2015

The aim of a study was to evaluate the value of intraoperative neurophysiological monitoring (IONM) using electromyography (EMG), brainstem auditory evoked potentials (BAEPs), and somatosensory evoked potentials (SSEPs) to predict and/or prevent postoperative neurological deficits in pediatric patients undergoing endoscopic endonasal surgery (EES) for skull base tumors.

All consecutive pediatric patients with skull base tumors who underwent EES with at least 1 modality of IONM (BAEP, SSEP, and/or EMG) at our institution between 1999 and 2013 were retrospectively reviewed. Staged procedures and repeat procedures were identified and analyzed separately. To evaluate the diagnostic accuracy of significant free-run EMG activity, the prevalence of cranial nerve (CN) deficits and the sensitivity, specificity, and positive and negative predictive values were calculated.

A total of 129 patients underwent 159 procedures; 6 patients had a total of 9 CN deficits. The incidences of CN deficits based on the total number of nerves monitored in the groups with and without significant free-run EMG activity were 9% and 1.5%, respectively. The incidences of CN deficits in the groups with 1 staged and more than 1 staged EES were 1.5% and 29%, respectively. The sensitivity, specificity, and negative predictive values (with 95% confidence intervals) of significant EMG to detect CN deficits in repeat procedures were 0.55 (0.22-0.84), 0.86 (0.79-0.9), and 0.97 (0.92-0.99), respectively. Two patients had significant changes in their BAEPs that were reversible with an increase in mean arterial pressure.

IONM can be applied effectively and reliably during EES in children. EMG monitoring is specific for detecting CN deficits and can be an effective guide for dissecting these procedures. Triggered EMG should be elicited intraoperatively to check the integrity of the CNs during and after tumor resection. Given the anatomical complexity of pediatric EES and the unique challenges encountered, multimodal IONM can be a valuable adjunct to these procedures [1)].

1)
Elangovan C, Singh SP, Gardner P, Snyderman C, Tyler-Kabara EC, Habeych M, Crammond D, Balzer J, Thirumala PD. Intraoperative neurophysiological monitoring during endoscopic endonasal surgery for pediatric skull base tumors. J Neurosurg Pediatr. 2015 Oct 30:1-9. [Epub ahead of print] PubMed PMID: 26517056.