Deciding on the type of anesthesia traditionally depends on personal preference and experience of the interventionalist. Recent evidence appears to support the shift from general (GA) to local (LA) anesthesia in neurovascular interventions. Regional anesthesia reduces the risks of major complications associated with carotid endarterectomy compared with GA. However, unlike elective interventions, the optimal modality of sedation during emergent endovascular procedures in the acute stroke setting has not been established.

Our proponents defend 2 diametrically opposed strategies. Beckenfield et al prefer steering their boat quietly by placing the patient under GA to avoid head movements that may potentially affect safety and technical success of the procedure, providing optimal pain control and airway protection, but unaware of the impact of the intervention and hemodynamic changes on the patient’s clinical status. In contrast, Gupta does not like the darkness; he needs to control the patient’s clinical and hemodynamic status and prefers to sail fast avoiding any delay on treatment initiation by using LA but with the risk of an eventual storm due to uncontrolled pain and patient agitation making the procedure technically complicated and even dangerous for the patient.

Time to treatment is critical and any delay should be avoided. Late complete recanalization does not ensure better outcome than early partial recanalization. In fact, the reverse is likely true. Even with a 24/7 available anesthesiology team, intubation and ventilation unavoidably associates a considerable delay in both treatment initiation and time to recanalization. Moreover, emergent intubation may induce aspiration and airway damage, particularly dangerous in patients treated with intravenous tissue plasminogen activator. In some cases, however, GA is clearly indicated for airway protection due to a decreased level of consciousness or uncontrolled patient agitation.

Acute stroke management in the endovascular suite should be monitored as rigorously as in the stroke unit. GA typically causes marked blood pressure (BP) changes during induction and recovery phases of anesthesia. Even mild BP-lowering during induction of GA may result in a more rapid recruitment of the penumbra into infarction. Although vasopressor agents may correct anesthesia-induced hypotension, BP variability within the “safe range” has been associated with poor outcome in patients with intracranial arterial occlusion. Tight BP control means avoiding BP variability even within the recommended range. In addition, hyperextension of the neck and its manipulations during the induction of GA and intubation could theoretically “kink” the carotid or vertebral arteries and further compromise cerebral blood flow. Further studies are needed to examine this possibility and to elucidate the frequency, degree, and clinical impact of BP fluctuations in patients under GA and LA during endovascular procedures.

The main advantage of LA compared with GA is that awake patients can be monitored for worsening neurological deficit, which may guide the interventionalist to reassess angiography for inadvertent reocclusion, embolization, or intracranial hemorrhage. On the other hand, neurological assessment may allow determining in real time the end point of the procedure based on the degree of clinical improvement rather than on angiographic result. Although GA provides optimal pain control, pain in awake patients usually alleviates with analgesics and represents a warning symptom of the aggressiveness of the procedure. Uncontrolled and persistent pain should alert the interventionalist to modify the endovascular technique to avoid vessel perforation or dissection.

GA and LA are not 2 sides of the coin. Some patients initially placed under LA may become anxious and agitated, making fluoroscopic navigation and imaging interpretation difficult. This may result in a longer procedure time and
greater exposure to fluoroscopy and contrast. Uncontrolled agitation, oversedation, and vomiting may require emergency intubation and conversion to GA for airway protection. Although the conversion rate seems to be low, prospective studies are required to determine the real frequency and predictors of emergent conversion from LA to GA. If GA is chosen, standardized protocols for early postprocedural extubation should be used to minimize the risk of pneumonia.

Although recent retrospective studies have shown that LA seems to be safe for endovascular acute stroke procedures and that GA was associated with higher rates of pneumonia, larger infarct volumes, and poorer clinical outcome, future prospective randomized controlled trials of endovascular treatment should evaluate the impact of sedation modality on safety of the intervention, technical success, time to recanalization, and clinical outcome.

Disclosures
None.

References

Key Words: endovascular treatment ■ anesthesia ■ stroke ■ reperfusion
General or Local Anesthesia During Endovascular Procedures: Sailing Quiet in the Darkness or Fast Under a Daylight Storm

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