Erector Spinae Plane Block in Postoperative Analgesia Following Lumbar Discectomy in a Patient with Facioscapulohumeral Muscular Dystrophy: Case Report

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Abstract

Patients with muscular dystrophy manifest complex characteristics in anesthesia and analgesia management. In the current case with facioscapulohumeral muscular dystrophy (FSHD), we planned to reduce opioid consumption and potential respiratory complications by incorporating erector spinae plane (ESP) block into multimodal analgesia management during surgery for lumbar disc herniation (LDH).

This case study presents the perioperative clinical findings of a 62-year-old patient with FSHD, who underwent a bilateral lumbar hemilaminectomy and discectomy with an ESP block applied. Our experience with ESP after lumbar disc surgery demonstrated effective analgesia and the absence of any complications in an adult patient with LDH.

Keywords: Facioscapulohumeral Muscular Dystrophy, Erector Spinae Plane Block, Postoperative Analgesia

Introduction

Facioscapulohumeral muscular dystrophy (FSHD) is an inherited genetic disorder transmitted in an autosomal dominant manner and ranks as the third most common form of muscular dystrophy.[1] The clinical presentation is characterized by asymmetric involvement of the face and upper extremity muscles and variable degrees of involvement in the trunk and lower extremities.[2] It is believed that the respiratory muscles are preserved in FSHD. However, there are studies indicating the possibility of respiratory muscle involvement leading to restrictive lung disease, with a reported risk of 10-20% for pulmonary complications.[1] Hazenberg et al. have reported that respiratory system involvement could lead to diaphragm paralysis, resulting in hypoventilation.[3] In a similar vein, Henke et al. indicated the involvement of both the diaphragm and expiratory respiratory muscles in FSHD.[4]

In muscular dystrophies, various complications, including rhabdomyolysis, hyperkalemia, cardiac comorbidities, and the risk of malignant hyperthermia (MH), can influence anesthesia management.[5] Furthermore, it should be noted that agents used in postoperative analgesia management might exacerbate hypoventilation in patients with respiratory system involvement.[6] Therefore, we planned to apply the erector spinae plane (ESP) block for postoperative analgesia management for our patient with FSHD, who underwent bilateral hemilaminectomy and discectomy due to lumbar disc herniation (LDH) and spinal stenosis. Our aim was to reduce opioid consumption and, thus, prevent potential respiratory complications that may arise as a result in our case.

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Case Description

After obtaining consent from a patient who underwent bilateral hemilaminectomy and discectomy for L4-5 level, their perioperative clinical data was recorded. The patient, a 62-year-old woman weighing 87 kg and measuring 160 cm, had known diagnoses of diabetes mellitus and hypertension and was classified as an ASA-2 patient. A pre-procedural magnetic resonance imagining (MRI) of the lumbar spine showed no

