Transient loss of motor-evoked potentials associated with intravenous levetiracetam in a patient undergoing craniotomy for resection of astrocytoma

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Case Report

A 12-year-old, 54-kg, female with right temporal lobe astrocytoma presents for craniotomy and tumor resection

PMH:
- Astrocytoma right temporal lobe
- Epilepsy secondary to astrocytoma

PSH:
- Right temporal lobectomy/tumor resection

Anti-Epileptic Meds:
- Topiramate 300mg BID
- Clorazepate 11.25mg BID

Anesthetic Plan:
- General Anesthesia with total intravenous anesthetic
- Transcranial Motor Evoked Potential (tcMEP) monitoring
- Levetiracetam infusion intra-operatively at surgeon’s request for anti-convulsant effect

Impact on Evoked Potentials

• Prior to the administration of levetiracetam (10mg/kg/dose infusion planned over 30 minutes) [“Start”], the amplitude of the tcMEPs was normal on the left and right.
• Eleven minutes after the initiation of the infusion, the amplitude significantly and abruptly drops on both the left and right tcMEPs, and the infusion was stopped [“Pause”].
• Within three minutes of stopping the infusion, the amplitude returned to baseline level on both sides.
• A similar pattern developed at the end of the case when the infusion was resumed [“Resume”], with improvement of tcMEPs back to baseline when the infusion was discontinued.

Discussion

• Levitiracetam is an anti-convulsant drug often encountered by anesthesiologists in the peri-operative period.
• Studies document that oral/levetiracetam increases motor thresholds (ie blunts the response), but little is known about the effect of intravenous levetiracetam on intra-operative tcMEPs.
• This case suggests intravenous levetiracetam can abruptly and profoundly decrease the amplitude of tcMEPs.
• Mechanism of loss of tcMEP is unknown; possibly related to interruption of exocytosis of neurotransmitters
• Levetiracetam use intra-operatively should be discussed with the neurosurgical and neuromonitoring teams prior to intra-operative administration when tcMEPs are being monitored.

References: