



Frequent Spinal Anesthesia in a Patient with Traumatic Lower Extremity Injury: A Case Report

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Abstract

Introduction: Spinal anesthesia is a commonly used anesthetic technique for lower extremity surgery. Despite its widespread use, the acceptable frequency of repeated spinal anesthesia for a patient is unclear. Therefore, herein, we report a patient who frequently received spinal anesthesia.

Case Presentation: A 21-year-old man with severe head and leg injury was admitted to the hospital after a motorcycle accident. On admission, he had a tracheal tube and GCS score of six. After emergency vascular and orthopedic surgeries under general anesthesia, he was transported to the ICU. Within 12 days of admission to the ICU, he was extubated with full awareness. After consultation with a neurosurgeon for spinal anesthesia, the patient received seven spinal anesthesia procedures for his lower extremity injury in a period of 15 days. Spinal anesthesia was performed at the L3 - L4 or L4 - L5 interspace with 24 or 25-gauge Quincke needles in the sitting position (12 - 15 mg of 0.5% hyperbaric bupivacaine) by four anesthesiologists. Despite performing several spinal anesthesia procedures, no neurologic sequelae were observed. Finally, he was discharged in a good overall condition. At a four-month follow-up, the patient was in a stable situation without any neurological complications.

Conclusions: This report emphasizes that spinal anesthesia with hypertonic bupivacaine could be used several times for a patient in some situation.

Keywords: Anesthesia, Spinal, Bupivacaine, Lower Extremity

1. Introduction

Spinal anesthesia is the anesthesia method of choice for lower extremity surgery owing to rapid onset, predictable and reliable block, and excellent postoperative analgesia without the risks of general anesthesia such as airway difficulties and pulmonary aspiration (1, 2). In the review of articles, no study has been found about acceptable frequencies and minimal admissible interval periods for spinal anesthesia in patients. Therefore, this encouraged us to share our experience about a patient who had multiple spinal anesthesia needle insertions during a short period (i.e. seven times in a 15-day period).

2. Case Presentation

A 21-year-old man with severe head and right leg injury was admitted to the hospital after a motorcycle accident. On admission, he had a tracheal tube and Glasgow Coma Scale (GCS) score of six.

The patient underwent surgical treatment in a supine position under general anesthesia for femoral and tibia shaft fractures and injury to the popliteal artery in two stages. In the first stage of surgery, the popliteal artery was repaired. In the second stage, he underwent intramedullary fixation surgery for femur fracture and external fixation for tibia fracture, and then the intubated patient was transferred to the intensive care unit (ICU). The CT scan of the brain revealed subdural effusion in the frontal lobe without compressive effect. The neurosurgery consultation suggested medical treatment. The patient was treated with mechanical ventilation during the ICU stay. After 12 days of admission, the patient was awakened and extubated after meeting standard extubation criteria in the ICU. Then, he was transferred to the orthopedic ward. After consultation with a neurosurgeon for spinal anesthesia, the patient underwent seven spinal anesthesia procedures (on 15, 18, 21, 22, 24, 27, and 30 days after admission) for irrigation and debridement for his open fractures in a period of 15 days. Spinal anesthesia was performed at the L3

- L4 or L4 - L5 interspace with 24 or 25-gauge Quincke needles in the sitting position (12 - 15 mg of 0.5% hyperbaric bupivacaine) by four anesthesiologists.

Despite performing several spinal anesthesia procedures, no complications and neurologic sequelae were observed. Finally, he was discharged in a good overall condition. Four months later, the patient was admitted for bronchoscopy with the suspicion of tracheal stenosis. Therefore, he was re-evaluated and examined for potential delayed complications and neurologic sequelae. Fortunately, despite several spinal anesthesia procedures in a short period, no complications and neurological sequelae were observed.

