Intraoperative monitoring of the vestibulocochlear nerve

Brainstem auditory evoked responses has been largely replaced by intraoperative monitoring of the vestibulocochlear nerve which provides more rapid information for the surgeon.

Neurosurgical procedures involving the skull base and structures within can pose a significant risk of damage to the brain stem and cranial nerves. This can have life-threatening consequences and/or result in devastating neurologic deficits. Over the past decade, intraoperative neurophysiology has significantly evolved and currently offers a great tool for live monitoring of the integrity of nervous structures. Thus, dysfunction can be identified early and prompt modification of the surgical management or operating conditions leads to avoidance of permanent structural damage. Along these lines, the vestibulocochlear nerve (CN VIII) and, to a greater extent, the auditory pathways as they pass through the brain stem are especially at risk during cerebelopontine angle (CPA), posterior/middle fossa, or brain stem surgery. CN VIII can be damaged by several mechanisms, from vascular compromise to mechanical injury by stretch, compression, dissection, and heat injury. Additionally, cochlea itself can be significantly damaged during temporal bone drilling, by noise, mechanical destruction, or infarction, and because of rupture, occlusion, or vasospasm of the internal auditory artery.CN VIII monitoring can be successfully achieved by live recording of the function of one of its parts, the cochlear or auditory nerve (AN), using the brain stem auditory evoked potentials (BAEPs), electrocochleography (ECochG), and compound nerve action potentials (CNAPs) of the cochlear nerve.This is a review of these techniques, their principle, applications, methodology, interpretation of the evoked responses, and their change from baseline, within the context of surgical and anesthesia environments, and finally the appropriate management of these changes [1)].

1)

Simon MV. Neurophysiologic intraoperative monitoring of the vestibulocochlear nerve. J Clin Neurophysiol. 2011 Dec;28(6):566-81. doi: 10.1097/WNP.0b013e31823da494. PMID: 22146352.