This is a 71-year-old female who underwent thoracic 10 to sacral 1 posterior spinal fusion with pedicle subtraction osteotomy (PSO) L4 for fixed sagittal imbalance. When patient woke up from anesthesia in recovery unit, she was noticed to have severe numbness and weakness in right leg. CT myelogram showed a slight cutoff of contrast at the osteotomy site (Figure 1). There was no improvement over the next day. Consequently, the patient was sent back to operating room for reduction of her osteotomy in the right L4 area. More than 50% of the correction of her lordosis was lessened (Figure 2.). Following the surgery the patient had improved movement in her right leg. The motor function was recovery to 5/5 a few months later after discharge.

After patients were intubated, anesthesia was maintained by using Propofol, Sevoflurane (<0.3MAC), and Remifentanil. Total intravenous anesthesia was used during second surgery. Baseline of motor evoked potentials (MEPs) was recorded before surgical procedure began. Electrical current was delivered through two corkscrews placed on C3 and C4 sites. Responses were recorded bilaterally in iliopsoas, quadriceps, tibia anterior/ extensor hallucis longus, gastro, foot flexor and extensor muscles for recording MEP responses to cover L2 to S2 nerve roots. MEPs were stable during the whole procedure (Figure 3).

At the beginning of the second surgery, MEPs can only be recorded from right foot flexor muscles on right lower extremity. After the correction was revised, weak MEPs were able to be recorded from some muscles in the right leg (Figure 4).

Fixed sagittal plane deformity can result in severe pain and significant impairment of neurological function. PSO has become more common management to restore sagittal balance. However, lumbar nerve root deficits following the procedure have a relatively high incidence of 11%. The deficits have been observed intraoperatively during a wake-up test, immediately after surgery while in the operating room, and in a delayed manner during the hospitalization course (1).

Transcranial MEPs from multiple segmental muscles have been reported to detect specific nerve root injury during corrective spine surgery (2, 3). This method has been routinely used in our medical center to detect the nerve root injury during definitive thoracic-lumbar surgery.

For this illustrated case, although MEPs were staying stable during the whole procedure, the patient suffered from right leg weakness when woke up from the surgery. However, no MEPs can be recorded from the deficit muscles at the beginning of the second surgery. The delayed deficit may not be able to be predicted by intraoperative neurophysiological monitoring.

Key point

Intraoperative MEPs monitoring for lumbar nerve root function may not predict delayed motor deficit that may happen a few hours later after end of MEP monitoring.

References