



## RESEARCH ARTICLE

## Comparison of Segmental Thoracic Spinal Anaesthesia Versus General Anaesthesia in Laparoscopic Cholecystectomy

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### ABSTRACT

**Background:** Laparoscopic cholecystectomy is commonly performed under general anaesthesia. Recently, segmental thoracic spinal anaesthesia has emerged as a feasible alternative with potential advantages including reduced postoperative pain, nausea, and shorter recovery time.

**Aim:** To compare the efficacy and safety of segmental thoracic spinal anaesthesia with general anaesthesia in patients undergoing laparoscopic cholecystectomy.

**Methods:** This comparative observational study was conducted at Sheikh Bhikari Medical College, Hazaribagh, Jharkhand over 12 months. A total of 100 patients undergoing elective laparoscopic cholecystectomy were included and divided into two groups: Group A received segmental thoracic spinal anaesthesia and Group B received general anaesthesia. Parameters assessed included intraoperative hemodynamics, postoperative pain, complications, duration of hospital stay, and patient satisfaction. Statistical analysis was performed using chi-square test and Student's t-test with  $p < 0.05$  considered significant.

**Results:** Postoperative pain scores were significantly lower in the spinal anaesthesia group compared to the general anaesthesia group ( $p = 0.01$ ). Incidence of postoperative nausea and vomiting was lower in Group A (12%) than Group B (34%) ( $p = 0.02$ ). Hospital stay was significantly shorter in the spinal anaesthesia group. Hemodynamic stability was comparable between groups.

**Conclusion:** Segmental thoracic spinal anaesthesia is a safe and effective alternative to general anaesthesia for, offering better postoperative analgesia, reduced nausea, and shorter hospital stay.

**Keywords:** nausea, hospital stay, general anaesthesia, laparoscopic, cholecystectomy.

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### INTRODUCTION

Laparoscopic cholecystectomy has become the gold standard surgical procedure for symptomatic gallstone disease due to its minimally invasive nature, reduced postoperative pain, shorter hospital stay, and faster recovery. Traditionally, the procedure is performed under general anaesthesia because pneumoperitoneum and patient positioning can significantly affect respiratory mechanics and hemodynamic stability. During surgery, general anaesthesia also ensures proper muscular relaxation and airway control. However, there are a number of drawbacks to general anaesthesia, such as higher postoperative analgesic doses, delayed recovery, airway difficulties, and postoperative nausea and vomiting. Because of these worries, anesthesiologists are investigating regional anaesthetic methods as possible substitutes for laparoscopic procedures.[1]

Recently, segmental thoracic spinal anaesthesia has drawn interest as a novel approach for upper abdominal laparoscopic surgeries. Thoracic spinal anaesthesia offers specific segmental blockage with less motor impairment and better postoperative pain management than traditional

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lumbar spinal anaesthesia. Strict aseptic precautions are taken when administering a local anaesthetic into the thoracic subarachnoid space. Thoracic spinal anaesthesia may lessen stress response, postoperative opioid use, pulmonary problems, and postoperative nausea and vomiting, according to several studies. Shorter hospital stays and early ambulation are also made possible by it. Additionally, it is especially helpful for patients with respiratory problems because it avoids airway manipulation. [2]

Despite these possible benefits, the broad use of thoracic spinal anaesthesia is still limited by worries about neurological damage, hypotension, shoulder soreness, and low surgeon acceptance. There is still little data comparing general anaesthesia versus thoracic spinal anaesthesia for laparoscopic cholecystectomy, particularly in poor nations and tertiary care teaching facilities. In order to compare segmental thoracic spinal anaesthesia and general anaesthesia in patients undergoing laparoscopic cholecystectomy, the current study was carried out at Sheikh Bhikari Medical College in Hazaribagh, Jharkhand. The study sought to compare the two methods in terms of intraoperative hemodynamic changes, postoperative pain, complications, length of hospital stay, and patient satisfaction. The results of this study could be used to assess the safety and viability of thoracic spinal anaesthesia as a substitute anaesthetic method for laparoscopic cholecystectomy.[3]

## MATERIALS AND METHODS

This comparative observational study was conducted in the Department of Anaesthesiology at Sheikh Bhikari Medical College, Hazaribagh, Jharkhand over a period of 12 months.

