

**Commentary on:**

*Sensitivity and Specificity of Intraoperative Neuromonitoring for Identifying Safety and Duration of Temporary Aneurysm Clipping Based on Vascular Territory, a Multimodal Strategy*

by Staarmann et al. *World Neurosurg* 100:522-530, 2017

## Aneurysm Surgery: Technique and Technology

### Abhidha Shah

Brain surgery is a terrible profession. If I did not feel it will become different in my lifetime, I should hate it.

— Wilder Penfield

It has been a long journey from the early experiments performed in the 1700s to stimulate the decapitated brains of prisoners to modern gadgetry available for neuromonitoring. The science of brain mapping and monitoring has made a quantum leap, and monitoring is increasingly being used to detect function and prevent neurologic catastrophe. Neurosurgery has progressed from just being preservation of life to achieving conservation and restoration of function. The advances in neuromonitoring have increased its applicability from epilepsy and tumor surgery to vascular neurosurgery. By monitoring both somatosensory evoked potentials and transcranial motor evoked potentials, Staarmann et al.<sup>1</sup> increased the sensitivity and specificity of detecting new neurologic deficits during temporary clipping.

The knack of clipping an aneurysm has to be mastered by sheer practice. The battery of sophisticated machinery is worthless in the face of improper technique. Surgery for intracranial aneurysms is a delicate and precise art. It is important to dissect the neck of the aneurysm, isolate the whole aneurysm from the surrounding neurovascular structures, safeguard the perforators and branch vessels, and finally clip it perfectly. There is no margin for error in this sequence. To be doubly sure about safety of the procedure, electrophysiologic monitoring is advocated.

Technology is derived from the Sanskrit word *takshata* and means something that “extends the hand and helps the eye.” Technique is an art or a skill of performing a particular activity;

technology refers to complex scientific processes used in applications and equipment. Aneurysm surgery has gone from being a technical surgery to being both a technical and technologic surgery. The additions of Doppler, fluorescence, adenosine, and better anesthesia have made surgery for intracranial aneurysms safer. To this armamentarium of thingamajigs we now add a battalion of electrophysiologic apparatus. Although safety of the patient is paramount, additional technologic equipment must not add tools that confuse the surgeon, unduly prolong the operation, and introduce sounds of metallic clutter in the operation. Moreover, technology can help, but cannot replace, technique. Technologic advancements should be combined with refinements in surgery. In aneurysm surgery in particular, technique is crucial. As they say, perfect gait is important, dressing up can come later.

Even in technology, less is more. Simple is superior to the sophisticated. Although I applaud technologic advances, I cannot indulge in flattery or hyperbole about them. While technology surges ahead, the philosophy of neurosurgery should not lag behind. Technology can make you bold without being wise.

The greatest danger in art is too much knowledge.

A little knowledge is a dangerous thing. So is a lot.

The only source of knowledge is experience.

— Albert Einstein

Knowledge is knowing that a tomato is a fruit; wisdom is not putting it in a fruit salad.

— Miles Kington

### Key words

- Cerebral aneurysms
- Intraoperative monitoring
- Postoperative deficits
- Somatosensory-evoked potentials
- Transcranial motor-evoked potentials

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Being “information overloaded” in the art of surgery can be hazardous and can make you insecure. Once there is a loss of intraoperative signals, rational decisions that are made based on experience and wisdom and not knowledge alone should guide the sequelae of events that follow. Present-day neuromonitoring may be able to predict the imminent danger

of a neurologic deficit, but it cannot prophesize whether the change will be temporary or permanent.

The results of neuromonitoring should be interpreted with caution. If used wisely, neuromonitoring can be an invaluable aid to aneurysm surgery.

## REFERENCE

1. Staarmann B, O'Neal K, Magner M, Zuccarello M. Sensitivity and specificity of intraoperative neuro-monitoring for identifying safety and duration of temporary aneurysm clipping based on vascular

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