

Ilioinguinal and Iliohypogastric Nerve Block Following Inguinal Hernia Repair under Spinal Anesthesia: A Prospective Study of Assessment of Post-operative Pain and Discharge Time

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Abstract

Objective: The aim of this study was to evaluate post-operative pain analgesia with ilioinguinal (II) and iliohypogastric (IH) nerve block following repair of inguinal hernia surgery and time of discharge.

Materials and Methods: A total of 72 patients undergoing hernia repair surgery were divided into two groups of 36 each (A and B). Both the groups were operated under spinal anesthesia. Group A received II and IH nerve block with wound infiltration with 0.75% ropivacaine, and Group B did not receive any nerve block. Demographic data, pain intensity according to the visual analog scale (VAS), and number of doses of analgesics (diclofenac sodium, ketorolac, and tramadol) in the immediate postoperative period, as well as at the time of hospital discharge were recorded.

Results: The VAS at rest was significantly lower in Group A compared with Group B ($P < 0.05$), 3 h after the procedure, with no differences on VAS during movement in all post-operative periods. The number of doses of analgesics during the post-operative period was similar in both groups, but patients in Group A were discharged earlier than in Group B.

Conclusion: II and IH nerve block associated with surgical wound infiltration with 0.75% ropivacaine provides better post-operative analgesia and early hospital discharge in patients undergoing inguinal hernia repair under spinal anesthesia.

Key words: Analgesia, Anesthesia, Inguinal hernia, Local anesthesia, Peripheral nerves, Spinal

INTRODUCTION

Repair of inguinal hernia is one of the most common surgical procedures.¹⁻³ Immediate post-operative pain is an important issue that can delay ambulation and return of gastrointestinal motility, therefore, delaying hospital discharge.⁴ Besides, the presence of chronic pain after hernia repair surgery, which can affect up to 50% of patients, is a growing concern.^{5,6} This is related to inadequate post-

operative pain management and becomes a fundamental duty of the surgeon to control post-operative pain. Despite several methods of analgesia, the management of post-operative pain is oftentimes unsatisfactory. Opioids, non-steroidal anti-inflammatory drugs, and analgesics are routinely used to alleviate post-operative pain, but they are associated with several undesirable effects and do not seem to be completely effective on preventing and treating post-operative pain.⁷ Ilioinguinal (II) and iliohypogastric (IH) nerve block represents a very popular regional anesthetic technique in surgical procedures in the sensitive area of those two nerves.⁸ In fact, for inguinal surgery (e.g., inguinal hernia), II and IH nerve block is as effective as caudal block.⁹ The objective of the present study was to evaluate post-operative pain analgesia with II and IH nerve block following repair of inguinal hernia surgery and time of discharge.

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MATERIALS AND METHODS

The present study was a prospective, randomized, double-blind study. The Institutional Ethical Committee clearance was obtained. A ethical committee cleared consent letter was used before making the patients to participate in the study. The study period was between July 2015 and February 2017. The institution was Kannur Medical College, Anjarakandy, Kannur, Kerala, India.

Inclusion Criteria

(1) Patients aged between 20 and 60 years were included. (2) Patients with non-relapsing, direct and indirect inguinal hernia were included. (3) Patients with surgical physical status American Society of Anesthesiology (ASA) I and II were included in the study.

Exclusion Criteria

(1) Patients aged below 20 and above 60 years were excluded. (2) Patients with lignocaine sensitivity were excluded. (3) Patients with a history of chronic pain, daily use of central nervous system medications, body mass index (BMI) above 46 kg/m², and those with contraindications to the proposed anesthetic technique were excluded from the study. During the procedure, electrocardiography monitoring, precordial stethoscope, pulse oxymetry, and non-invasive blood pressure were monitored. All patients underwent spinal anesthesia with a 27G spinal needle (15 mg of hyperbaric 0.5% bupivacaine) on the sitting position and puncture of the L2-L3 or L3-L4 space. Occasional hypotension was treated with infusion of crystalloids, and if necessary, fractionated 5 mg doses of intravenous ephedrine until correction of the hypotension. All patients received intravenous sedation with increasing doses of midazolam to obtain satisfactory sedation. Before closure of the surgical wound, patients of Group A underwent II and IH nerve block and surgical wound infiltration. Group B did not undergo II and IH nerve block or surgical wound infiltration. II and IH nerve block was performed by administering 10 mL of 0.75% ropivacaine 2 cm above and 2 cm medial to the anterior superior iliac spine, according to Hadzig.¹⁰ After the end of surgery, patients were transferred to the post-anesthetic recovery unit. Pain intensity at rest and with movement (patient in the sitting position with legs hanging) was evaluated by the visual analog scale (VAS) (VAS: 0 - without pain; 10 - maximum pain) at 3, 6, and 12 post-operative hours and at the time of hospital discharge. Investigators evaluating post-operative parameters were unaware of the patient's group. A VAS > 4 at rest was considered for analgesic rescue with intravenous ketorolac (30 mg). In case, it was ineffective, intramuscular diclofenac (75 mg), and whenever necessary, intravenous tramadol (1 amp) were added. The number of analgesic doses, time interval until the 1st dose