A total of 100 patients scheduled for elective laparoscopic cholecystectomy were included in the study. Patients were randomly divided into two groups

**Table 1:** Demographic Characteristics

| Variable         | Group A | Group B | p-value |
|------------------|---------|---------|---------|
| Mean Age (years) | 42.3    | 44.1    | 0.31    |
| Male             | 18.0    | 20.0    | 0.64    |
| Female           | 32.0    | 30.0    | 0.71    |

**Table 2:** Postoperative Pain Scores

| Time     | Group A | Group B | p-value |
|----------|---------|---------|---------|
| 6 hours  | 2.8     | 4.6     | 0.01*   |
| 12 hours | 2.1     | 3.7     | 0.02*   |
| 24 hours | 1.5     | 2.9     | 0.03*   |

**Table 3:** Postoperative Complications

| Complication    | Group A | Group B | p-value |
|-----------------|---------|---------|---------|
| Nausea/Vomiting | 6       | 17      | 0.02*   |
| Shoulder Pain   | 8       | 3       | 0.04*   |
| Hypotension     | 10      | 4       | 0.05*   |

**Table 4:** Hospital Stay and Satisfaction

| Parameter                | Group A | Group B | p-value |
|--------------------------|---------|---------|---------|
| Hospital Stay (days)     | 2.1     | 3.5     | 0.01*   |
| Patient Satisfaction (%) | 88.0    | 72.0    | 0.03*   |

## Group A

Segmental thoracic spinal anaesthesia (n=50)

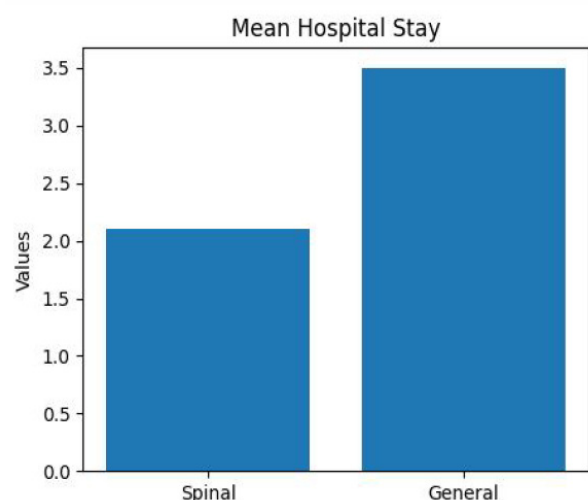
## Group B

General anaesthesia (n=50)

Inclusion criteria included patients aged 18–65 years, ASA grade I and II, and patients willing to participate. Patients with coagulation disorders, spinal deformities, severe cardiopulmonary disease, or contraindications to spinal anaesthesia were excluded. Parameters assessed included heart rate, blood pressure, oxygen saturation, postoperative pain scores using Visual Analogue Scale (VAS), postoperative nausea and vomiting, duration of surgery, hospital stay, and patient satisfaction.

Statistical analysis was performed using SPSS version 25. Chi-square test and Student's t-test were used. A p-value <0.05 was considered statistically significant.

