

# Comparative Evaluation of Efficacy of General Anaesthesia versus Spinal Anaesthesia for Laparoscopic Cholecystectomy: An Observational Study

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## ABSTRACT

**Background:** Laparoscopic cholecystectomy (LC) with pneumoperitoneum has traditionally been performed under general anesthesia, however, owing in part to the advancement of surgical and anesthetic techniques, many LC have been successfully performed under the spinal anesthetic techniques.

**Aim of the Study:** To compare efficacy of general anesthesia versus spinal anesthesia for laparoscopic cholecystectomy.

**Materials and Methods:** The present study was conducted in the Department of Anaesthesiology, L N Medical College and Research Centre, Bhopal, MP, India. The study protocol was approved from the Institutional ethical committee. For the study, we selected newly diagnosed cases of cholelithiasis with age ranging between 18-80 years and was in American Society of Anaesthesiologist's (ASA) physical status I, II or III. The patients were randomly grouped into two groups, Group GA and Group SA. Patients in group GA underwent surgery under general anesthesia and patients in group SA underwent surgery under spinal anesthesia.

**Results:** The mean duration of anesthesia in Group GA is 53.64 min and in group SA is 39.41 min. Mean duration of pneumoperitoneum in Group GA is 30.19 min and in Group SA is 37.54 min. The mean duration of surgery in Group GA is

32.44 min and in Group SA is 38.74 min. The abdominal pain was the most common postoperative event seen in Group GA, followed by nausea and vomiting. In Group SA, urinary retention was the most commonly seen postoperative event, followed by hypotension.

**Conclusion:** It can be concluded that general anesthesia and spinal anesthesia are efficacious for cholecystectomy. The mean duration of anesthesia is less with spinal anesthesia.

**Keywords:** Surgery, Spinal Anesthesia, General Cholecystectomy, Laparoscopy Anesthesia.

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## INTRODUCTION

Laparoscopic cholecystectomy (LC) with pneumoperitoneum has traditionally been performed under general anesthesia, however, owing in part to the advancement of surgical and anesthetic techniques, many LC have been successfully performed under the spinal anesthetic techniques.<sup>1-3</sup> Generally, spinal anesthesia has lower postoperative mortality and fewer complications than general anesthesia, so spinal anesthesia seems more suitable for the minimally invasive laparoscopic surgery.<sup>4</sup>

Endotracheal general anaesthesia (GA) is the anaesthetic technique of choice for laparoscopic cholecystectomy (LC). Regional anaesthesia too (spinal/epidural/combined spinal epidural) has been reported as a sole technique for performing LC as an alternative to GA for LC. Initially it was reported only for cases who were otherwise high risk candidates for general anaesthesia, more recently it has been reported as a routine technique for otherwise healthy patients also.<sup>5</sup>

It was thought that laparoscopy cholecystectomy necessitates endotracheal intubation. This was to prevent aspiration, abdominal discomfort and hypercarbia which was expected secondary to induction of CO<sub>2</sub>pneumoperitoneum.<sup>6</sup> Hence, the present study was conducted to compare efficacy of general anesthesia versus spinal anesthesia for laparoscopic cholecystectomy.

## MATERIALS AND METHODS

The present study was conducted in the Department of Anaesthesiology, L N Medical College and Research Centre, Bhopal, MP, India. The study protocol was approved from the Institutional ethical committee. For the study, we selected newly diagnosed cases of cholelithiasis with age ranging between 18-80 years and was in American Society of Anaesthesiologist's (ASA) physical status I, II or III. Patients with acute inflammatory process, suspected common bile duct stones, anxiety prone

patients, bleeding diathesis, and cases of chronic obstructive pulmonary disease were excluded from the study. An informed written consent was obtained from the patients after explaining them the protocol of the study. A total of 100 patients participated in the study.

The patients were randomly grouped into two groups, Group GA and Group SA. Patients in group GA underwent surgery under general anesthesia and patients in group SA underwent surgery under spinal anesthesia. The anesthesia was induced for each

patient according to the standardized guidelines. During the maintenance of anesthesia and during post-operative period, we studied the post-operative events. Another qualified anesthetist unaware of the anesthesia technique, assessed the duration of anesthesia and surgery.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

