Hypertension Management in Stroke Patients: A Quick Update

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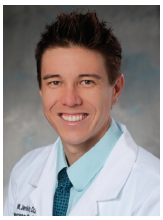

Stroke is a common disease seen by emergency physicians with over 800,000 new cases in the U.S. each year (Mozaffarian, 2016). Both ischemic (embolic or thrombotic) and hemorrhagic stroke patients frequently have derangement of their blood pressure, in addition to the fact that 70% of stroke patients have hypertension as a chronic condition (Miller, 2014). Acute hypertension management has long been a vital component of the medical management of stroke patients. However, guidelines are frequently changing and recent literature has demonstrated that large fluctuations in systolic pressure, whether up or down, lead to adverse outcomes (Anderson, 2013). In this brief review, I want to lay out a framework for dealing with hypertension in stroke patients, based on recent literature and guidelines from the American Stroke Association (ASA).

Hemorrhagic Stroke

Hypertension in hemorrhagic stroke patients is typically more severe than in ischemic stroke patients. Elevated blood pressure is correlated with increased hematoma volume and expansion, which are associated with negative outcomes (Miller, 2014). Thus, the last 30 years have seen most guidelines recommend aggressive blood pressure management for hemorrhagic stroke. Two recent large, randomized controlled trials have changed that. The INTERACT2 trial had 2,839 patients with spontaneous intracerebral hemorrhage (ICH) with hypertension and assigned them to either the experimental group (with a target systolic pressure <180mmHg) or the control group (with blood pressure management consistent with current guidelines and a target systolic pressure <140mmHg). With a primary outcome of death or disability at 90 days, the study found no statistically significant difference between the two groups (Anderson, 2013). Similarly, the authors of the ATACHII trial conducted a study with 1000 patients and found obtaining a target systolic blood pressure of 110 to 139mmHg did not result in a more favorable outcome (lower rate of death) compared to the control group with a target systolic blood pressure (SBP) of 140 to 170mmHg (Qureshi P. e., 2016).

Current ICH management guidelines from the ASA, however, state that ICH patients with systolic blood pressure (SBP) between 150-220 should receive anti-hypertensive therapy with a goal SBP of 140mmHg, based on Class I-Level A evidence (Hemphill, 2015). This guideline was published in 2015, before the ATACHII trial was published.

Subarachnoid Stroke

Subarachnoid strokes need to be differentiated from ICH, especially in terms of hypertension management. These bleeds are often secondary to aneurysm rupture and carry high morbidity and a mortality rate of up to 20% (Nieuwkamp, 2009). One of the most important sequela that needs to be controlled is rebleeding of the aneurysm, so blood pressure management is critical (Naidech, 2005). The ASA recommends using a titratable agent to control hypertension and prevent re-bleeding, with a Class I-Level A recommendation. They further recommend SBP be lowered to 160 mm Hg regardless of the initial systolic pressure, but this is a Class IIb-Level B recommendation (Connolly, 2012). In their guidelines, the ASA does recognize the risk of reducing cerebral perfusion pressure with aggressive hypertension control, but believes this is outweighed by the benefit of preventing hypertension-induced aneurysmal rebleeding (Connolly, 2012).

Ischemic Stroke

Similar to blood pressure control in hemorrhagic stroke, there has been a movement to treat hypertension less aggressively in ischemic stroke patients (Willmot, 2004). Prior rationales for aggressive hypertension control included a reduction in cerebral edema, prevention of hemorrhagic conversion, and prevention of recurrent of stroke — with decreased mortality in a number of early studies (Bee, 2002). However, this relationship was not determined to be causal and the mechanism behind hypertension is complicated. During ischemic states (embolic or thrombotic) cerebral vascular autoregulation is dysfunctional, so cerebral blood flow is dependent on cardiac output and intracranial pressure.

Thrombolytic vs. Non-thrombolytic Candidates

With respect to patients who are not thrombolytic candidates, the ASA guidelines follow the evidence-based trend of permissive hypertension and recommend blood pressure control when SBP is above 220mmHg, diastolic above 120mmHg, or there is evidence of end organ damage. The goal is to maintain cerebral perfusion and minimize the enlargement of the ischemic penumbra in patients who are not thrombolytic candidates.

The guidelines recommend aggressive but controlled reduction of SBP to under 185mmHg in thrombolytic candidates (Jauch, 2013). The authors believe the benefits of thrombolytics outweigh the risks of rapidly lowering blood pressure. The ASA recommends a titratable IV agent for hypertension control and, though there is no consensus on which anti-hypertensive agent to use, below is basic information on the most common agents used in the United States.

Agent	Class of Drug	Dosing	Onset	t1/2
Labetalol	α/β antagonist	10-20mg q 15 min (max 300mg)	5-10 min	4 hrs
Nicardipine	CCB	5mg/hr, ↑ by 2.5mg q 5-10min	5-10 min	2 hrs
Nitroprusside	Nitrate	0.2-10 µg/kg/min	1 min	3 min
Nitroglycerin	Nitrate	10-400 µg/kg	1 min	3 min
Clevidipine	CCB	1-2 mg/hr, double rate q 90 sec (max 21 mg/hr)	2-4 min	10 min

Conclusion

Hypertension control is just one part of the complex management of a stroke patient. Multiple studies over the last 15 years have demonstrated

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the benefits of permissive hypertension in ICH and ischemic stroke patients, and therefore aggressive anti-hypertensive therapy for all stroke patients is no longer favored. However, current ASA guidelines still recommend tight hypertensive management in ICH, subarachnoid, and thrombolytic candidate ischemic stroke patients. With the release of the ATACHII trial, these guidelines may change.

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