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Original Research Article

A Comparative Study of Ilioinguinal/ Iliohypogastric Nerve Block with Spinal Anaesthesia for Inguinal Hernia Repair

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Abstract

Introduction: Typically, inguinal hernia repair is performed under spinal anaesthesia. Local anaesthetic, on the other hand, gives stable hemodynamics and decreased postoperative discomfort. We examined the efficacy, feasibility, and safety of ilioinguinal/iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair.

Material and Methods: Sixty adult male patients were randomised into two groups of 30 individuals each for elective inguinal hernia repair. Group A was given an ilioinguinal/iliohypogastric nerve block, while Group B was given spinal anaesthesia. Both groups were compared in terms of total time to complete anaesthetic operations, time of onset, hemodynamic changes, and complications. For continuous variables and categorical variables, the unpaired t-test and Chi-square were used. P <0.05 was taken as significant.

Results: Duration to perform ilioinguinal/iliohypogastric nerve block was significantly longer than that of spinal block. The duration of postoperative analgesia was longer in Group A than Group B. Mean blood pressure showed statistically significant reduction in Group B patients. Complications like Nausea, Vomiting, Headache, Hypotension & urinary retention were seen in Group B patients.

Conclusion: For elective unilateral inguinal hernia repair, ilioinguinal/iliohypogastric nerve block can be a safe alternative to spinal anaesthesia.

Keywords: Inguinal Hernia Repair Ilioinguinal/Iliohypogastric Nerve Block, Spinal Anaesthesia.

Introduction

Inguinal hernia repair is one of the most frequently performed operations worldwide; it can be performed under general anaesthesia, spinal or epidural anaesthesia, or local anaesthesia, depending on a number of factors, such as the surgeon's preference, the patient's acceptance, the safety of the procedure, its feasibility, and its cost, etc. [1-3]

General anaesthesia entails hazards of probable airway issues, postoperative cognitive decline, sore throat, nausea, vomiting, and prolonged time of immobilisation with associated risk of deep vein thrombosis and lengthier hospital stay.[4]

Although effective, spinal anaesthesia is not risk-free for patients with decompensated heart disease, recent head trauma, convulsions, and coagulopathies. In addition, spinal and epidural anaesthesia have been linked to hemodynamic instability, vomiting, urinary retention, headache and backache following dural puncture. [5] Local inguinal field block, which comprises the blocking of the ilioinguinal and iliohypogastric nerves, may be an appropriate technique since it reduces surgical stress, provides improved hemodynamic stability, prolonged analgesia, early ambulation, and carries a low risk of complications. [6]

The present study was conducted to compare the inguinal hernia repair under spinal anaesthesia and local anaesthesia with ilioinguinal and iliohypogastric nerves block.

Materials and Methods

This prospective, randomised, double-blind study was carried out at Panimalar Medical College & Hospital in Chennai, India, in the department of Anaesthesiology. The current study comprised 60 patients with simple unilateral inguinal hernia. The study lasted from January 2022 to December 2022. All patients were provided detailed written information about the treatment, and their written consent was acquired. The institutional ethical committee granted ethical approval.

Inclusion criteria:

1. Patients between the ages of 18 and 65
2. patients with non-relapsing, direct and indirect inguinal hernias.
3. patients with surgery physical status American Society of Anesthesiology (ASA) I and II.

Exclusion criteria:

1. Patients under the age of 18 and over the age of 65
2. Patients who were sensitive to lignocaine
3. Patients with a history of chronic pain, daily use of central nervous system drugs, a BMI greater than 46 kg/m2, or contraindications to the suggested anaesthetic.

A simple random sample procedure was employed to divide patients into odd and even number groups of 30 patients each, termed Group A and Group B. Inguinal hernia repair was performed on group A patients under ilioinguinal and iliohypogastric nerve block, and spinal anaesthesia was used on group B patients.

Patients provided written informed consent, and data on age, gender, and occupation, history of edoema in the inguinal region, COPD, jaundice, previous abdominal surgery, obesity, and concomitant diseases were gathered on printed proforma. All patients were medically and surgically assessed, and all regular medical tests were performed.

Preoperative evaluation: The day before surgery, all patients were assessed. All patients were informed whether they would be receiving ilioinguinal and iliohypogastric nerve blocks or spinal anaesthesia, as well as how the procedure would be carried out in either manner. All patients were taught to indicate their pain using a visual analogue scale (VAS). Before the surgery, all patients were given a sedative dose of midazolam (2-3 mg).

An intravenous line was placed with an 18 G cannula on the day of operation. Standard monitors such as NIBP, ECG, and pulse oximeters were connected, and baseline pulse

rate, blood pressure, ECG, respiratory rate, and SpO2 levels were recorded. The appropriate anaesthetic techniques were administered to the patients.

