Stroke Presentations⁷. The “5 D’s” of the posterior circulation can help you remember some of the most common symptoms of posterior circulation strokes: dizziness, diplopia, dysarthria, dysphagia and dystaxia (or the lack of coordination leading to shaky limb movements or unsteady gait). Management for these patients is the same as for those experiencing ischemic strokes affecting the anterior circulation of the brain. The reason for further discussion of around this important subset of ischemic strokes is due to the difficulty making the diagnosis both in the out-of-hospital or emergency department realms (for more information, please see the MSA blog on posterior strokes somewhere in this paper as well – for further reading or reference. <https://www.mainestroke.org/post/posterior-circulation-stroke>).

Table 1. Clinical Presentations of Posterior Stroke⁷.

Clinical Presentation	Frequency (Percentage)
Vertigo	56.25
Ataxia	48.75
Motor Weakness	42.5
Vomiting	41.25
Headache	31.25
Cranial Nerve Deficits	26.25
Dysphagia	13.75
Visual changes	20.0



As the American Heart Association continues to emphasize, EMS clinicians play a critical role in the rapid identification of patients experiencing an acute neurologic event. With the advanced notification that EMS clinicians provide, patients experiencing an acute stroke can have increased success in receiving advanced imaging, faster infusions of thrombolytic medications, and faster transfer to institutions capable of providing mechanical thrombectomy or emergent evaluation by neurologists. Lastly, EMS clinicians should be aware of the different types of strokes and subsequent clinical presentations in an effort to minimize the devastating sequelae that can occur from missed diagnoses and delays in care.

References :

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