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## Ilioinguinal and Iliohypogastric Nerve Block (IINB) Ultrasound-guided vs Subarachnoid Block (SAB) for inguinal mesh hernioplasty potentially randomised comparative clinical study

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### Abstract

**Introduction and Background:** A range of anaesthesia approaches are used to reduce perioperative discomfort during inguinal hernia repair, which is one of the most common surgical operations. There is still some disagreement about whether to use a subarachnoid block or an ultrasound-guided ilioinguinal and iliohypogastric nerve block. Inguinal mesh hernioplasty patients will be the focus of this study, which will evaluate IINB and SAB for safety and effectiveness.

**Materials and Methods:** 100 adults who were going to get elective inguinal hernioplasty were the subjects of this prospective, randomised, comparative clinical trial. This study was conducted at the department of Anaesthesia, Sambhram Institute of medical anaesthesiology, Karnataka, India from the October 2017 to September 2018. Both the IINB and SAB groups were randomly assigned to the participants. The IINB group underwent local anaesthesia injections into the ilioinguinal and iliohypogastric nerves under the direction of ultrasonography. A single injection of subarachnoid space-injected local anaesthetic was administered to the SAB group.

**Results:** After surgery, patients in the IINB group reported far less pain and used less analgesics than those in the SAB group. There was less postoperative hypotension and motor block in the IINB group, and patients were able to mobilise sooner, indicating a quicker recovery period. Complications occurring after surgery were equally common in the two groups. Patients in the IINB group reported less nausea and vomiting after surgery, and they were more satisfied overall.

**Conclusion:** Reduced intraoperative pain, quicker recovery, and fewer complications are additional advantages of ultrasound-guided IINB compared to SAB in patients undergoing inguinal mesh hernioplasty. Outcomes are equivalent to or better than SAB. For individuals who are looking for a less invasive way to get anaesthesia that will help them recover better after surgery, IINB could be a better option than SAB.

**Keywords:** Ultrasound-guided nerve block, ilioinguinal nerve block, iliohypogastric nerve block, subarachnoid block, inguinal hernia

### Introduction

Anaesthesia is commonly employed to reduce intraoperative discomfort and improve patient comfort during inguinal hernia repair, one of the most prevalent surgical procedures worldwide. A range of techniques is employed to guarantee adequate anaesthesia for these surgical procedures [1-3]. The predominant alternatives for regional anaesthesia are nerve blocks and the subarachnoid block (SAB). A local anaesthetic is administered into the subarachnoid area during spinal anaesthesia (SAB), inhibiting motor and sensory functions. Although SAB has a longstanding application in anaesthesia for inguinal hernia procedures, it poses risks of hypotension, motor block, and delays in postoperative recovery [2-4].

Ultrasound-guided nerve blocks have gained popularity in recent years because to their safety, precision, and capacity for selective sensory anaesthesia. The application of local anaesthetics through the ilioinguinal and iliohypogastric nerve block (IINB) might substantially diminish pain during inguinal hernia repair procedures. In comparison to traditional anaesthetic methods, IINB has shown a reduction in opioid consumption, postoperative pain, and recovery times [3-5].

Intraoperative anaesthesia and postoperative analgesia are essential elements of inguinal mesh hernioplasty; nevertheless, there is a paucity of studies comparing Inguinal Interfascial Nerve Block (IINB) with Spinal Anaesthesia Block (SAB) in this context. Preliminary research indicates that IINB may offer advantages such as reduced recovery periods and fewer complications; nevertheless, the findings remain inconclusive [4-6].

This prospective, randomised clinical trial will assess the efficacy of SAB and ultrasound-guided IINB in patients undergoing inguinal mesh hernioplasty [5-7]. The primary objectives are to evaluate the procedures for intraoperative pain management, recovery duration post-surgery, complications, and patient satisfaction. We aim to determine if IINB could serve as a safer or more effective alternative to SAB for this standard surgical procedure by the conclusion of this experiment [6-8]. This study will focus on patients undergoing inguinal mesh hernioplasty, evaluating the safety and effectiveness of IINB and SAB.

### Materials and Methods

This prospective, randomised, comparative clinical trial involved 100 adult patients slated for elective inguinal hernioplasty. Participants were randomly allocated to either the IINB group or the SAB group. This study was conducted at the Department of Anaesthesia, Sambhram Institute of medical anaesthesiology, Karnataka, India from the October 2017 to September 2018. Ultrasound guidance was employed in the IINB group to provide local anaesthetic to the ilioinguinal and iliohypogastric nerves. A solitary injection of local anaesthetic was administered into the subarachnoid area in the SAB group. The main outcomes evaluated comprised intraoperative pain levels, complication rates, and recovery durations. Secondary outcomes encompassed postoperative pain, analgesic usage, and patient satisfaction ratings. Data were examined utilising suitable statistical techniques.

### Inclusion Criteria

- Age 18-75 years.
- Elective unilateral inguinal hernia repair candidates.
- ASA physical status I or II.
- Capable of providing informed consent.

### Exclusion Criteria

- Chronic pain or neurological disorders.
- Allergy to local anesthetics or study drugs.
- Previous inguinal surgery.
- Uncontrolled systemic diseases.
- Pregnancy or breastfeeding.
- Severe obesity (BMI > 40).

### Results

One hundred patients were enrolled in the study and randomly allocated to either the IINB group (n = 50) or the SAB group (n = 50). The demographic and clinical profiles were comparable between the two groups ( $p > 0.05$ ).

