

Title: SSEP MONITORING IN NEUROSURGICAL PATIENTS IN THE SITTING POSITION

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Introduction: Midcervical quadriplegia has been reported following acoustic tumor resection performed in patients in the sitting position. This injury may be due to acute flexion of the cervical spine during positioning of the anesthetized patient, leading to impaired blood flow to the cervical cord. The purpose of this study was to determine whether SSEP monitoring during head positioning would identify patients at risk for such cervical cord injury.

Methods: We studied 200 patients; scheduled to undergo neurosurgical procedures in the sitting position. All were anesthetized using an N₂O/narcotic/relaxant technique. Baseline SSEPs were obtained using a Neurotrac™ evoked response monitor (Interspec Inc., Philadelphia, PA). Potentials were evoked by stimulating the median nerve at the wrist via needle electrodes and the cortical evoked responses were recorded using a needle electrode in the contralateral C3 or C4 position in the scalp. Following head and neck positioning, SSEP monitoring was repeated and the latencies and amplitudes of the responses were

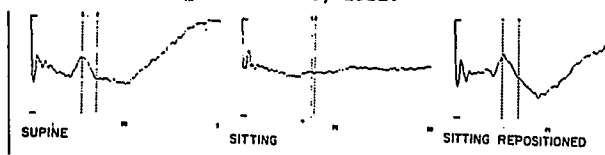
compared with baseline recordings.

Results: Of 200 patients monitored, two showed changes of increased latency and decreased amplitude in the post-positioning SSEP. These changes were normalized by repositioning of the neck. None of the patients studied suffered neurological sequelae attributable to mid-cervical cord compression due to hyperflexion.

Discussion: Our results suggest that SSEP monitoring may be useful in positioning patients scheduled for neurosurgical procedures in the sitting position. Since SSEP monitoring only tests the integrity of the posterior sensory tracts, impairment of other pathways may go undetected. Further studies are needed to fully elucidate the value of SSEP monitoring in the present context.

References:

1. Arch Otolaryngol 106:69, 1980.
2. Surg Neurol 17:255-259, 1982.
3. Neurosurg 11:530-531, 1982.



One of two patients in whom SSEP's changed with positioning

TITLE: SOMATOSENSORY EVOKED POTENTIAL LATENCY CHANGES DURING HYPOTHERMIC CARDIOPULMONARY BYPASS

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During hypothermic cardiopulmonary bypass (CPB) somatosensory evoked potentials (SEP) have been shown to persist at temperatures where the EEG can not be reliably interpreted¹. However, for SEPs to be used reliably during CPB, the effects of anesthetic agents and temperature need to be defined. This study was undertaken to document SEP changes at different temperatures during CPB, in both cooling and rewarming, using 4 anesthetic maintenance techniques.

Following institutional approval and informed consent, 73 patients undergoing elective cardiac surgery utilizing CPB were included in this study. Patients were assigned to one of the following groups for anesthetic maintenance: Fentanyl (FENT, n = 40), Isoflurane (ISO, n = 11), continuous infusion of sufentanil with midazolam (SUF/M, n = 11) or continuous infusion of ketamine with midazolam (KET/M, n = 11). Standard hemodynamic monitoring for open heart surgery was utilized and esophageal temperature was measured. The Neurotrac was used to record median nerve SEPs. Electrodes were placed according to the International 10-20 system. Data were recorded using a filter bandpass of 5-850 Hz and analyzed for latency and amplitude over the first 100 µsec following stimulation. A total of 590 measurements obtained during cooling and rewarming were analyzed.

The figure shows the regression lines relating latency of the first cortical peak and temperature by anesthetic for both cooling and rewarming. Analysis of covariance was performed on the regression lines. Analysis between groups during cooling did not demonstrate any significant differences ($P < .01$) between the regression slopes. However, during rewarming, KET/M was significantly different ($P < .01$) from the other agents.

Our data demonstrates that synthetic opioids (FENT and SUF/M) and ISO affect the SEP cortical latency to different degrees, however, during CPB the cooling and rewarming trends are similar. KET/M has a greater effect on the cortical latency at most temperatures measured. This may be associated with functional and electrophysiological dissociation. The differential effect on cortical latencies demonstrated by KET/M needs further evaluation.

References:

1. J Thorac. Cardiovasc. Surgeon 34:217-222, 1986

