Letter to the editor


We read with great interest this article. We understand that this article aims to present developments and state of art of intraoperative neurophysiologic monitoring (IOM) only in France, as the title suggests. As members of the International Society for Intraoperative Neurophysiology (ISIN) we support much of the content and wholeheartedly embrace the authors’ concern on the value of remote monitoring and automated IOM systems. Yet we have objections to some of the data and statements in this article.

In the first sentence of their summary the authors wrote: “Intraoperative spinal cord monitoring consists in a subcontinuous evaluation of spinal cord sensory-motor functions and allows the reduction the incidence of neurological complications resulting from spinal surgery.” We believe that this statement is somehow misleading. It is true that in some circumstances a truly continuous monitoring of evoked potentials may not be ideal, for example with transcranial motor-evoked potentials (MEPs) inducing strong muscle twitches that may interfere with surgery. Nevertheless, as a general rule, intraoperative monitoring should be performed in a way as to continuously monitor functional integrity of nervous structure under risk during critical surgical steps, as opposed to subcontinuously. Most monitoring modalities such somatosensory evoked potentials, brainstem auditory evoked potentials and D-wave monitoring have no contraindications to continuous monitoring.

Besides the continued widespread use of the ‘neurogenic MEP’ (NMEP) in France, this method has been largely abandoned elsewhere [1,2]. This became especially true after NMEPs were severely challenged as useful for monitoring the corticospinal motor pathway in an article published by Minahan et al., [3] accompanied with an editorial [4] and fully documenting two patients who suffered anterior spinal cord injury with immediate postoperative paraplegia despite full preservation of intraoperative NMEPs and somatosensory evoked potentials (SEPs). Gavaret et al. fail to cite this important article as well as other theoretical [5], experimental animal [6] and clinical [7] published evidence opposing a motor component in the recorded NMEP. On the contrary, they cite a single article written by one of the authors Pereon et al. [8] showing evidence for a small polyphasic motor component. Unfortunately in clinical practice just the opposite has been shown, that paraplegia can appear during surgery with completely preserved NMEPs. We do not object using NMEPs as a method for monitoring functional integrity of the dorsal columns by their antidromic activation, but not the corticospinal tracts. In fact, since SEPs and NMEPs both assess the dorsal columns, referring to their combination as ‘multimodal’ is somewhat misleading and only fosters confusion, as evidenced by the authors specifying the ‘M’ in NMEP as ‘motor’ in the abstract, but ‘mixed’ in the body text, and suggesting that SEP and NMEP monitoring is an equivalent option to truly multimodal SEP and MEP monitoring. In no way can spinally elicited peripheral nerve potentials be thought of as a surrogate for selective MEP monitoring [1,2]. The NMEP nomenclature itself fosters confusion by containing MEP and would best be changed to something else, such as spinally elicited peripheral nerve responses (SEPNRs) [3] or neurogenic sensory evoked potentials (NSEPs).

In their paragraph: “Disadvantage of D-waves” the authors state that “D-waves cannot be used in small children, generally under 4 years of age (incomplete maturation of motor pathways)”. While younger children need higher stimulation intensities and it may be more challenging to monitor MEPS in this population, Szelenyi et al. [9], recorded D-waves in children as young as 21 months of age.

In the author’s paragraph “Proposition for guidelines” it is written that “Whatever the monitoring technique used, it remains preferable to the absence of monitoring”. We consider this statement as unacceptable because inadequate monitoring techniques failing to assess the most at-risk neural structure can be falsely reassuring and result in tragic postoperative neurologic deficit [3,10,11]. Moreover, such a statement may foster the attitude to pursue intraoperative monitoring “at all costs” – mainly for medicolegal implications – at the expense of good quality IOM. Recently, Hong et al. published the case of a young girl who emerged paraplegic from scoliosis surgery, claiming that muscle MEPS did not document the injury [12]. It was then clearly shown that they mistakenly inverted the recording electrodes so that they were looking at the upper extremities thinking these were the lower extremities and vice versa [13]. Rather than a false-negative MEP result, this was indeed an unrecognized true positive MEP result. It was evident that no professionals with IOM expertise supervised this procedure. We therefore strongly believe that no monitoring is definitively better than bad monitoring, such as the one depicted in the case of this unfortunate young patient.

References


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