Articles of Interest - Spinal Cord Tumors

Delitis, V; Sala, F. (2008), 'Intraoperative neurophysiological monitoring of the spinal cord during spinal cord and spine surgery: A review focus on the corticospinal tracts', Clinical Neurophysiology 119(2), 248 –264.

ABSTRACT:
Recent advances in technology and the refinement of neurophysiological methodologies are significantly changing intraoperative neurophysiological monitoring (IOM) of the spinal cord. This review will summarize the latest achievements in the monitoring of the spinal cord during spine and spinal cord surgeries. This overview is based on an extensive review of the literature and the authors' personal experience. Landmark articles and neurophysiological techniques have been briefly reported to contextualize the development of new techniques. This background is extended to describe the methodological approach to intraoperatively elicit and record spinal D wave and muscle motor evoked potentials (muscle MEPs). The clinical application of spinal D wave and muscle MEP recordings is critically reviewed (especially in the field of Neurosurgery) and new developments such as mapping of the dorsal columns and the corticospinal tracts are presented. In the past decade, motor evoked potential recording following transcranial electrical stimulation has emerged as a reliable technique to intraoperatively assess the functional integrity of the motor pathways. Criteria based on the absence/presence of potentials, their morphology and threshold-related parameters have been proposed for muscle MEPs. While the debate remains open, it appears that different criteria may be applied for different procedures according to the expected surgery-related morbidity and the ultimate goal of the surgeon (e.g. total tumor removal versus complete absence of transitory or permanent neurological deficits). On the other hand, D wave changes – when recordable – have proven to be the strongest predictors of maintained corticospinal tract integrity (and therefore, of motor function/recovery). Combining the use of muscle MEPs with D wave recordings provides the most comprehensive approach for assessing the functional integrity of the spinal cord motor tracts during surgery for intramedullary spinal cord tumors. However, muscle MEPs may suffice to assess motor pathways during other spinal procedures and in cases where the pathophysiology of spinal cord injury is purely ischemic. Finally, while MEPs are now considered the gold standard for monitoring the motor pathways, SEPs continue to retain value as they provide specificity for assessing the integrity of the dorsal column. However, we believe SEPs should not be used exclusively – or as an alternative to motor evoked potentials – during spine surgery, but rather as a complementary method in combination with MEPs. For intramedullary spinal tumor resection, SEPs should not be used exclusively without MEPs.

Kothbauer, K. F. (2007), 'Neurosurgical management of intramedullary spinal cord tumors in children.', Pediatr Neurosurg 43(3), 222 –235.

ABSTRACT:
The majority of intramedullary spinal cord tumors in children are low-grade glial tumors. They become symptomatic with pain, neurologic deficits or spinal deformity. The diagnosis is most readily obtained using magnetic resonance imaging. The natural history is significant for slow progression of symptoms. Surgery is the best treatment and is also indicated to confirm the histological diagnosis. In case of a low-grade tumor or a vascular lesion such as hemangioblastoma or cavernoma, a total or near-total resection is attempted. For astrocytomas the resection almost always remains biologically incomplete, but a near-total resection is still associated with a long progression-free survival. Neurologic morbidity is relatively low during long-term follow-up but can be up to 30\% for

transient motor deficits. The risk for neurologic deterioration is higher for patients with pronounced dysfunction preoperatively. This is an important argument for early surgical resection. Surgery is performed using the spectrum of microsurgical techniques as well as advanced technology, e.g. lasers and intraoperative neurophysiological monitoring with motor evoked potentials. High-grade tumors are resected conservatively and treated with radiation and chemotherapy. The prognosis of high-grade glial tumors remains poor.

Impulse Monitoring, Inc., 10420 Little Patuxent Parkway, Suite 250, Columbia, MD 21044
Ph: 410-740-2370, www.impulsemonitoring.com
For questions on neuromonitoring please contact Impulse Monitoring, Inc. (888) 464-7999