3. Discussion

August Bier performed the first spinal anesthesia at the royal surgical hospital in 1898 (3). At present, spinal anesthesia is one of the most common methods of modern regional anesthesia. Like other anesthesia techniques, spinal anesthesia is not free of complications (4). The complication rates of spinal anesthesia have been reported from 1% to 17%, depending on the experience of anesthesiologists performing the procedure and the definition of a complication (5). The complications of spinal anesthesia include hypotension, bradycardia, nausea and vomiting, urinary retention, insufficient block, hematoma or abscess around the injection site, post-dural puncture headache (PDPH), septic or aseptic meningitis, back pain, arachnoiditis, and neurologic sequelae. Although neurological complications caused by spinal anesthesia are rare, it is possible to occur. Possible neurological complications with spinal anesthesia include conus medullaris injury, transient neurologic syndromes, and permanent neurologic injury. The incidence of transient neurologic syndromes after spinal anesthesia varied between 0% - 7%. The reported incidence of permanent neurological injury following spinal anesthesia is 0 - 4.2 per 10000 patients. Local anesthetic neurotoxicity and needle trauma are the origins of most neurological complications. The pain during needle placement or injection of local anesthetic is reported in about two-thirds of patients with neurological complications. In the event of paresthesia, the needle should be immediately removed to avoid radiculopathy after surgery. It is also recommended that repeated injections of local anesthetics should be avoided to prevent toxic effects on the spinal cord (6, 7). Hirabayashi et al. described a 33-year-old healthy woman who had neurologic sequelae following repeated spinal anesthesia. The first spinal anesthesia was performed with a 25-gauge Quincke needle in the right decubitus position. The hyperbaric dibucaine (7.5 mg) was

injected into the subarachnoid space at the L3 - L4 interspace on the first attempt. Since the patient could flex entirely both feet and knees 15 min following the spinal anesthesia, they decided to repeat the spinal anesthesia. The repeated spinal anesthesia was performed again in the same fashion as the first spinal anesthesia with 6 mg of hyperbaric dibucaine. The surgery was done without problem after repeated spinal anesthesia. On the first postoperative day, she started to complain of loss of sensation in the buttocks and inability to void. The magnetic resonance imaging showed no abnormality in the spine. The numbness in the buttocks and urinary difficulties completely resolved within six weeks. They concluded that a subsequent injection at the same interspace following the initial failure of the spinal anesthesia is accompanied by the risk of neurologic complications (8). Bhar et al. performed a study comparing 10 mg and 12 mg doses of intrathecal hyperbaric (0.05%) bupivacaine repeated after failed spinal anesthesia in 100 cesarean section patients. The spinal anesthesia was performed at the L3 - L4 or L4 - L5 interspace with 26-gauge Quincke needles in the sitting position with hyperbaric bupivacaine. The repeated spinal anesthesia was performed again in the same fashion as during the first spinal anesthesia. Unlike the previous report, Bhar et al. stated that spinal anesthesia could be safely repeated with hyperbaric bupivacaine in the cesarean section without neurological symptoms (9). Additionally, Wipfli et al. reported repeated spinal anesthesia in a 78-year-old man with Guillain-Barré syndrome who underwent spinal anesthesia twice within six days for urologic procedures. Both spinal blocks were performed at the L4-L5 interspace with a 25-gauge Pencan™ needle in the sitting position. Both spinal blocks were induced with hyperbaric bupivacaine (12.5 mg) and fentanyl (20 µg). After the spinal anesthesia had worn off, his neurological status was the same as before the surgery (10). In this case, despite performing several spinal anesthesia procedures at short intervals, no complications and neurologic sequelae were observed. Therefore, it seems that spinal anesthesia with hyperbaric bupivacaine can be used repeatedly for a patient in some situation.

Footnotes

Conflict of Interests: No conflicts of interests are declared.

