Intraoperative Neuromonitoring Monitoring Does Not Affect Surgical Outcomes or Decrease Post-operative Dysesthesia in Percutaneous Transformal Surgery

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Introduction: Intraoperative neuromonitoring monitoring is used when the spinal nerves are at risk for damage during spine surgery. Is its routine use, however cost and beneficially effective?

Method: 100 consecutive Patients undergoing Lumbar Transforaminal Endoscopic Discectomy were monitored pre-op, intra-op, and post-operatively by SEP (somatosensory evoked potentials) and EMG (electromyography) activity. A comparable group without neuromonitoring served as the control. Live free-running EMG was recorded during surgery, on the affected leg. Responses were graded as: mechanical irritation, neurotonic discharges, and no response. surface electrodes monitored the Quadriceps muscle for L3/4 , Tibialis Anterior for L5, and Gastrocnemius for S1. Each patient was anesthesized with 1% lidocaine, Versed and Fentanyl. follow-up 2-6 months.

Results:

SEP: The SEP on the affected leg was averaged, and compared with the asymptomatic unaffected leg pre-operative and post operatively. Post-operative dysesthesia, if moderate or severe, was treated by a transformal block and sympathetic block or gabapentin until the usually temporary dysesthesia resolved. The painful affected leg sometimes, but not always demonstrated latency delays or depressed amplitudes in the SEP waveform. The recorded pathway may show, but not always, asymmetries between affected and control limbs.

EMG: Mechanical elicitation of evoked discharges occurred in 33% of the cases intra-operatively. Discharges correlated with the action of tapping a dilator and cannula past the exiting and/or traversing nerve. EMG neurotonic irritation patterns was also exhibited when the peripheral nerve was stimulated either during extraction of a sequestered disc fragment or during foraminoplasty. The patient was able to simultaneously feel nerve irritation. Immediately after decompression, the EMG returned to baseline, correlating well with lack of symptoms. While EMG provided feed back to the surgeon, warning him of the vicinity of a peripheral nerve, it was not critical to the performance of endoscopic decompression or the use of thermal ablation, but provided feedback on the pain source. The patient may report pain even when there was no EMG activity, but continuous EMG monitoring warned the surgeon that the nerve was in the vicinity. There was no correlation of EMG irritation patterns experienced intra-operately with post-operative dysesthesia. Dysesthesia occurred in 5 % of patients even when was no EMG activity intraoperatively. Some patients exhibiting EMG activity (33%) during surgery had no dysesthesia post-op. SEP monitoring documented improved changes in latency of the involved nerve when there was significant radiculopathy pre-operatively, but this was not consistent. Some amplitudes increased and others decreased, with post-operative decrease in amplitude was expected, due to the effects of the local anesthetic. Overall, these latency and amplitude changes nevertheless reflect measurable changes of the central and peripheral nervous system, and generally provided additional information to the surgeon regarding nerve decompression and the position and irritability of the nerves in the operative area. EMG stimulation could be correlated with physician visualization of the involved nerve in the operative field.

Conclusion: Monitoring EMG and SEP may be useful in avoiding complications in general Lumbar surgery under general anesthesia, but its expense appears to be unnecessary when the surgery is under local anesthesia and sedation. The patient providing intra-operative feedback to the surgeon is as, if not more valuable than neuromonitoring.