EFFECT OF MAGNESIUM SULFATE ON MOTOR AND SOMATOSENSORY EVOKED POTENTIALS

Carolyne Pehora¹, Mark W. Crawford¹, Samuel Strantzas ², Christian Zaarour ¹, Laura M. Holmes², Michael Leta ¹, Catherine Doherty¹

1. Department of Anesthesia and Pain Medicine, The Hospital for Sick Children, Toronto, ON, Canada
2. Division of Neurosurgery, The Hospital for Sick Children, Toronto, ON, Canada

Introduction: Motor and sensory evoked potentials are used to assess the functional integrity of the spinal cord during surgery such as correction of scoliosis that places the spinal cord at risk for surgical trauma.¹ Opioid-induced hyperalgesia can develop during scoliosis surgery as a result of high-dose opioid infusion.² Intraoperative administration of magnesium may prevent the development of opioid-induced hyperalgesia;³ however, we could find no prior studies evaluating the effect of intraoperative magnesium infusion on evoked potentials. We evaluated whether i.v. magnesium sulfate has a clinically significant effect (defined as ≥ 50% reduction) on the amplitude of motor and somatosensory evoked potentials in adolescents undergoing surgical correction of idiopathic scoliosis.

Methods: Local ethics committee approval and informed consent were obtained. Five ASA physical status I adolescents undergoing posterior spinal fusion were studied. Propofol and remifentanil titrated to response were used for maintenance of anesthesia. Magnesium sulfate was administered i.v. as a bolus dose of 50 mg/kg followed by an infusion of 10 mg/kg/hr in the interval between the completion of spinal instrumentation and skin closure. Motor (left and right tibialis anterior and abductor hallucis muscles) and cortical somatosensory evoked potentials were recorded immediately before and at 10 and 30 min after the start of the magnesium infusion. A reduction of 50% or greater in evoked potential amplitude was considered to be clinically relevant.

Results: Of the 40 motor evoked potential amplitudes recorded during magnesium infusion, eight (20%) were less than 50% of the value at baseline (Figure) and were considered clinically significant reductions. Serum ionized magnesium concentration increased from 0.70 ± 0.06 mmol/L at baseline to 1.28 ± 0.13 mmol/L after magnesium infusion. There were no clinically significant changes in motor evoked potential latency, somatosensory evoked potential amplitude or latency, and no adverse events attributable to infusion of magnesium sulfate.

Discussion: Magnesium sulfate can decrease the amplitude of motor evoked potentials. Its use as an adjuvant during scoliosis surgery to prevent opioid-induced hyperalgesia is not recommended.

References:
1. Eur Spine J 2007;16:S115-29

MEPs at baseline, 10 min and 30 min after starting MgSO₄ infusion