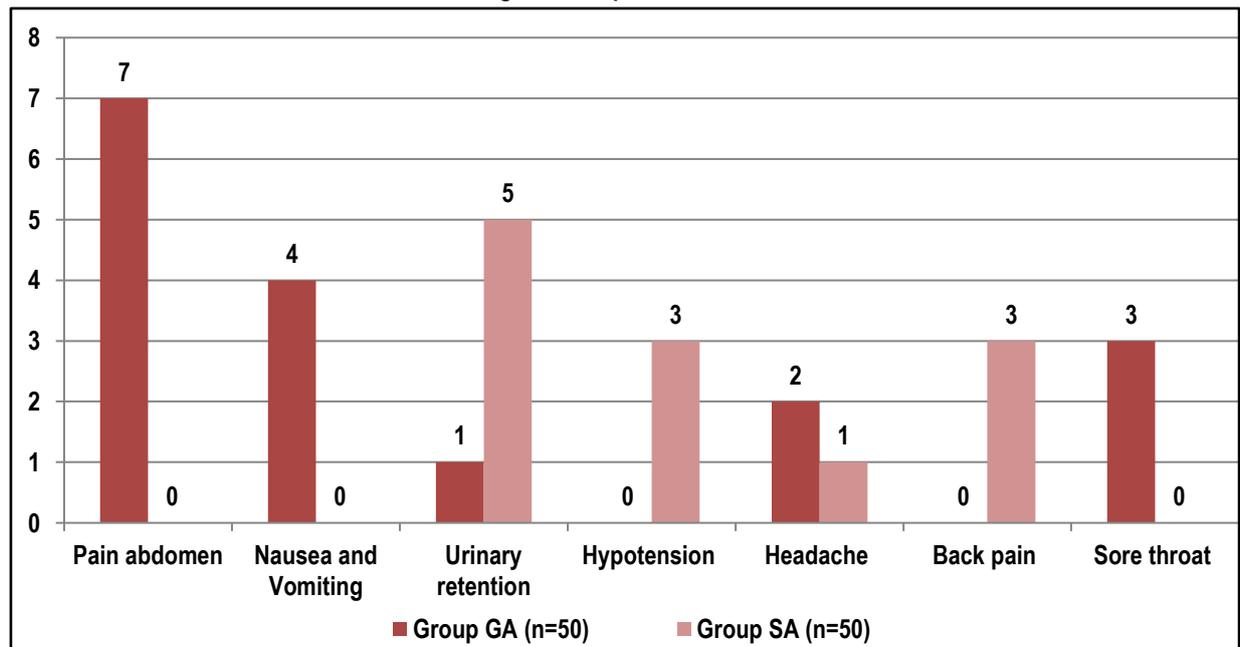
**Table 1: Mean anesthesia time and duration of surgery of subjects**

Characteristic	Group GA (n=50)	Group SA (n=50)	p-value
Mean duration of anesthesia (time)	53.64	39.41	0.001
Mean duration of pneumoperitoneum (time)	30.19	37.54	0.26
Mean duration of surgery (time)	32.44	38.74	0.77

**Table 2: Frequency of postoperative events in groups**

Event	Group GA (n=50)	Group SA (n=50)
Pain abdomen	7	0
Nausea and Vomiting	4	0
Urinary retention	1	5
Hypotension	0	3
Headache	2	1
Back pain	0	3
Sore throat	3	0

**Fig 1: Post-operative events**



**RESULTS**

Table 1 shows the mean anesthesia time and duration of surgery of subjects in group GA and SA. The mean duration of anesthesia in Group GA is 53.64 min and in group SA is 39.41 min. Mean duration of pneumoperitoneum in Group GA is 30.19 min and in Group SA is 37.54 min. The mean duration of surgery in Group GA is 32.44 min and in Group SA is 38.74 min. The results were statistically significant with respect to mean duration of

anesthesia. Table 2 shows the frequency of postoperative events in group GA and SA. The abdominal pain was the most common postoperative event seen in Group GA, followed by nausea and vomiting. In Group SA, urinary retention was the most commonly seen postoperative event, followed by hypotension. The results were compared and were found to be statistically non-significant. [Fig 1]

## DISCUSSION

The present study was conducted to compare efficacy of general anesthesia versus spinal anesthesia for laparoscopic cholecystectomy. Both the anesthesia techniques are significantly efficacious for cholecystectomy.

We observed that the mean surgical anesthesia time in spinal anesthesia patients was significantly lower as compared to group GA. In group GA, abdominal pain and nausea was most common postoperative events. However, in group SA, urinary retention was the most common postoperative event.