Patients in Group A had ilioinguinal and iliohypogastric nerves blocked using a single puncture procedure. The skin was prepared in an aseptic manner. A local anaesthetic solution (0.25% Bupivacaine) was produced. A 2 cm medial and 2 cm superior skin wheal was raised to the anterior superior iliac spine. The spinal needle was inserted perpendicular to the skin through the skin puncture site. The needle finds increased resistance as it approaches the external oblique aponeurosis, and the first decrease of resistance is noticed as the needle passes through the muscle lying between it and the internal oblique. Following the initial loss of resistance and blood aspiration, 7-8 ml of local anaesthetic was administered. The needle was moved farther down to observe the second reduction of resistance when it crossed the internal oblique and rested between the internal oblique and transversus abdominis muscle. A further 7-8 ml of local anaesthetic was administered. The needle was then withdrawn until it reached the skin and guided at a 45-degree angle towards the inguinal ligament's midpoint to pierce the external and internal oblique muscles. 7-8 ml of local anaesthetic was delivered after each loss of resistance. The remaining prepared amount was saved for possible additional supplementing after sac dissection.

An anesthesiologist administered spinal anaesthesia to group B patients with 0.5% bupivacaine. The patients were held in a sitting position, and the inter-space between the L3 and L4 lumbar vertebrae was measured. After obtaining free flow of Cerebrospinal Fluid, a subarachnoid puncture was conducted using a 26-gauge spinal needle and 12.5 mg (2.5cc) of 0.5% bupivacaine was injected in the subarachnoid space (CSF). Finally, the patient was positioned supine [11].

Intraoperatively, Group 1 patients received local anaesthesia infiltration as well as injectable midazolam and/or propofol supplementation in graduated dosages as needed, particularly during sac dissection. However, the overall dose of midazolam was not greater than $0.1 mgkg^{-1}$. Injection midazolam $0.03 mg\ kg^{-1}$ IV was administered to patients in Group II for sedation if needed during surgery. Supplemental oxygen (2-3 L/min) was administered to all patients via nasal prongs.

The following characteristics were evaluated intraoperatively: the time of commencement of the block and the duration of the block, the pulse rate (PR), and the mean arterial pressure (MAP).

intraoperative requirement of intravenous fluid and vasopressors, supplements required in the form of local anaesthetic infiltration, IV midazolam and Propofol, intraoperative problems such hypotension, bradycardia, nausea and vomiting and the duration of surgery. After surgery, the patient was transferred to the postanesthesia care unit and monitored for pulse, blood pressure, oxygen saturation, VAS score, and any postoperative problems such as nausea, vomiting, urine retention, and headache. When the VAS score ≥ 4., rescue analgesia in the form of IV tramadol $1 mgkg^{-1}$ was administered.

Statistical Analysis

Continuous variables are presented on Mean ± SD and categorical measurements are presented in Number (%). Un Paired student t-test and Chi-square /Fisher exact test were used to find the significance of study parameters on continuous variables & categorical scale between two groups. P value less than 0.05 was taken as statistically significant.

Result

A total of 60 patients undergoing hernia surgery were randomly allocated into two groups as follows: Group A: Patients received ilioinguinal and iliohypogastric nerve block Group B: Patients received spinal anaesthesia.

The mean age of the patients in group A was 41.24 ± 9.438 years while in group B was 46.12 ± 9.845 years and it is not statistically significant.Total time taken for performing the procedure of ilioinguinal and iliohypogastric nerve block in group A was 7.82±0.253 minutes while in group B was 3.85±0.892 min and it was statistically significant. The onset of action was 6.456±0.268 min in group A while in group B was 6.142±0.482 min and it was statistically significant. Duration of surgery in group A was 86.23±6.423 min while in group B was 83.12±9.123 min and it is not statistically significant. Duration of analgesia in group A was 5.172±0.246 hours while in group B was 3.791±0.392 hours and it is statistically significant. (Table 1)

Table 1: Intraoperative and postoperative comparison of various parameters

	Group I	Group II	P-value
Age (years)	41.24 ± 9.438	46.12 ± 9.845	0.432
Mean duration of procedure (min)	7.82±0.253	3.85±0.892	0.002*
Onset of action (min)	6.452±0.364	6.132±1.032	0.001*
Duration of surgery (min)	86.23±6.423	83.12±9.123	0.457
Duration of analgesia (hour)	5.172±0.246	3.791±0.392	0.001*

* significant

Intraoperative pain was assessed by using Visual Analog Scale (VAS). In spinal anesthesia group none of the patients had pain (VAS=0) during surgery. In local anesthesia 7 cases had no pain (VAS=0), 9 cases had mild pain (VAS=1-3), 11 cases had moderate pain (VAS =4-6) and 3 had severe pain (VAS≥7) (p value <0.05). Table 2

Table 2: Intraoperative pain

Intraoperative pain (VAS)	Group A	Group IB	P-Value
None	7	30	0.0001*
Mild	9	0	
Moderate	11	0	
Severe	3	0	

*significant

Postoperatively pain was assessed at 12 hours, 24 hours and 48 hours and no significant statistical difference was found (p value >0.05). The mean pain visual analog score is slightly lower in group A than in group B (Table 3).