anomalies in vertebral alignment or paraspinal muscles (Fig. 1), but LDH and spinal canal narrowing at L4-5 level were observed (Fig. 2). Following routine monitoring (EKG, SpO2, non-invasive arterial blood pressure), anesthesia induction was performed using 1 mcg/kg fentanyl, 1 mg/kg lidocaine, 2 mg/kg propofol, and 0.6 mg/kg rocuronium. Maintenance of anesthesia after intubation was achieved through 6-10 mg/kg/hour propofol infusion and 0.02-0.2 µg/kg/min remifentanil infusion, utilizing total intravenous anesthesia (TIVA). Additionally, arterial cannulation was conducted for invasive arterial blood pressure monitoring and blood gas analysis alongside routine monitoring. The patient was placed in the prone position, and the surgery commenced. Intraoperative vital parameters remained stable, and no hyperkalemia or acidosis developed during blood gas monitoring. Thirty minutes before the operation concluded, tramadol 100 mg and dexketoprofen 50 mg were intravenously administered without the patient waking up. A bilateral ESP block at the L1 level, as described by Forero et al.,[5] was performed post-operation. Under ultrasound (US) guidance, the block needle was advanced to the L1 level, confirmed with hydrodissection, intermittent aspiration, and subsequent administration of 10 mL of 0.5% bupivacaine, 5 mL of 2% lidocaine, and 5 mL of saline, monitoring the cranio-caudal spread of the local anesthetic. The same procedure was replicated on the other side, completing the intervention with a total volume of 40 mL. The operation lasted for 3 hours, with an anesthesia duration of 3.5 hours. The patient's muscle relaxation was reversed using 200 mg of sugammadex, and extubation occurred without complications. No additional analgesics were administered to the patient in the Post-Anesthesia Care Unit, where a numeric rating scale (NRS) score of 1 was recorded. Postoperatively, routine doses of 20 mg tenoxicam were administered twice. There were no recorded local anesthetic toxicity, motor block or hemodynamic instability due to sympathetic block. The patient did not require additional opioids in the postoperative period. A 24-hour NRS scores was recorded for the patient (Table 1). Oral intake commenced at the 5th hour, and the patient was mobilized at the 10th hour, and no nausea or vomiting was noted.

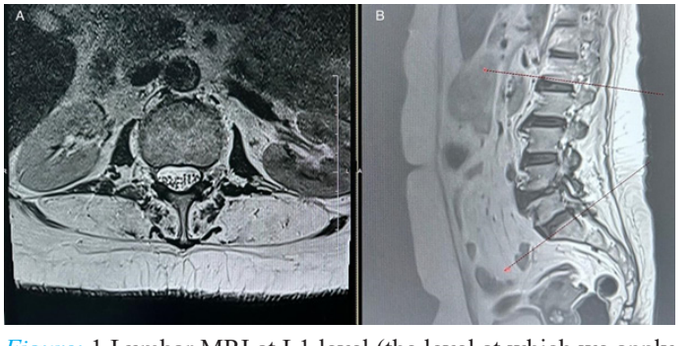

Figure: 1 Lumbar MRI at L1 level (the level at which we apply the process), T2 sequence, axial (A) and sagittal (B) slices

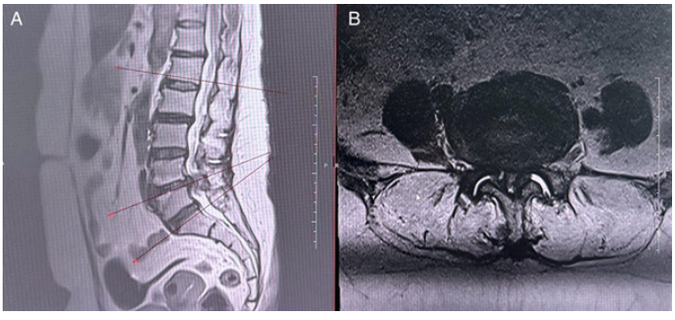

*Figure:*2: Lumbar MRI at L4-5 level (the level with disc herniation), T2 sequence, sagittal (A) and axial (B) slices.

Table : 1 24-hour NRS scores

	PACU	2nd hour	4th hour	8th hour	12th hour	16th hour	24th hour
NRS score	1	1	1	2	2	1	1

Abbreviation: PACU, post-anesthesia care unit

Discussion

In the management of postoperative analgesia, the aim is to reduce opioid consumption to avoid side effects. Also, effective pain management is part of multimodal analgesia, contributing to early recovery.[7] It has been believed that the respiratory and cardiac muscles are preserved in FSHD. However, studies have shown potential pulmonary involvement in these patients. Therefore, restricting opioid use and emphasizing effective analgesic control become more crucial due to the risk of hypoventilation during the postoperative period in FSHD cases.[4] Our patient was assessed preoperatively for symptoms related to hypoventilation, such as shortness of breath, fatigue, and morning headaches, with no positive symptoms identified.[3] And posterior anterior lung graphy was evaluated as normal. However, absence of evaluation pCO2 values in preoperative arterial blood gas and not performing respiratory function tests because no positive symptoms of hypoventilation were detected are the limitations of our study. We believe that a detailed preoperative respiratory system assessment would provide more precise insights into the patient's functional capacity regarding respiratory involvement in FSHD, shedding light on potential issues in anesthesia management.