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References

- Rahimzadeh P, Faiz SHR, Imani F, Derakhshan P, Amniati S. Comparative addition of dexmedetomidine and fentanyl to intrathecal bupivacaine in orthopedic procedure in lower limbs. *BMC Anesthesiol.* 2018;**18**(1):62. doi: [10.1186/s12871-018-0531-7](https://doi.org/10.1186/s12871-018-0531-7). [PubMed: [29875020](https://pubmed.ncbi.nlm.nih.gov/29875020/)]. [PubMed Central: [PMC5991430](https://pubmed.ncbi.nlm.nih.gov/PMC5991430/)].
- Jones GW, Samuel RA, Biccard BM. Management of failed spinal anaesthesia for caesarean section. *S Afr Med J.* 2017;**107**(7):611-4. doi: [10.7196/SAMJ.2017.v107i7.12056](https://doi.org/10.7196/SAMJ.2017.v107i7.12056). [PubMed: [29025452](https://pubmed.ncbi.nlm.nih.gov/29025452/)].
- Wulf HF. The centennial of spinal anesthesia. *Anesthesiology.* 1998;**89**(2):500-6. doi: [10.1097/00000542-199808000-00028](https://doi.org/10.1097/00000542-199808000-00028). [PubMed: [9710410](https://pubmed.ncbi.nlm.nih.gov/9710410/)].
- Derakhshan P, Imani F, Koleini ZS, Barati A. Comparison of adding sufentanil and low-dose epinephrine to bupivacaine in spinal anesthesia: A randomized, double-blind, clinical trial. *Anesth Pain Med.* 2018;**8**(5). e69600. doi: [10.5812/aapm.69600](https://doi.org/10.5812/aapm.69600). [PubMed: [30538940](https://pubmed.ncbi.nlm.nih.gov/30538940/)]. [PubMed Central: [PMC6252044](https://pubmed.ncbi.nlm.nih.gov/PMC6252044/)].
- Wenk M, Weiss C, Mollmann M, Popping DM. Procedural complications of spinal anaesthesia in the obese patient. *Anesthesiol Res Pract.* 2012;**2012**:165267. doi: [10.1155/2012/165267](https://doi.org/10.1155/2012/165267). [PubMed: [22899910](https://pubmed.ncbi.nlm.nih.gov/22899910/)]. [PubMed Central: [PMC3414000](https://pubmed.ncbi.nlm.nih.gov/PMC3414000/)].
- Molina G, Borraz L, Jose GO, Fernandez R, Aliaga R, Juan EB. Neuraxial anaesthesia complications. *Med Clin Rev.* 2015:1-4.
- Apan A, Apan ÖC. Complications in spinal anaesthesia. In: Whizar-Lugo VM, editor. *Topics in spinal anaesthesia*. IntechOpen; 2014. p. 139-58. doi: [10.5772/57013](https://doi.org/10.5772/57013).
- Hirabayashi Y, Konishi R, Shimizu R. Neurologic symptom associated with a repeated injection after failed spinal anesthesia. *Anesthesiology.* 1998;**89**(5):1294-5. doi: [10.1097/00000542-199811000-00057](https://doi.org/10.1097/00000542-199811000-00057). [PubMed: [9822037](https://pubmed.ncbi.nlm.nih.gov/9822037/)].
- Bhar D, RoyBasunia S, Das A, Chhaule S, Mondal SK, Bisai S, et al. Repeat spinal anesthesia in cesarean section: A comparison between 10 mg and 12 mg doses of intrathecal hyperbaric (0.05%) bupivacaine repeated after failed spinal anesthesia: A prospective, parallel group study. *Anesth Essays Res.* 2016;**10**(2):362-9. doi: [10.4103/0259-1162.172725](https://doi.org/10.4103/0259-1162.172725). [PubMed: [27212775](https://pubmed.ncbi.nlm.nih.gov/27212775/)]. [PubMed Central: [PMC4864706](https://pubmed.ncbi.nlm.nih.gov/PMC4864706/)].
- Wipfli M, Arnold M, Luginbuhl M. Repeated spinal anesthesia in a tetraparetic patient with Guillain-Barre syndrome. *J Clin Anesth.* 2013;**25**(5):409-12. doi: [10.1016/j.jclinane.2013.01.017](https://doi.org/10.1016/j.jclinane.2013.01.017). [PubMed: [23965204](https://pubmed.ncbi.nlm.nih.gov/23965204/)].