

Warning Values of Intraoperative BAEP Monitoring During Microvascular Decompression for Hemifacial Spasm: A Tool for Safety and Functional Preservation

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Abstract

Introduction: Microvascular decompression (MVD) is the gold standard treatment for hemifacial spasm (HFS), but it carries a risk of auditory morbidity, primarily due to lateral traction on the eighth cranial nerve during exposure of the facial nerve. This study aimed to: (1) assess the incidence and mechanisms of hearing loss during MVD for HFS; (2) identify critical intraoperative changes in brainstem auditory evoked potentials (BAEPs) that predict postoperative outcomes; and (3) define practical intraoperative warning thresholds.

Method: We retrospectively analyzed 100 patients undergoing MVD for HFS, including 84 with detailed intraoperative BAEP recordings and 34 earlier cases. BAEPs were continuously monitored, focusing on Wave I–V interpeak latency, Wave V latency shifts, and amplitude changes. Pre- and postoperative auditory function was evaluated using pure tone average (PTA). Correlations between intraoperative changes and hearing outcomes were analyzed to identify risk thresholds.

Result: Hearing was preserved in 88% of monitored patients. Hearing loss occurred in 9.5%, and complete deafness in 2.3%. Wave V latency delay was the most sensitive intraoperative marker. Mean delay was 0.61 ms (± 0.36) in patients without hearing loss, and 1.05 ms (± 0.64) in those with hearing decline. Wave V abolition was associated with permanent deafness. Most BAEP changes occurred during cerebellar retraction. Earlier cases without systematic monitoring showed a higher deafness rate (3/7) than later ones (2/93).

Discussion: BAEP monitoring reduces the risk of hearing loss by detecting reversible changes during MVD. We propose three intraoperative warning thresholds: • 0.4 ms Wave V delay – “watching” • 0.6 ms – “warning” • 1.0 ms or BAEP loss – “critical” These thresholds help prevent irreversible auditory damage in functional neurosurgery.

References

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