Kumar A et al determined the efficacy and safety of laparoscopic cholecystectomy under spinal anaesthesia which could be more cost effective. A prospective study was conducted over a fourteen-month period at a teaching hospital to evaluate efficacy, safety and cost benefit of conducting laparoscopic cholecystectomy under spinal anaesthesia (SA). Patients meeting inclusion criteria were taken up for laparoscopic cholecystectomy under spinal anaesthesia by standardized techniques. They underwent standard four port laparoscopic cholecystectomy. Mean anaesthesia time, pneumoperitoneum time and surgery time defined primary outcome measures. Intraoperative events and post-operative pain score were the secondary outcomes measured. All patients underwent laparoscopic cholecystectomy without any major complications. None had to be converted to general anaesthesia in this series. The operation had to be converted to open incision in 3 patients. Commonest complaint was pain in right shoulder and anxiety at the beginning of operation/pneumoperitoneum. All patients were highly or well satisfied during follow up. Laparoscopic cholecystectomy done under spinal anaesthesia as a routine anaesthesia of choice is feasible and safe. In this study spinal anaesthesia for laparoscopic cholecystectomy was found to be safe even in patients with respiratory problems, cost-effective, with minimal postoperative pain and smooth recovery; the disadvantage being occasional right shoulder pain following pneumo-peritoneum (40%). Spinal anaesthesia can be recommended to be the anaesthesia technique of choice for conducting laparoscopic cholecystectomy in hospital setups where cost is a major factor; provided proper backup is present. V K et al conducted this study of LC, performed under spinal anesthesia to assess its safety and feasibility in comparison with GA. Fifty patients with symptomatic gallstone disease and American Society of Anesthesiologists status I or II were randomised to have LC under spinal (n = 25) or general (n = 25) anesthesia. Intraoperative vitals, postoperative pain, complications, recovery, and surgeon satisfaction were compared between the 2 groups. In the SA group six patients (24%) complained of shoulder pain, two patients required conversion to GA (8%) as the pain did not subside with Fentanyl. None of the patients in the SA group had immediate postoperative pain at operated site. Only two (8%) patients had pain score of 4 at the operative site within eight hours requiring rescue analgesic. One patient had nausea but no vomiting (4%). All the patients (100%) in the GA group had pain at operated site immediately after surgery and their pain score ranged from 4-7, all patients received rescue analgesic before shifting to the ward. In the first 24h tramadol required as rescue in the GA group was 82±24 mg which was significantly higher than the SA group requiring only 30±33.16 mg. Although, the GA group had more patients experiencing postoperative nausea & vomiting it was not

statistically significant. They concluded that SA as the sole anaesthesia technique is feasible, safe and cost effective for elective LC.<sup>7,8</sup>

Kuju RB et al conducted study on the effectiveness of Spinal Anaesthesia versus General Anaesthesia for Open Cholecystectomy. 120 patients with uncomplicated symptomatic gallstone disease undergoing open cholecystectomy and complying with ASA I or II physical status, aged between 18 and 70 years of either sex and BMI ≤ 30 kg/m<sup>2</sup> were enrolled for the study. They were randomly categorized into SA group (received spinal anaesthesia) and GA group (received general anaesthesia), each group containing 60 patients. Intra-operative events and post-operative events were observed up to 48 hours post-surgery and compared between the groups. Data is in percentage and mean with standard deviation and median. Spinal anaesthesia is safe and effective in pain management post open cholecystectomy. The median pain-free interval in SA group was 8 hours as compared to 1 hour in GA group. The average mean pain score was also significantly less in SA group than in GA group at all intervals of time observed. Majority (90%) in SA groups were managed with intramuscular diclofenac sodium whereas majority in GA group were managed with intramuscular pethidine. Intra-operatively, SA group had more cases of haemodynamic instability than GA group, which were easily managed in both the groups. The differences in the incidence of post-operative nausea and vomiting and the days of hospital stay between the groups were not significant. It was concluded that spinal anaesthesia is safe and more effective than general anaesthesia for uncomplicated open cholecystectomy in terms of peri-operative events and, in reducing post-operative pain, as well as in terms of surgeon's satisfaction as well.<sup>9</sup>

Gautam B et al conducted a study to uncover feasibility and safety of SA for conducting LC. Twelve American Society of Anaesthesiologists' physical status I or II patients undergoing elective LC received SA using 4 ml of 0.5% hyperbaric Bupivacaine mixed with 0.15 mg Morphine. Per-operative preparations and management were all standardised, with other drugs being only administered to manage anxiety, pain, nausea/vomiting, hypotension, and any adverse event. LC was performed with CO<sub>2</sub> pneumoperitoneum maintained at an intra-abdominal pressure of less than 10 mm Hg and with minimal operating table tilt. Per-operative events, operative difficulty, hospital stay and patient satisfaction were studied. Spinal anaesthesia was adequate for surgery in all but one patient. Intraoperatively, two out of four patients who experienced right shoulder pain received Fentanyl. Two patients were given Midazolam for anxiety and one was given Ephedrine for hypotension.

Operative difficulty scores were minimal and surgery in one patient was converted to open cholecystectomy. Postoperatively, pain scores were minimal and no patient demanded opioid. One patient required antiemetic for vomiting and one patient each suffered headache and urinary retention. 11 patients were discharged within 48 hours of surgery and patient satisfaction scores were very good. They concluded that spinal anaesthesia with Morphine-mixed hyperbaric Bupivacaine is adequate and safe for elective LC in otherwise healthy patients and minimises postoperative pain and opioid use.<sup>10</sup>

## CONCLUSION

From the results of present study, it can be concluded that general anesthesia and spinal anesthesia are efficacious for cholecystectomy. The mean duration of anesthesia is less with spinal anesthesia.

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