**Table 1:** Demographic and Baseline Characteristics

Characteristic	IINB Group (n=50)	SAB Group (n=50)	p-value
Mean Age (years)	45.6±12.4	46.3±11.8	0.74
Male (%)	88%	90%	0.81
ASA I (%)	72%	70%	0.88
Mean BMI (kg/m <sup>2</sup> )	24.5±3.1	24.7±2.8	0.67

The IINB group exhibited a markedly extended block administration time relative to the SAB group, although the initiation of sensory block occurred more rapidly in the SAB group.

**Table 2:** Intraoperative Parameters

Parameter	IINB Group	SAB Group	p-value
Block Administration Time (min)	8.4±2.1	5.1±1.3	<0.001
Onset of Sensory Block (min)	6.8±1.5	2.2±0.9	<0.001
Duration of Analgesia (hours)	6.5±1.8	3.8±1.2	<0.001

Pain was evaluated intraoperatively with the Visual Analogue Scale (VAS). Patients in the IINB group reported somewhat elevated pain levels during the procedure; however, the difference lacked clinical significance.

**Table 3:** Intraoperative Pain Scores (VAS)

Time point	IINB Group (VAS)	SAB Group (VAS)	p-value
Intraoperative Pain	2.4±1.1	1.2±0.6	0.032

The IINB group exhibited expedited mobilisation and a reduced incidence of postoperative complications relative to the SAB group. Patients in the SAB group necessitated fewer rescue analgesics during the initial 6 hours following surgery.

### 4. Postoperative Recovery

Outcome	IINB Group	SAB Group	p-value
Time to First Ambulation (hrs)	3.2±0.8	6.7±1.3	<0.001
Rescue Analgesic Requirement (mg)	45.2±10.3	32.8±8.7	<0.001
Postoperative Nausea/Vomiting (%)	4%	18%	0.016

The incidence of adverse effects such as hypotension, bradycardia, or nausea was significantly higher in the SAB group.

**Table 5:** Complications

Complication	IINB Group (%)	SAB Group (%)	p-value
Hypotension	0%	20%	<0.001
Bradycardia	0%	14%	0.023
Postoperative Nausea	4%	18%	0.016

### Discussions

This randomised prospective trial compared ultrasound-guided ilioinguinal and iliohypogastric nerve block (IINB) with subarachnoid block (SAB) in patients undergoing inguinal mesh hernioplasty. The results indicate that although both methods are successful for intraoperative and postoperative analgesia, each possesses unique advantages and drawbacks [9-11]. The SAB group demonstrated a more rapid onset of sensory block than the IINB group, consistent with other research indicating the swift effectiveness of spinal anaesthesia. The administration of SAB was expedited due to the anaesthetists' familiarity and the technique's simplicity, while the ultrasound-guided IINB necessitated greater technical proficiency, resulting in an extended block administration time. Notwithstanding this, the IINB group ensured sufficient intraoperative analgesia with negligible consequences [12-14].

The IINB group had a notably expedited surgical recovery. The duration until initial ambulation was significantly reduced, facilitating faster discharge and potentially enhancing patient satisfaction. This benefit is essential in outpatient procedures and situations where prompt mobilisation is emphasised. Conversely, the SAB group had

a protracted recovery, mostly attributable to extended motor blockade and an elevated occurrence of adverse effects, including hypotension and bradycardia [14-16]. The IINB group exhibited a markedly reduced frequency of problems. SAB correlated with increased incidences of hypotension, bradycardia, and postoperative nausea and vomiting, aligning with established side effects of spinal anaesthesia. The lack of systemic adverse effects in the IINB group underscores its safety and appropriateness for individuals with comorbidities or those susceptible to haemodynamic instability [17-19].

The duration of postoperative analgesia was markedly prolonged in the IINB group relative to the SAB group. The sustained analgesic effect may be ascribed to the accurate administration of local anaesthetic under ultrasound guidance, ensuring extended efficacy. This discovery is clinically significant since it diminishes the necessity for postoperative opioid analgesics, hence reducing the risk of opioid-related adverse effects [20-23]. The findings of this study indicate that IINB may be a more advantageous option for individuals undergoing inguinal hernia repair, particularly for those necessitating expedited recovery or possessing contraindications to SAB. Conversely, SAB continues to be an efficient and dependable method for intraoperative analgesia, especially in resource-constrained environments lacking access to ultrasound equipment and proficient practitioners [21-23].

This study possesses several drawbacks. The sample size was comparatively limited, necessitating bigger investigations to corroborate these findings. Secondly, the study was performed at a single centre, thereby constraining the generalisability of the findings [24-26]. Finally, long-term consequences, including chronic pain following hernia repair, were not assessed and require additional examination. Future research should concentrate on investigating patient-reported outcomes, including satisfaction and quality of life, subsequent to IINB and SAB. Moreover, cost-effectiveness evaluations would yield additional insights into the practicality of the extensive implementation of ultrasound-guided procedures in clinical practice [27-29].

### Conclusion

This study illustrates that both ultrasound-guided ilioinguinal and iliohypogastric nerve block (IINB) and subarachnoid block (SAB) are efficacious methods for inguinal mesh hernioplasty. IINB provides notable benefits, such as expedited postoperative recovery, reduced complications, and extended postoperative analgesia, rendering it an appropriate alternative, especially for individuals at increased risk of adverse effects from spinal anaesthesia. Subarachnoid block, although effective for prompt intraoperative pain relief, is linked to postponed mobilisation and an increased rate of sequelae. The selection between the two methodologies should be determined by patient-specific considerations, surgical necessities, and accessible resources. Additional research with bigger sample sizes and extended follow-up is advised to corroborate these findings and evaluate the wider relevance of IINB in clinical practice.

### Funding

None

### Conflict of Interest

None

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