Spinal Anesthesia Induced Transient Lower Limbs Tremor for the Patient With Implanted Deep Brain Stimulator

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To the Editor,

We are more likely to meet patients with implanted deep brain stimulator (DBS) because it has become a popular method to treat advanced Parkinson’s disease (PD).¹ Some publications suggested shut-down DBS and performed general anesthesia.²⁻⁵ Here, we present a case with DBS performed spinal anesthesia but induced transient lower limbs tremor.

A 74-year-old man had received DBS implantation (Activa PC 37601, Medtronic, Minneapolis, MN, USA) 11 years ago for his PD control. His DBS conditions were stable and regularly follow-up (Madopar 1# tid-qid) without events. He was scheduled for laser photo-vaporization for prostate (PVP). Pre-operative laboratory survey presented normal including coagulation function. Electrocardiogram showed fine artifacts in all 12 leads and chest X-ray showed an implanted pulse generator in situ (Figure 1). He took his regular PD medication early in the surgical morning. The surgery was performed without inactivation of DBS because the surgeons thought that laser PVP had no electromagnetic interference to DBS. We addressed spinal anesthesia because of the lack of absolute contraindication and his old age. We punctured at lumbar L3–4 level with clear cerebrospinal fluid withdrawing under the patient’s knee-chest position. Then 2.8 mL (14 mg) 0.5% bupivacaine was injected and the patient returned to the supine position immediately. But just several minutes after bupivacaine injection, severe bilateral lower limbs tremor developed. Firstly, we checked the patient’s sensory blocking level and it was around T6 level concomitant with stable blood pressure. We closely observed the patient’s condition and administered intravenous pethidine 20 mg twice for suspecting spinal anesthesia-induced shivering but in vain. To evaluate

Figure 1. Pre-Anesthesia Chest X-ray Presented the Implanted Deep Brain Stimulator
the nature of the tremor, no additional treatment was administered as the patient-reported fair condition. The tremor lasted about 10 minutes and stopped. No other tremor was noted on the following PVP period. There was no any specific event later till his discharge several days later.

Yeoh et al. reviewed 22 cases with implanted DBS devices received various anesthesia (general anesthesia most) but no spinal anesthesia. For patients with DBS undergoing general anesthesia, inactivating DBS during operations to avoid possible electromagnetic interference and adequate sedation to diminish limb tremor symptoms are usually suggested. They also noticed that regional anesthesia, for patients with inactivation of the DBS device would result in recurrence of PD symptoms, may be challenging for the anesthesiologists. In our case, lower limb tremor still happened though DBS was not inactivated. The tremor was less likely post-spinal anesthesia shivering which usually involves the whole body and can be suppressed by pethidine. We thought that this lower limbs tremor may be caused by the following complex: in PD, DBS placed at the subthalamic nucleus could create a stimulus to adjust the rhythm to activate efferent neurons but inhibit target neurons. It led to increase excitability in the motor cortex and activity of the inhibitory pathway to provide clinical improvement. But after spinal bupivacaine injection, a sensory nerve was blocked first and then, without afferent sensory neurons input for sensorimotor integration, the balance which was corrected by DBS, became imbalance again and caused a tremor. More evidence is certainly needed to confirm this hypothesis. We also cannot totally exclude the possibility for spinal anesthesia-induced a tremor in this case. But only low body tremor, no response to 40 mg pethidine, stopping spontaneously and recovering smoothly without cold sensation make this diagnosis unlikely.

In conclusion, our case proves that spinal anesthesia can be a choice for geriatric patients with DBS even without inactivation but temporary tremors which might happen and shall be handle carefully. Sedation may be not necessary if the patients feel no discomfort. The complexity of the DBS mechanism requires more experience for all anesthesiologists to address comprehensive anesthesia care.

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References

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