Table 3: Postoperative pain scores

Time after surgery	Group A	Group B	P-Value
12 hours	4.1	4.3	0.001*
24 hours	3.5	3.7	0.001*
48 hours	1.3	1.4	0.002*

*significant

There was no statistically significant difference in the heart rate difference between the 2 groups at any time (Table 4)

Table 4: Difference in Heart rate

Time interva	Group A	Group B	P-Value
Base line	83.12±5.782	81.4±5.986	0.243
At 0 Minute	83.76±6.134	81.9±5.876	0.076
At 5 Minute	99.56±5.982	84.7±6.132	0.421
At 15 Minute	100.23±7.784	85.12±7.453	0.256
At 30 Minute	94.92±6.453	82.12±5.765	0.064
At 60 Minute	86.12±5.985	80.23±5.132	0.236
At 90 Minute	82.34±6.124	79.12±5.897	0.056

There was statistically significance difference in the MAP among the 2 groups from 5 minutes. (Table 5)

Table 5: Differences in MAP

Time interva	Group A	Group B	P-Value
Base line	94.55± 6.054	91.74± 9..436	0.432
At 0 Minute	94.60± 6.062	93.78± 8.342	0.312
At 5 Minute	92.32± 6.457	86.73± 6.777	0.002*
At 15 Minute	92.80± 6.150	86.33± 6.738	0.01*
At 30 Minute	93.44± 6.447	88.38± 7.187	0.003*
At 60 Minute	95.65± 7.604	89.41± 7.308	0.02*
At 90 Minute	97.56± 8.101	90.64± 7.472	0.001*

*significant

In group B, 1 patient had Nausea, 1 patient had vomiting, 5 patients had Headache, and 7 patients had Hyptotension and 10 patients had urinary retention where was one patient in Group A had urinary retention. (Table 6)

Table 6: Complications

complications	Group A	Group B
Nausea	0	1
Vomiting	0	1
Headache	0	5
Hypotension	0	7
Urinary retention	1	10

Discussion

The most common procedure, inguinal hernia repair, has been performed under general, spinal, epidural, and local anaesthesia. According to recent European Hernia Society guidelines, in an open hernia surgery, all adult primary reducible unilateral inguinal hernias should be considered for a local anaesthetic. [7] There is some resistance among anaesthesiologists to using this approach. The surgeon initially utilised local anaesthetic at the surgical location, however this did not deliver total anaesthesia. Somatic block across the lower abdomen is provided via ilioinguinal and iliohypogastric nerve blocks, and visceral pain is frequently eased by delivering additional local anaesthesia at

the time of sac dissection. The efficacy, safety, feasibility, benefits, and complications of ilioinguinal and iliohypogastric nerve block by a single puncture approach combined with wound infiltration via the same puncture were compared to spinal anaesthesia in this study.

The current study is a hospital-based randomised clinical trial of 60 individuals who are scheduled to have elective hernia repair surgery. The mean age in group A was 41.249.438 and 46.129.845 in group B in the current study. The age distribution of patients in our study was comparable to that of other studies. [8, 9]

The current study compared ilioinguinal, iliohypogastric nerve block with spinal anaesthesia for inguinal hernia repair for the onset of analgesia and discovered that group A (spinal group) took 4.271.437 minutes and group B (inguinal block group) took 14.876.152 minutes (p-value 0.001). Our findings contradict Pramod *et al*. [10] and Khedkar *et al*. [11], and our findings contradict Chatrapati *et al*. [12] in a spinal group.

In our current study, 1 patient (3.3%) in group A experienced mild discomfort, and 1 patient (3.3%) experienced moderate pain. In group B, however, 6 patients (20.0%) experienced mild discomfort, whereas 20 patients (66.7%) experienced considerable pain. There is a statistically significant difference (p=0.00). Our study's findings were comparable to those of other studies. [11-13] In Group II, 3.33% of patients experienced nausea and vomiting that responded to IV ondansetron, 16.67% experienced urine retention, and 3.33% experienced Headache. None of the patients in Group I suffered from any of these problems. Young *et al*. [14] (urinary retention 14%) and Sultana A *et al*. [15] found similar results.

Conclusion

It may be concluded that inguinal hernia repair using local anaesthesia is as safe as spinal anaesthesia, with the added benefits of decreased post-operative pain, shorter recovery room and ward stays, and no spinal anaesthesia-related problems.

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