Local Is Better Than General Anesthesia During Endovascular Acute Stroke Interventions

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The aim of endovascular reperfusion techniques for acute ischemic stroke is to improve clinical outcomes. Reperfusion grade, age, earlier time to reperfusion, and location of vessel occlusion have been implicated in impacting clinical outcome. Interestingly, much of the focus in acute stroke protocols has been in the emergency room and stroke units, but the endovascular specialist does not typically adhere to a standard medical or technical protocol. Arguably, the time spent in the endovascular suite may be the most critical portion of patient care and the medical management (ie, blood sugars, blood pressure readings, neurological assessments, etc) is likely not monitored as rigorously as in the intensive care unit. The use of general anesthesia (GA) is common for such interventions ranging from 23% to 44% in recent publications. Proponents of GA have argued that the procedure is safer due to patient immobility, that hemodynamics are more tightly controlled, anesthesia may offer cerebral protection, and that the airway is often compromised in patients with acute stroke. Although these concerns on the surface appear to be intuitive, one must first prove that GA does offer these advantages. The question of safety of GA compared with conscious sedation (CS) can be analyzed in 2 ways. The first is the rate of intracranial hemorrhages (surrogate for wire perforations) and the second is the number of patients that require emergent intubation who were initially placed under CS. Two recent publications have shown that there are no hemorrhage differences in the GA and CS groups and thus the procedure can be performed safely with CS. Furthermore, the conversion rate from CS to GA was low (2.7%) and patients who were treated with GA had higher rates of pneumonia, length of stay in the intensive care unit, and larger infarct volumes. Patient immobility may not be required, and awake patients can also undergo neurological assessments allowing the operator to determine if there has been neurological improvement in the setting of a more distal residual embolus. Such real-time decisions may impact neurological outcome, particularly for operators who may be more aggressive in trying to achieve an angiographic result.

It is important to recognize that patients presenting with acute stroke typically have concomitant coronary artery disease, pulmonary disease, cardiac dysrhythmias, renal disease, and valvulopathy. Such comorbidities would place patients at high risk for more semielective or planned surgical procedures to be performed under GA. Given the emergency nature of an acute ischemic stroke and time constraints, a detailed analysis of a patient’s comorbidities may not be available. Moreover, emergent intubation, particularly without rapid sequence intubation, may carry a high risk of airway injury and pulmonary aspiration. Cerebral protection from inhaled gases particularly, in the setting of an acute ischemic stroke, is an untested hypothesis in humans. As evidenced by the multitude of failed clinical trials for stroke and neuroprotection, this hypothesis currently remains as such. Maintenance of cerebral autoregulation in the setting of an arterial occlusion is imperative to allow for adequate cerebral perfusion pressure to the target penumbra for which the therapy is being initiated. Induction of anesthesia typically causes hypotension, which is corrected with vasopressor agents that may overshoot on the upper limits of the autoregulation curve. Wide fluctuations in blood pressure have been linked to worse clinical outcomes in acute stroke. A last consideration for patients being intubated for acute stroke interventions surrounds the timing of extubation. Many acute stroke interventions are performed in the middle of the night and patients may return to the intensive care units intubated. There may be reluctance to extubate patients immediately in patients with moderate to severe strokes. Each ensuing day increases the risk of nosocomial infections, delays in rehabilitation, and discharge planning at the time patients reside in the intensive care unit. Moreover, families may be more prone to withdraw care on patients because they see their loved ones on “life support” with a profound neurological deficit.

In conclusion, the use of GA should be rigorously studied further for endovascular acute stroke interventions. The use of GA for safety concerns appears unfounded in recent publications. To date, no publication has shown GA improves clinical outcomes for acute stroke interventions, whereas 3...
publications alert us to the potential association to poorer clinical outcomes with GA. Select patients will require GA for airway protection or other respiratory requirements, but the use of CS may have advantages that need to be further explored in ongoing clinical trials.

**Disclosures**

**References**

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