CEREBELLAR EVOKED POTENTIALS AND NITROUS OXIDE IN HEALTHY SUBJECTS

Melinda J Davis BMed FANZCA, Robert A McTaggart Cowan MD FRCPC, Pirjo Manninen MD FRCPC, David P Archer MD MSc FRCPC, Erin Phillip BSc CNIM.

Department of Anaesthesia, Foothills Medical Centre, 1403 29th St NW Calgary, AB, T2N 2T9.

INTRODUCTION: Evoked Potential monitoring has become common practice during major spinal surgery. The aim is to alert the surgical team to impending ischaemic damage and avoid permanent neurological injury. The most common modality used is Somatosensory Evoked Potential (SSEP) monitoring. However, SSEPs have some important limitations. They are known to be influenced by commonly used anaesthetic agents.(1). SSEPs are carried via the dorsal columns so monitoring of SSEPs alone may allow a ventral cord defect to go undetected. Cerebellar Evoked Potentials (CEPs) have been reported as a potential monitor of ventral cord integrity. (2,3). A pilot study in the intraoperative setting has suggested that CEPs are robust during general anaesthesia.(4). The purpose of this study is to characterize these evoked potentials and to determine the effect of nitrous oxide in healthy volunteers.

METHODS: Following IRB approval consent was obtained from 11 volunteers. A basic history and physical examination was performed to ensure ASA 1 or 2 status and the absence of contraindications to the use of nitrous oxide. Non-invasive surface electrodes were placed according to the standard practice for intraoperative neurophysiologic monitoring, based on the 10-20 system. Peripheral nerve stimulation was via the posterior tibial nerve. CEPs were recorded using electrodes 3 cm from the midline at the superior nuchal line. CEPs, SSEPs, and vital signs were obtained with the patient breathing 100% oxygen via standard anaesthetic circuit, then once equilibrium was reached breathing 50% N₂O, and again following return to 100%. Analysis of the data for amplitude and latency was performed using ANOVA.

RESULTS:

Figure 1. Nitrous oxide reduces evoked response amplitude with somatosensory but not cerebellar evoked potentials

DISCUSSION: CEPs were able to be reliably monitored and were resistant to the effects of nitrous oxide. SSEPs demonstrated a loss of amplitude during anaesthesia with 50% nitrous oxide, consistent with previous reports.

REFERENCES:

1. Can J Anaesth 41: 295-300, 2. Spine 20: 2318-27, 3. J Neurotrauma 10:181-200, 4. Can J Anaesth A61 1998 (abstract).