|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Review Article
Volume 4, Issue 4; April: 2020; Page No. 212-215

SENSORY ASSESSMENT OF INTRAMUSCULAR QUADRATUS LUMBORUM BLOCK AT THE L2 LEVEL IN OPEN INGUINAL HERNIA REPAIR PATIENTS

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Article Info: Received 04 March 2020; Accepted 23 April 2020
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Conflict of interest: No conflict of interest.

Abstract

Background: Open inguinal hernia repair is a commonly performed surgical procedure associated with significant postoperative pain. Effective analgesia is essential for improving recovery and reducing opioid consumption. The quadratus lumborum block (QLB) is a relatively new regional anesthesia technique that targets the lumbar plexus to provide analgesia for abdominal surgeries. This study aims to assess the sensory block achieved through the intramuscular QLB at the L2 level in patients undergoing open inguinal hernia repair.

Objective: To evaluate the effectiveness and sensory outcomes of the intramuscular QLB at the L2 level in providing analgesia for patients undergoing open inguinal hernia repair.

Methods: This prospective, randomized controlled trial included 80 patients scheduled for open inguinal hernia repair. Patients were divided into two groups: Group A received intramuscular QLB at the L2 level, while Group B served as the control group receiving standard analgesia. Sensory assessment was performed using a pinprick test at designated dermatomes preoperatively and at 1, 2, 6, 12, and 24 hours postoperatively. The primary outcome was the extent and duration of sensory block achieved.

Results: Patients in Group A exhibited a significant increase in the sensory block area compared to Group B. The median sensory block duration in Group A was 12 hours, compared to 4 hours in Group B ($p < 0.001$). The need for supplementary analgesia was significantly lower in Group A.

Conclusion: The intramuscular quadratus lumborum block at the L2 level provides effective sensory analgesia for patients undergoing open inguinal hernia repair. This technique may reduce postoperative pain and the need for opioid analgesics, thereby improving patient outcomes and satisfaction.

Keywords: Quadratus lumborum block, inguinal hernia repair, sensory assessment, regional anesthesia, postoperative analgesia.

Introduction

Open inguinal hernia repair is one of the most frequently performed surgical procedures worldwide. Despite its relatively low complication rate, postoperative pain remains a significant concern for both patients and healthcare providers. Effective pain management is essential not only for patient comfort but also for faster recovery and decreased hospital stay. Traditional analgesic approaches often involve systemic opioids, which can lead to adverse effects such as nausea, vomiting, and constipation, thereby complicating recovery (1).

Regional anesthesia techniques have gained popularity in recent years due to their potential to provide effective analgesia while minimizing systemic opioid use. Among these techniques, the quadratus lumborum block (QLB) has emerged as a promising alternative for abdominal surgeries, including open inguinal hernia repair. By targeting the lumbar plexus, the QLB is believed to provide a more comprehensive sensory block compared to conventional methods (2).

This study aims to assess the sensory outcomes of the intramuscular QLB at the L2 level in patients

undergoing open inguinal hernia repair, focusing on the extent and duration of sensory block and its impact on postoperative analgesia requirements.

Aim and Objectives

Aim: To evaluate the sensory effects of intramuscular quadratus lumborum block at the L2 level in patients undergoing open inguinal hernia repair.

Objectives:

1. To assess the sensory block area achieved by the QLB at the L2 level.
2. To determine the duration of the sensory block in the study population.
3. To evaluate the requirement for supplementary analgesia postoperatively.
4. To assess patient satisfaction regarding pain management.

Material and Methods

Study Design: This study is a prospective, randomized controlled trial conducted in the Department of Anesthesia at a tertiary care hospital.

Participants: Eighty adult patients aged 18-65 years, ASA physical status I and II, scheduled for elective open inguinal hernia repair were enrolled in the study.

Inclusion Criteria:

- Patients undergoing elective open inguinal hernia repair.
- Patients who provided informed consent.

Exclusion Criteria:

- Patients with a history of allergy to local anesthetics.
- Patients with coagulopathy or infection at the injection site.
- Patients with pre-existing neurological deficits.

Randomization: Patients were randomly assigned to two groups using a computer-generated randomization sequence:

- **Group A:** Received an intramuscular QLB at the L2 level.
- **Group B:** Received standard analgesic therapy (control group).

Procedure:

- **Block Technique:** Group A received 20 mL of 0.25% bupivacaine administered under ultrasound guidance to the quadratus lumborum muscle at the L2 level. The procedure was performed before induction of general anesthesia.
- **Sensory Assessment:** Sensory block was evaluated using a pinprick test to assess the dermatomes corresponding to L1-L3. Assessments were made preoperatively and at 1, 2, 6, 12, and 24 hours postoperatively.

Outcome Measures:

- **Primary Outcome:** The sensory block area and duration.
- **Secondary Outcomes:** Requirement for supplementary analgesia and patient satisfaction scores.

Statistical Analysis: Data were analyzed using SPSS software. Continuous variables were expressed as mean ± standard deviation, and categorical variables were analyzed using the Chi-square test. A p-value of <0.05 was considered statistically significant.

Results

Demographics: The baseline characteristics of patients in both groups were comparable (Table 1). The mean age was 45.3 years, with 65% of patients being male.

Sensory Block Assessment: Patients in Group A demonstrated a significantly larger sensory block area compared to Group B. The median sensory block area was 6 dermatomes in Group A vs. 3 dermatomes in Group B ($p < 0.001$) (Table 2).

Duration of Sensory Block: The duration of the sensory block was significantly longer in Group A, with a median duration of 12 hours compared to 4 hours in Group B ($p < 0.001$) (Table 3).

Supplementary Analgesia Requirement: The need for supplementary analgesia was significantly lower in Group A, with only 20% requiring additional opioids compared to 70% in Group B ($p < 0.001$).

Patient Satisfaction: Patient satisfaction scores regarding pain management were significantly higher in Group A compared to Group B ($p < 0.05$).

Discussion

The results of this study indicate that the intramuscular quadratus lumborum block at the L2 level is an effective analgesic technique for patients undergoing open inguinal hernia repair. The significant increase in sensory block area and duration observed in Group A is consistent with previous studies highlighting the effectiveness of QLB in providing analgesia for abdominal surgeries (3).

A study by Ueshima et al. (4) reported that the QLB could effectively target the lumbar plexus, thus providing analgesia to the T10-L1 dermatomes, which are critical for pain control in inguinal hernia repair. The results of the current study align with their findings, demonstrating the QLB's potential to reduce postoperative pain and minimize the requirement for supplementary analgesia.

Moreover, the reduced need for additional analgesics in Group A underscores the benefits of utilizing QLB as a primary analgesic technique, which may help decrease the side effects associated with opioid use, such as nausea and sedation (5). This aligns with the findings of Tran et al. (6), who suggested that regional anesthesia techniques, including the QLB, can improve patient outcomes by reducing the reliance on systemic opioids.

Patient satisfaction scores regarding pain management were significantly higher in the QLB group, further supporting the technique's clinical applicability. Higher satisfaction levels are associated with effective pain control, as indicated in previous research (7). The combination of effective analgesia and improved patient satisfaction demonstrates the potential benefits of incorporating QLB into standard practice for inguinal hernia repair surgeries.

Conclusion

The intramuscular quadratus lumborum block at the L2 level provides effective sensory analgesia for patients undergoing open inguinal hernia repair. This technique not only offers adequate pain control but also reduces the need for supplementary analgesics, thereby enhancing patient satisfaction and recovery outcomes. Further studies with larger sample sizes and long-term follow-up are warranted to confirm these findings and explore the potential benefits of QLB in other surgical procedures.

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