ESP block, defined by Forero et al., has demonstrated practical analgesic effects when applied in various surgical procedures.[8] Studies supported the addition of ESP block to multimodal analgesia management in spinal surgeries through randomized controlled trials.[9] Nevertheless, documented side effects in literature linked to the spread of ESP block include motor and sympathetic block leading to hemodynamic instability,[10,11] which were not recorded in our case. Vigilant monitoring for potential complications related to ESP block application, such as pneumothorax, vascular injury, local anesthetic toxicity, and hematoma, was undertaken, but no procedure-related complications were identified in our case.[12]

It is unclear whether nerve blocks, particularly in muscular dystrophies, cause progression related to existing muscle pathology postoperatively. Although case presentations in muscular dystrophy patients indicate a preference for regional anesthesia due to disadvantages associated with general anesthesia, reports of post central and peripheral regional block applications do not indicate any subsequent attacks or progression linked to this intervention. Abnormalities in evoked potentials in myopathic disorders were first described by Mongia and Lundervold and have since been recorded and studied in myotonic dystrophies.[13] Evoked potentials are gold standard methods to prevent nerve damage in spinal surgeries. Despite the unclear impact of spinal blocks on neuro-monitoring, case presentations affirm that evoked potentials remain unaffected post-plane block.[14] Preserving evoked potentials, post-block may suggest that plane blocks might not be associated with postoperative disease progression. As neuro-monitoring was not deemed necessary for the surgical procedure in our case, we lack data on the impact on evoked potentials. However, we propose that future studies and long-term monitoring could address concerns regarding the relationship between plane blocks and disease progression.

Anatomical variations in muscular dystrophies are another crucial aspect when applying nerve blocks. Any alterations in spinal alignment, vertebral height anomalies, or atrophy in paraspinal muscles that could affect the intervention should be evaluated preoperatively. While these anatomical anomalies might complicate the procedure, they could also pose risks of sympathetic system involvement due to the potential spread of paravertebral anesthesia. Conversely, restrictions in cranio-caudal spread might impede achieving the desired effect due to anatomical anomalies. In our case, real-time US visualization during the procedure confirmed the accurate placement of the block, and there were no visualization issues during the administration.

The studies report efficacy and the absence of additional complications in various surgical types using nerve blocks in muscular dystrophy cases. However, there needs to be more data on the application of ESP block in FSHD cases or spinal surgery, making our case valuable. Gürkan et al. presented a case series involving ESP block catheter application after scapulothoracic arthrodesis in FSHD patients, suggesting that ESP block contributed to analgesia management and could be part of multimodal analgesia.[15]

In anesthesia management in FSHD cases, factors including sensitivity to muscle relaxants, rhabdomyolysis, hyperkalemia, acidosis, and MH risk require close monitoring.[5] In the present case, rocuronium, reported as safe for use, was chosen as the muscle relaxant, and reversal was achieved with sugammadex due to concerns about hyperkalemia risk associated with anticholinesterases in myopathies. We opted for TIVA, known to be safe in muscle dystrophies, without encountering any complications.[16,17]

Conclusion

Following lumbar surgery, regarding ESP block, we observed that effective pain relief was obtained without encountering any additional complications. The prevention of potential pulmonary collapse and the absence of the need for extra opioids due to efficient pain relief may contribute to preserving pulmonary functions. Randomized controlled trials could contribute significantly to our clinical practice by investigating the effectiveness and reliability of plane blocks in the postoperative pain management of specific patient groups, such as muscular dystrophy.

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