Effects of depth of anesthesia on muscle motor evoked potential characteristics - A case report

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OBJECTIVE

The influence of anesthetic depth on Tc-mMEP (transcranial electrical stimulation muscle motor-evoked-potential) characteristics is not known. Anesthetic depth is commonly quantified with the bispectral-index (BIS). The association of stepwise changes in BIS on Tc-mMEP characteristics in an adolescent patient is described.

METHODS

A female with idiopathic scoliosis was included in an ongoing prospective observational study examining the effects of depth of anesthesia on Tc-mMEPs. Preoperative neurological examination showed no abnormalities. Total intravenous anesthesia with target-controlled infusions of propofol and remifentanil were used. Prior to the start of the study procedures, train of four testing was performed to rule out residual muscle relaxation. Preceding incision, study measurements were conducted, and depth of anesthesia was increased stepwise from a target (BIS) value of 50 to 30, by increasing target propofol concentrations. The remifentanil target concentration was kept at 4ng/ml throughout the study, no ketamine was administered, and blood pressure and body temperature were kept as stable as possible. Tc-mMEPs were recorded approximately every 2-4 minutes and thresholds were determined at BIS values of 50, 40 and 30.

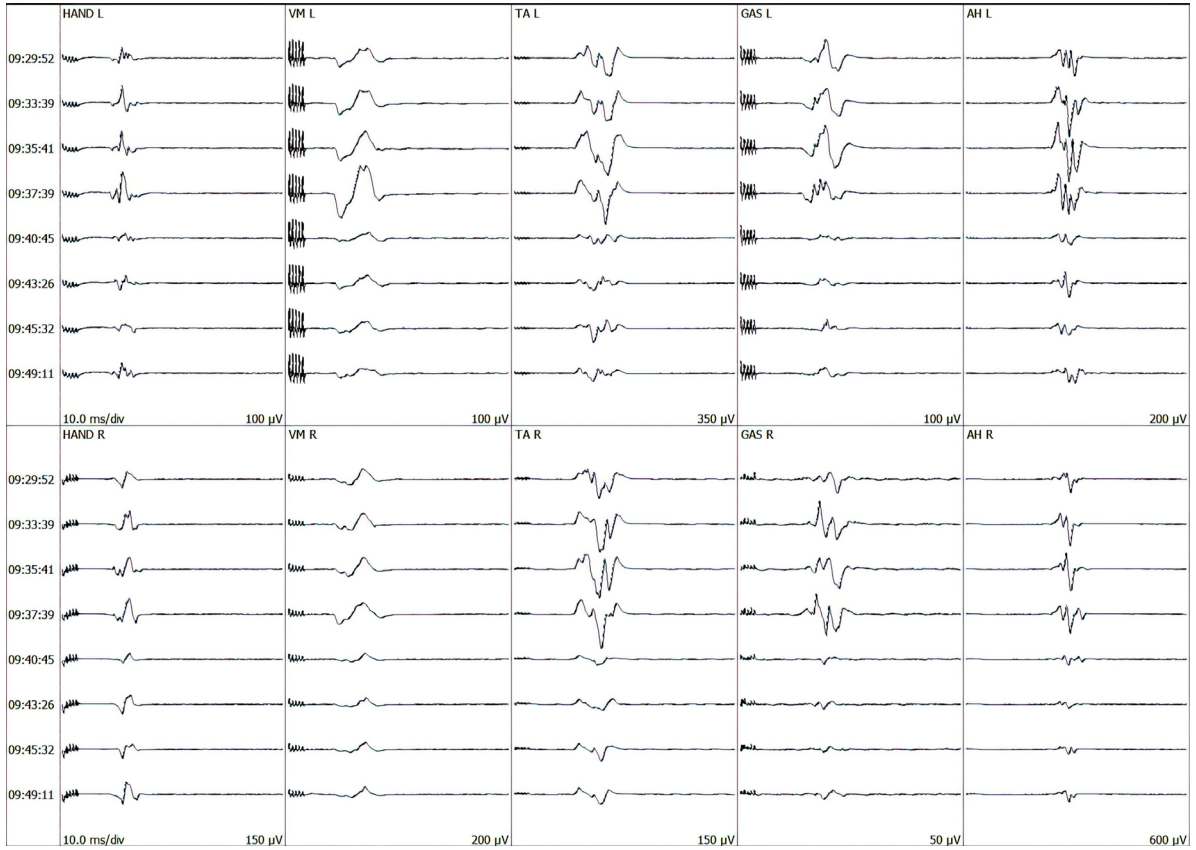

Figure 1 *Transcranial electrical stimulation muscle motor evoked potentials over time.*
VM= vastus medialis; TA= tibialis anterior; GAS= gastrocnemius; AH= abductor hallucis; L= left; R= right.

RESULTS

Tc-mMEP amplitudes declined pronouncedly when the BIS was decreased to 30 (figure 1). The motor threshold changed by less than 40V in all muscles.

CONCLUSION

In this patient, we observed a decline in Tc-mMEP amplitude with increasing depth of anesthesia in all measured muscles while the thresholds remained below clinical warning criteria. Further comprehensive analysis will be performed using data from 25 subjects to show whether these results are statistically significant and replicable across a larger sample size.

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