



Visualizing, Tracking the Neural Function, Discriminating Reversible Injury by Respecting the Time Factor with New Intraoperative Continuous Dorsal Cochlear Nucleus Action Potentials and Facial Nerve Root Evoked Electromyography Improved Functional P

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Introduction

Adult cranial nerve, particularly cochlear nerve, is extremely vulnerable to various insults in brain tumor surgery. The recent discovery of the reversible injury of cranial nerve, however, raises the possibility of restoring the nerve function by making injuring period minimum and recuperating period maximum following the insult so that we respect the time factor of neuronal injury. A new application of continuous auditory evoked dorsal cochlear nucleus action potentials (DNAPs) and continuous facial nerve root evoked electromyography (FREEMG) for monitoring retrosigmoid acoustic neuroma resection enabled us to investigate this hypothesis with attempted complete functional preservation.

Methods

83 consecutive patients underwent retrosigmoid unilateral acoustic neuroma surgery during 2006-2010 and postoperative hearing and facial nerve function were evaluated. 58 patients underwent continuous DNAP and FREEMG monitorings that visualize and track in-time neural function throughout the entire procedure. In this group, whenever these responses declined to 40% and 65% of initial responses respectively, intentional recuperating period at least 30 minutes for DNAP and 15 minutes for FREEMG were taken until those responses return to the determined level so as to discriminate the reversible injury. 25 patients did not receive intraoperative DNAP and FREEMG monitorings as well as intraoperative recuperating treatment. Postoperatively hearing and facial functions were assessed on the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) hearing preservation classification system and House-Brackmann (HB) grades respectively.

Results

Serviceable hearing was preserved in 91 % of patients who had DNAP and FREEMG monitorings together with intraoperative recuperating treatment. Whereas, serviceable hearing was maintained in 46% of patients who did not receive both of them. Normal facial nerve function (HB grade 1) was achieved in 83% of patients with these monitorings and the treatment as opposed to 52% in patients without them at the acute postoperative period (within 3 days). Normal facial nerve function (HB1) was achieved in 94% in monitored and treated patients at the late postoperative period (6-12 months).

Conclusions

Visualizing, tracking the neural function and discriminating reversible injury by respecting the time factor of neuronal injury with new intraoperative continuous DNAPs and FREEMG improved functional preservation in acoustic neuroma surgery

Learning Objectives

After completing this session, participants would understand the usefulness of DNAP and FREEMG for acoustic neuroma surgery

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