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Nervous System Monitoring in the Positioning Process of Cervical Myelopathy Surgery : A Case Report

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Introduction

- The use of intraoperative neurophysiological monitoring (IONM) in surgical decompression surgery for cervical myelopathy may assist the surgeon in taking corrective measures to reduce or prevent permanent neurological deficits. However, neurological injury may not only appear during the surgical procedure itself, but can also occur during neck or arm positioning before surgery.

Patient Concerns & Diagnosis

- A 61-year-old male patient had been suffering from hypoesthesia of the left upper and lower extremities and motor weakness of the left lower extremity for four months
- Focal cervical ossification of a posterior longitudinal ligament (OPLL) at C6-7 and markedly compressing spinal cord.

Interventions

- Anterior cervical corpectomy decompression and fusion surgery was planned for a patient with cervical myelopathy with IONM. For preoperative patient evaluation, motor evoked potential (MEP) and somatosensory evoked potential (SSEP) studies were performed the day before surgery. In the results of this study, delays in the central motor conduction time of MEP and latency of SSEP were observed. However, it was confirmed that both evoked potentials were evoked. In the operation day, before positioning the patient, we checked that MEP were evoked (Fig. 1). However, after positioning the patient for surgery, MEP waveforms in most myotomes were not evoked. (Fig.2 Blue Arrow). Even after all technical causes that could affect IONM were checked, MEP was not evoked. The monitoring physicians informed the surgeon the possibility of cervical cord injury due to improper positioning of the neck, and the surgeon immediately discontinued the operation and adjusted the patient's positioning. Subsequently, the surgeon repositioned the neck of the patient by using a towel to make neck neutral position (Fig.2 Asterisk). And then all of MEP waveforms were recovered (Fig. 2 Red Arrow).

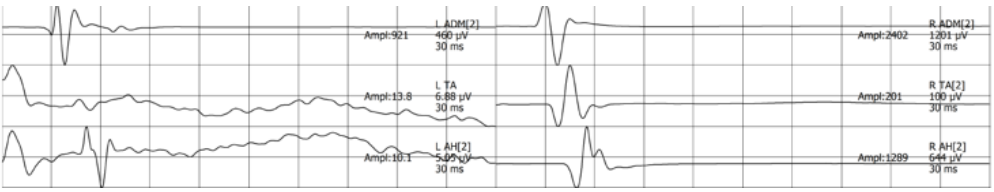

Fig. 1. Baseline MEP of both ADM, TA, and AH muscle in the operation day before neck positioning. ADM = abductor digiti minimi, TA = tibialis anterior, AH = abductor halluces.

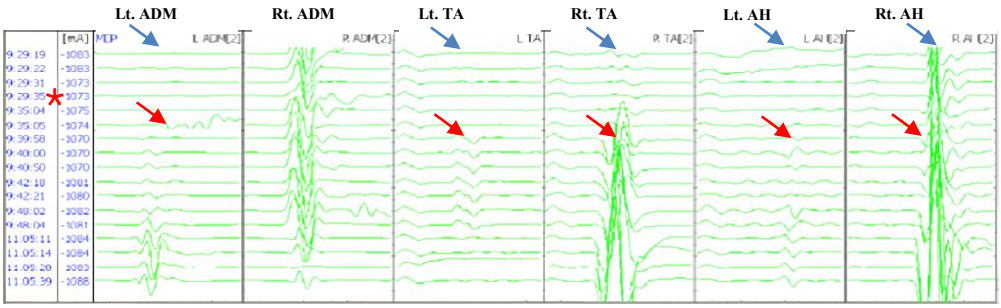

Fig. 2. During the operation, intraoperative MEP signals were recorded. After neck positioning, we observed a decline in the MEP amplitude of the left ADM, TA, and AH muscle. The surgeon adjusted the patient's positioning (asterisk). The MEP of the most muscles showed low amplitude compared to baseline (blue arrow). The MEP of the left ADM, TA, and AH muscle showed signs of recovery, but the amplitude of the signals remained relatively low (red arrow). Lt. = left, Rt. = right, ADM = abductor digiti minimi, TA = tibialis anterior, AH = abductor hallucis.

Outcomes

- At the end of the operation, the MEP signals were observed in all muscles. And amplitude and latency of SSEP in all extremities except for left upper extremity were maintained without significant amplitude drop or latency delay compared to baseline SSEP. A 30% decrease in amplitude and a 5% delay in latency were seen in left upper limb.

Lessons

- IONM, composed of SSEP and MEP, should be applied throughout cervical myelopathy surgery, including the positioning of the neck, and the preoperative EP studies are also very important.