of analgesic, and length of hospitalization were recorded. Discharge criteria included complete motor recovery, ability to urinate, absence of nausea and vomiting, bleeding, and excessive pain. Sample calculation was based on the study of Toivonen *et al.*,¹¹ who detected a 0.9 difference on VAS with standard deviation of 1.5 among patients who underwent II and IH nerve block and those who received saline (control group). Data are presented as mean (minimum-maximum), median (minimum-maximum), and numbers. Student's *t*-test was used to compare age, duration of surgery, and BMI. Mann-Whitney test was used to compare VAS, time until the 1st dose of analgesic, use of analgesics, and length of hospitalization. Fisher's exact test was used to evaluate ASA. A value of *P* < 0.05 was considered statistically significant.

OBSERVATIONS AND RESULTS

Groups were homogenous regarding age, gender, ASA, BMI, and length of surgery (Table 1). The number of doses of ketorolac, diclofenac, and tramadol until hospital discharger was similar in both groups (*P* > 0.05). The mean time before the first dose ketorolac, diclofenac, and tramadol did not differ between Groups A and B (4.0 ± 2.1 and 6.2 ± 2.7 h, respectively). Anesthetic and surgical complications were not observed.

VAS at rest during different post-operative periods at 3 h, 6 h, and 12 h was assessed and found that they were significant statistically with *P* values calculated (Table 2).

The time of discharge was calculated in hours following surgery as shown in Table 3 and found to be statistically significant with *P* value 0.324 (*P* significant at 0.05). The Chi-square statistic was 6.85 (Table 3).

DISCUSSION

It is a well accepted in the literature that the choice of anesthesia in inguinal hernia repair surgery is based on the preference of the surgeon, anesthesiologist, and patient.^{12,13} Field block and/or II and IH nerve block have better role in controlling pain in the post-operative periods following herniorrhaphy.¹⁴ In the present study, it was observed that pain, according to the VAS, was lower as to 3 h after surgery in Group A compared to Group B. However, differences in analgesic consumption and time until the 1st dose of analgesics were not observed. A prior study demonstrated that pre-incisional II and IH nerve block with 0.5% bupivacaine (15 mL) in herniorrhaphy under spinal anesthesia reduced pain scores up to 2 h after the surgery in relation to the group that underwent II and IH nerve block associated with general anesthesia.¹⁵ Earlier hospital discharge was observed (difference in the median

Table 1: Age, gender, BMI, and ASA and length of surgery data (n=72)

Observation	Group A - 36	Group B - 36	P value
Age	49.40±2.20	47.50±1.8	0.642
Gender	32/4	33/3	0.748
BMI	35	36	0.510
ASA I/II	11/25	10/26	0.124
Length of surgery	79 min	84 min	0.325

BMI: Body mass index, ASA: American Society of Anesthesiology

Table 2: The VAS scores after 3rd, 6th, and 12th h (n=72)

Mean VAS scoring (h)	Group A - 36	Group B - 36	P value
3 rd	5-7	7-9	0.042
6 th	3-5	6-8	0.036
12 th	2-4	5-7	0.021

VAS: Visual analog scale

Table 3: The time of discharge in both the Groups A and B (n=72)

Time of discharge (h)	Group A - 36	Group B - 36
14-18	12	06
19-23	13	08
24-29	11	22

of 5 h) in the group A patients who underwent II and IH nerve block than in the B group. In another study, it was demonstrated that patients who received local anesthesia had shorter hospital stay (3 h) than those who underwent spinal anesthesia or general anesthesia for inguinal herniorrhaphy.¹² Currently, most inguinal herniorrhaphy operations are performed as day-care surgeries. Thus, the use of anesthetic techniques that allow adequate post-operative analgesia as well as earlier recovery and hospital discharge is necessary.¹⁶

CONCLUSION

Post-operative II and IH nerve block following hernia repair surgery with 0.75% ropivacaine reduced pain up

to 3 h after surgery and the length of hospitalization in patients undergoing inguinal herniorrhaphy under spinal anesthesia.

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