



## Articles of Interest - Chiari Malformation Surgery

**Anderson, R. C. E.; Dowling, K. C.; Feldstein, N. A. & Emerson, R. G. (2003), 'Chiari I malformation: potential role for intraoperative electrophysiologic monitoring.', J Clin Neurophysiol 20(1), 65 – 72.**

### ABSTRACT:

Intraoperative electrophysiologic monitoring can diminish the risk of neurologic injury by enabling the detection of injury at a time when it can be reversed or minimized. Although it is clear that in patients with cervical spine disease monitoring during surgery reduces the incidence of neurologic injury, almost no data are available regarding its utility in patients undergoing suboccipital decompression for Chiari I malformation. Patients with Chiari I malformation have caudal displacement of the cerebellar tonsils below the skull base, thereby creating a tight foramen magnum and cervical canal. Although the majority of pediatric neurosurgeons perform a bony decompression with duraplasty for symptomatic patients, there is much controversy regarding the amount of bony decompression required for clinical improvement and whether a duraplasty is essential. The authors therefore conducted a prospective, observational study using intraoperative brainstem auditory evoked potentials (BAEPs) and somatosensory evoked potentials in pediatric patients undergoing suboccipital decompressions for Chiari I malformations to determine whether there were consistent changes in intraoperative BAEPs that could help the operating surgeon decide how extensive a decompression was needed in these patients, and whether changes in BAEPs or somatosensory evoked potentials occurred during operative positioning that could be modified to reduce the risk of neurologic injury.

**Anderson, R. C. E.; Emerson, R. G.; Dowling, K. C. & Feldstein, N. A. (2003), 'Improvement in brainstem auditory evoked potentials after suboccipital decompression in patients with chiari I malformations.', J Neurosurg 98(3), 459 – 464.**

### OBJECT:

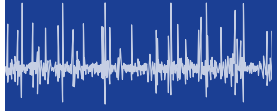
The optimal treatment for patients with symptoms related to Chiari I malformation remains controversial. Although a suboccipital decompression with duraplasty is most commonly performed, there may be a subset of patients who improve in response to bone decompression alone. In an initial attempt to identify such patients, we performed a continuous study of intraoperative brainstem auditory evoked potentials (BAEPs) in patients undergoing a standard decompression with duraplasty and compared conduction times at three different time points: 1) baseline while the patient is supine (before positioning); 2) immediately after opening of the bone and release of the atlantooccipital membrane (that is, the dural band); and 3) after opening of the dura mater.

### METHODS:

Eleven children and young adults (mean age 9.8 years) with symptoms related to Chiari I malformation underwent suboccipital decompression and duraplasty with intraoperative monitoring of BAEPs and somatosensory evoked potentials (SSEPs). Six patients (55%) had associated syringomyelia. At baseline, the I to V interpeak latency (IPL) for both sides (total 21 BAEPs) was 4.19 +/- 0.22 msec (mean +/- standard deviation). After complete bone decompression and before the dura mater was opened, the I to V IPL decreased to 4.03 +/- 0.25 msec ( $p = 0.0005$ ). When the dura was opened, however, no further decrease in the I to V IPL was detected (4.03 +/- 0.25 msec;  $p = 0.6$ ). The SSEPs remained stable throughout the procedure.

### CONCLUSIONS:

In children and young adults undergoing suboccipital decompression with duraplasty for Chiari I malformation, the



vast majority of improvement in conduction through the brainstem occurs after bone decompression and division of the atlantooccipital membrane, rather than after opening of the dura. Additional studies are needed to establish whether the improvement seen with BAEP monitoring during bone decompression will predict long-term clinical improvement in these patients.

**Mérat, S.; Blondet, E.; Gulluche, Y. L.; Faillot, T. & Brinquin, L. (2002), '[Paraplegia and the sitting position]', *Ann Fr Anesth Reanim* 21(7), 596 – 599.**

ABSTRACT:

The sitting position in neurosurgery may lead to complications such as air embolism and neurological complications. We report the case of a 16-year-old male who suffered from post-operation paraplegia after surgery for Arnold Chiari disease. This patient had several risk factors and serious morphological spinal abnormalities. We propose to include monitoring of somatosensory evoked potentials (SSEP) during this surgery in order to detect this type of devastating incident.

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