## RESULTS



**Figure 1:** Mean hospital stay

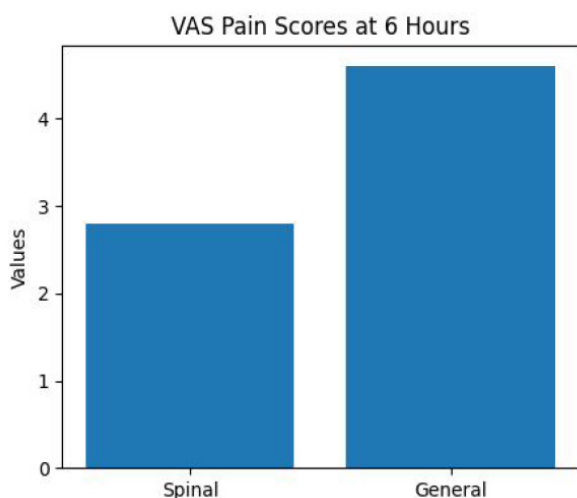


Figure 2: VAS pain scores at 6 hours

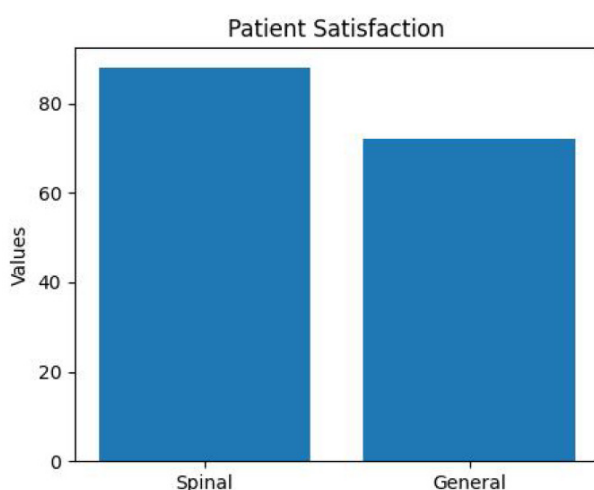


Figure 3: Patients satisfaction

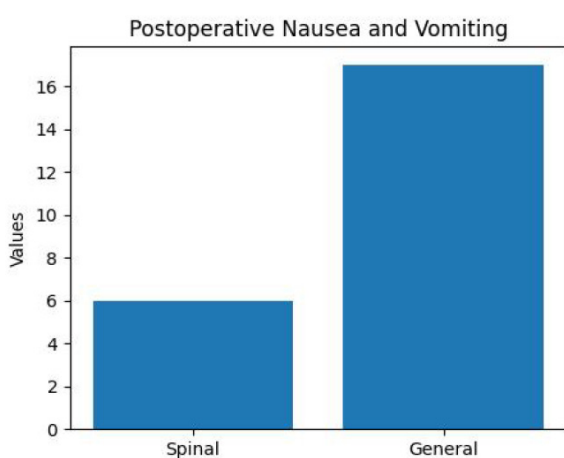


Figure 4: Post-operative nausea and vomiting

## DISCUSSION

The effectiveness and safety of segmental thoracic spinal anaesthesia versus general anaesthesia in patients undergoing laparoscopic cholecystectomy were assessed in the current comparative study.[4] According to the results, thoracic spinal anaesthesia is a viable and efficient substitute for general anaesthesia with a number of perioperative benefits. Because of worries about pneumoperitoneum-induced respiratory compromise and patient discomfort, laparoscopic cholecystectomy is typically carried out under general anaesthesia. However, due to better postoperative recovery profiles and fewer anesthetic-related problems, localised anaesthetic procedures have become more common.[5]

The demographic characteristics of the two groups in the current investigation were similar, suggesting proper group matching. Both groups' hemodynamic values stayed constant, although the spinal anaesthesia group had moderate hypotension more frequently. This result is in line with other research that found sympathetic blockage to be an expected side effect of spinal anaesthesia. Nevertheless, these episodes were brief and successfully treated with vasopressors and water.[6] The thoracic spinal anaesthesia group's greater postoperative analgesia was one of the study's most important conclusions. Pain levels on the Visual Analogue Scale were considerably lower than those of patients under general anaesthesia at every postoperative interval. Prolonged sensory blockage and a lower surgical stress response may be responsible for decreased postoperative pain. Improved patient comfort and early mobilisation were also facilitated by better pain management.[7]

Patients undergoing thoracic spinal anaesthesia had far lower rates of postoperative nausea and vomiting. Postoperative nausea and vomiting are known to be caused by general anaesthetics, opioids, and airway manipulation. The reduced incidence seen in the spinal anaesthesia group is probably due to avoidance of these factors. Patients undergoing thoracic spinal anaesthesia had shorter hospital stays. Early discharge was facilitated by early ambulation, less discomfort, less nausea, and a quicker recovery. This discovery has significant ramifications for patient satisfaction and the use of healthcare resources.[8]

In the group receiving spinal anaesthesia, patient satisfaction was noticeably higher. Better comfort, less pain, and a speedier return to oral intake and mobility were reported by the majority of patients. However, the spinal anaesthesia group had shoulder pain more frequently as a result of diaphragmatic irritation from

pneumoperitoneum. Tolerance was enhanced by low-pressure pneumoperitoneum and appropriate counselling. The current study confirms earlier findings that skilled anesthesiologists may safely provide thoracic spinal anaesthesia for laparoscopic procedures. Benefits of the approach include better postoperative recovery, less narcotic use, and avoidance of airway instrumentation. Patients with obesity, respiratory conditions, or a high risk of pulmonary problems following surgery may benefit most from it.[9]

However, widespread usage is still restricted by worries about neurological consequences. The current investigation showed no neurological problems, highlighting the significance of appropriate technique and patient selection. This study's single-center design and small sample size are among its drawbacks. To confirm these results and evaluate long-term results, more multicenter randomised controlled studies with bigger populations are required.[10]

Overall, the current study shows that segmental thoracic spinal anaesthesia is a safe and efficient substitute for general anaesthesia for laparoscopic cholecystectomy, offering better recovery and postoperative analgesia.

## CONCLUSION

For laparoscopic cholecystectomy, segmental thoracic spinal anaesthesia provides a safe, practical, and efficient substitute for general anaesthesia, according to the current study. Compared to patients undergoing general anaesthesia, those undergoing thoracic spinal anaesthesia showed considerably lower postoperative pain scores, a decreased incidence of postoperative nausea and vomiting, a shorter hospital stay, and higher patient satisfaction. While some patients undergoing thoracic spinal anaesthesia experienced moderate hypotension and shoulder soreness, these side effects were controllable and had little bearing on the results of surgery. In both groups, hemodynamic stability was still satisfactory.

According to the results, thoracic spinal anaesthesia may improve recovery following laparoscopic surgery and provide a number of perioperative benefits. Patients who are more likely to experience difficulties from general anaesthesia may find the approach particularly helpful. Thoracic spinal anaesthesia must be administered safely, which requires careful patient selection, skilled anesthesiologists, and suitable intraoperative monitoring.

To develop standardised procedures and assess the long-term results of this method in laparoscopic surgery, further extensive multicenter studies are advised.

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