Editor-in-Chief : Atul Goel (INDIA)
Open Access HTML Format
For entire Editorial Board visit : http://www.jcvjs.com/editorialboard.asp
Journal of Craniovertebral Junction and Spine

Editorial

Awake craniotomies for aneurysms, arteriovenous malformations, skull base tumors, high flow bypass, and brain stem lesions

Saleem I. Abdulrauf

Department of Neurosurgery, Saint Louis University, Saint Louis, Missouri, United States

Corresponding author: Prof. Saleem I. Abdulrauf, 3635 Vista Avenue, Saint Louis - 63110, Missour, United States. E-mail: abdulrsi@slu.edu

Journal of Craniovertebral Junction and Spine 2015, 6:3

Craniotomies for glioma resection under conscious sedation (CS) have been well-documented in the literature for gliomas that are in or adjacent to eloquent areas.[1-5] To the best of our knowledge, based on a review of current literature, the use of awake surgery forclipping of aneurysms, high flow extracranial to intercranial (EC-IC) bypass, resection of arteriovenous malformations (AVMs), resection of skull base tumors, and the resection of brain stem lesions has not previously been reported.

Intraoperative monitoring using electroencephalography (EEG), somatosensory evoked potentials (SSEP), and motor evoked potentials (MEP) have inherent false-positives and-negatives that have been reported and have been experienced by neurosurgeons during craniotomies for the abovementioned pathologies.

During cerebral aneurysm surgery, temporary clipping is often required, and by proposing craniotomy under CS, we are capable of assessing neurological function (i.e., hand-motor function during middle cerebral artery division temporary clipping). At the final reconstruction of the aneurysm and by assessing neurological function, we are able to evaluate any potential risk to a perforator behind the aneurysm by performing a direct neurological evaluation.

During microsurgical resection ofAVMs located in or around eloquent areas can be challenging. This is due, in large part, to the risk of obliterating vessels in the area of the AVM nidus that may be supplying normal cortical and subcortical structures. By checking each one of these feeder versus bystander vessel by performing direct neurological examination, we are able to avoid the risk of ischemia to normal brain tissue.

During high-flow EC-IC bypass surgery, two important steps, temporary occlusion of the recipient vessel and the permanent occlusion of the parent aneurysmal vessel, are monitored using electrophysiology, which can have both false-positives and -negatives. The risk of the latter can be significantly avoided if the procedure can be performed in a patient under conscious ("awake") sedation, allowing direct motor evaluation.

During brain stem surgery, monitoring technology is even more limited. By performing the procedure under CS, we are able to test each function related to the respective region being operated on and thus potentially decreasing the neurological morbidity of the procedure.

Anesthesia team protocol is as follows: The surgical procedure is performed under a monitored anesthesia care. Spontaneous respirations are maintained throughout the case with dexmedetomidine (0.2-1.0 mcg/kg/h) and remifentanil (0.05-2 mcg/kg/min) infusions. EEG monitoring is used to help gauge the appropriate depth of anesthesia. A scalp block using 0.5% ropivicaine with epinephrine is used to anesthetize the respective scalp region. Prior to the awake-phase of the surgery, thedexmedetomidineinfusion is discontinued. Remifentanil is continued for pain control, and elevations in blood pressure are treated with nitroglycerin and esmolol. Neurological evaluation is then focused on the function of interest depending on the specific procedure. Sedation is then restarted for the remainder of the surgery.

Motor function is tested for the respective region by a member of the neurosurgery team. Vision testing is performed by using color plates and an iPad with specific programs quantifying various visual tests [Figures 1 and 2]. Motor cranial nerve function is tested directly.

Access this article online

Quick Response Code:

Website: www.jcvjs.com

DOI: 10.4103/0974-8237.151580

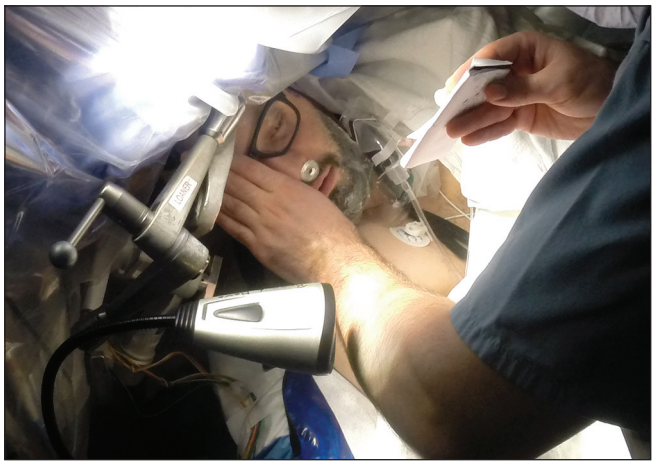

Figure 1: Intraoperative photograph taken during temporary clipping of vessels surrounding a pulvinar-occipital (arteriovenous malformation) AVM

We have now performed 61 craniotomies using the above awake/CS protocol. No single case had to be converted into general anesthesia during or after the procedure. Compared to our own series prior to the awake procedures, for the same cases, we have lower neurological morbidity, zero mortality, and shorter hospital stay in this cohort.

REFERENCES

1. Bejjani GK, Nora PC, Vera PL, Broemling L, Sekhar LN. The predictive value of intraoperative somatosensory evoked potential monitoring: Review of 244 procedures. Neurosurgery 1998;43:491-8.

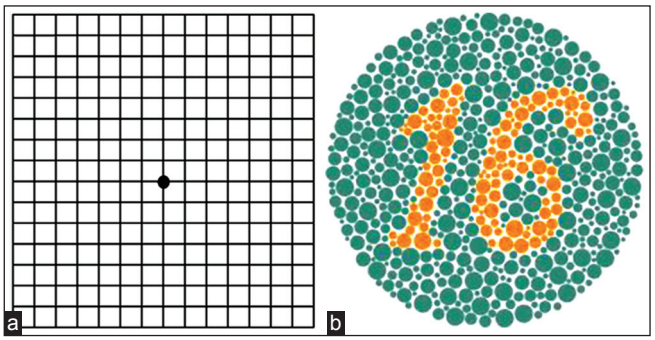

Figure 2: (a) Amsler grid and (b) color plate

2. De Benedictis A, Mortiz-Gasser S, Duffau H. Awake mapping optimizes the extent of resection for low-grade gliomas in eloquent areas. Neurosurgery 2010;66:1074-84.
3. Peruzzi P, Bergese SD, Viloria A, Puente EG, Abdel-Rasoul M, Chiocca EA. A retrospective cohort-matched comparison of conscious sedation versus general anesthesia for supratentorial glioma resection. Clinical article. J Neurosurg 2011;114:633-9.
4. Taylor MD, Bernstein M. Awake craniotomy with brain mapping as the routine surgical approach to treating patients with supratentorial intraaxial tumors: A prospective trial of 200 cases. J Neurosurg 1999;90:35-41.
5. Wiedemayer H, Sandalcioglu IE, Armbruster W, Regel J, Schaefer H, Stolke D. False negative findings in intraoperative SEP monitoring: Analysis of 658 consecutive neurosurgical cases and review of published reports. J Neurol Neurosurg Psychiatry 2004;75:280-6.

How to cite this article: Abdulrauf SI. Awake craniotomies for aneurysms, arteriovenous malformations, skull base tumors, high flow bypass, and brain stem lesions. J Craniovert Jun Spine 2015;6:8-9.

Source of Support: Nil, **Conflict of Interest:** None declared.