Supplementary Information

Methods

Anesthetic Protocol

Anesthesia was maintained with remifentanil (0.25 μg/kg/min) and propofol (target effect-site concentration of 2–5 μg/mL). We did not administer muscle relaxants following anesthesia induction or insertion of the endotracheal tube.

Motor Evoked Potentials (MEPs)

Transcranial MEP was induced after confirming that the effects of the muscle relaxants had disappeared by the recovery of the train-of-four ratio to 0.8. Following craniotomy and before microscopic manipulation, suprathreshold stimulation was performed at a stimulus intensity of up to 500 V, which was used as the baseline. Stimulation was performed with train-of-five pulses at a stimulation interval of 2 ms between two electrodes located at C3 and C4, wherein one was the anode and the other as the cathode. For transcranial MEP, the stimulating electrode was defined as the anode.

The ground electrode was placed proximally at either the left or right elbow. Myoelectric signals were amplified with a 0.3–3000-Hz bandpass filter and displayed on a monitor (Neuromaster; MEE-2032G1, Nihon Kohden, Tokyo, Japan). MEP amplitude was defined as the range between the maximum positive and maximum negative peaks of multiphasic compound muscle action potentials. MEPs were elicited from the adductor pollicis brevis (APB), tibialis anterior (TA), gastrocnemius (Gc), and abductor hallucis longus (AH) muscles. We measured MEPs with suprathreshold stimulation using APB and AH as the main intraoperative monitoring and TA and Gc as secondary assessments. If MEPs were difficult to detect using conventional transcranial

electrical stimulation (TES), we attempted to amplify them by tetanic stimulation of the peripheral extremities or pudendal nerves. Previous reports also utilized these procedures [1, 2].

References

1. Sasaki R, Tamura K, Yamazaki S, Kim TK, Takatani T, Hayashi H, Motoyama Y, Nakagawa I, Park YS, Kawaguchi M, Nakase H (2023) Effects of intraoperative motor evoked potential amplification following tetanic stimulation of the pudendal nerve in pediatric craniotomy. J Neurosurg Pediatr 31:488–495. https://doi.org/10.3171/2023.1.peds22505
2. Sasaki R, Tamura K, Kim TK, Takatani T, Nakagawa I, Park YS, Nakase H (2023) Tetanic stimulation of the pudendal nerve amplifies intraoperative motor evoked potential in pediatric craniotomy. World Neurosurg 174:227–8. https://doi.org/10.1016/j.wneu.2023.03.071