Intraoperative neurophysiologic monitoring

Intraoperative neurophysiologic monitoring of the extraocular cranial nerve (EOCN) is not commonly performed because of technical difficulty and risk, reliability of the result and predictability of the postoperative function of the EOCN. METHODS: We performed oculomotor nerve (CN III) and abducens nerve (CN VI) intraoperative monitoring in patients with skull base surgery by recording the spontaneous muscle activity (SMA) and compound muscle action potential (CMAP). Two types of needle electrodes of different length were percutaneously inserted into the extraocular muscles with the free-hand technique. We studied the relationships between the SMA and CMAP and postoperative function of CN III and CN VI. RESULTS: A total of 23 patients were included. Nineteen oculomotor nerves and 22 abducens nerves were monitored during surgery, respectively. Neurotonic discharge had a positive predictive value of less than 50% and negative predictive value of more than 80% for postoperative CN III and CN VI dysfunction. The latency of patients with postoperative CN III dysfunction was 2.79 ± 0.13 ms, longer than that with intact CN III function (1.73 ± 0.11 ms). One patient had transient CN VI dysfunction, whose CMAP latency (2.54 ms) was longer than that of intact CN VI function (2.11 ± 0.38 ms). There was no statistically significant difference between patients with paresis and with intact function. CONCLUSIONS: The method of intraoperative monitoring of EOCNs described here is safe and useful to record responses of SMA and CMAP. Neurotonic discharge seems to have limited value in predicting the postoperative function of CN III and CN VI. The onset latency of CMAP longer than 2.5 ms after tumor removal is probably relevant to postoperative CN III and CN VI dysfunction. However, a definite quantitative relationship has not been found between the amplitude and stimulation intensity of CMAP and the postoperative outcome of CN III and CN VI [1)].

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Li ZY, Li MC, Liang JT, Bao YH, Chen G, Guo HC, Ling F. Usefulness of intraoperative electromyographic monitoring of oculomotor and abducens nerves during skull base surgery. Acta Neurochir (Wien). 2017 Aug 2. doi: 10.1007/s00701-017-3268-z. [Epub ahead of print] PubMed PMID: 28766024.