

## Laparoscopic Cholecystectomy Under Spinal Anaesthesia: Experience From Secondary Care Centre

Shirin Parveen<sup>1</sup>, Devendra Singh Negi<sup>1</sup>, Mohd Chand Bagwan<sup>1</sup>,  
Naseem Akhtar<sup>2</sup>

<sup>1</sup>(Department Of Anaesthesiology, Dr. Ram Manohar Lohia Combined Hospital, Lucknow, India)

<sup>2</sup>(Department Of Surgical Oncology, King George's Medical University, Lucknow, India)

### **Abstract**

**Background:** laparoscopic cholecystectomy is usually performed under general anaesthesia. However, many studies have been done to assess feasibility of spinal anaesthesia for the same, and it was found to be safe and feasible for laparoscopic cholecystectomy. At our centre laparoscopic cholecystectomy is usually performed under spinal anaesthesia with very good results. This study done over a period of one year, shows the feasibility of spinal anaesthesia for laparoscopic cholecystectomy.

**Material and methods:** 164 patients aged between 20-70 years with ASA grade I or II having gallstone disease, posted for elective laparoscopic cholecystectomy after their consent for spinal anaesthesia were included in this study, which was carried out over a period of one year. Spinal anaesthesia was given to all the patients included in the study. Patient's refusal for spinal anaesthesia, any contra-indication to spinal anaesthesia and obese patients were excluded from this study.

**Results:** spinal anaesthesia was found to be feasible, safe and cost effective alternative to general anaesthesia for laparoscopic cholecystectomy with good post-operative recovery.

**Keyword:** feasibility, general anaesthesia, laparoscopic cholecystectomy, spinal anaesthesia.

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### **I. Introduction**

Laparoscopic cholecystectomy is standard of care for cholecystitis. This minimally invasive procedure has less post-operative pain, early wound recovery leading to reduced hospital stay, and earlier return to daily activities. Laparoscopic cholecystectomy is usually done under general anaesthesia. However, regional anaesthesia has also been used for performing laparoscopic cholecystectomy as an alternative to general anaesthesia. Earlier it was reported only for patients who were having higher risk under general anaesthesia [1,2]. Recently it has become a routine technique for otherwise healthy patients [3,4]. Laparoscopic cholecystectomy requires pneumoperitoneum which can cause abdominal discomfort, shoulder pain, increased risk of aspiration and hypercarbia [5]. So, it was thought that this necessitates endotracheal intubation. However, some studies demonstrate that laparoscopic cholecystectomy with low-pressure capnoperitoneum can be safely performed under spinal anaesthesia [6]. Despite of this it has not gained widespread acceptance. Spinal anaesthesia has better postoperative recovery and fewer complications than general anesthesia, so spinal anaesthesia can be more suitable option for laparoscopic cholecystectomy .We designed a prospective study to ascertain the feasibility of spinal anaesthesia for laparoscopic cholecystectomy and to assess if spinal instead of general anaesthesia, can be used as a routine practice.

### **II. Methods**

This prospective study was conducted at Dr Ram Manohar Lohia Combined hospital, between February 2014 to January 2015.

Patients with ASA grade I and II and age between 18–70 years, planned for laparoscopic cholecystectomy were included in the study. The exclusion criteria were obesity, acute cholecystitis, and the presence of any condition contra-indicating spinal anaesthesia. Informed consent was obtained explaining the patients about possible events during surgery like vomiting, shoulder pain and anxiety. They were also explained that if there is any pain, discomfort, or anxiety it would be dealt with by the administration of systemic medication and if required conversion to general anaesthesia.

Usual pre-anaesthetic medications were given to all patients. Intravenous midazolam 1mg was given 20 minutes prior to induction. Fentanyl 50 mg and ondansetron 4 mg were given by intravenous route before induction. Baseline values of heart rate, mean arterial pressure, and pulse oximetry were recorded. Subarachnoid block was given at the level of L2-L3 inter-space in the sitting position with 4 ml of 0.5% hyperbaric Bupivacaine. Immediately after spinal block patients were kept in 20°–30° trendelenburg position till effect was

achieved at T3 dermatome. After achievement of the desired level, table tilt was reversed and patients were made supine. Steep trendelenburg position was avoided.

Capnoperitoneum at pressure in range of 10-12 mmHg was used. Patient oxygenated using face mask (5 litres / minute). Heart rate, blood pressure, and SpO<sub>2</sub> recording was done every 3 minute. If the mean arterial pressure dropped below 60 mmHg, 6mg of Mephentermine was administered. During the procedure, anxiety was treated with 1 mg iv Midazolam and pain with Fentanyl 50 µg in intravenous boluses. Bradycardia was treated with Atropine (0.3-0.6 mg i.v).

Continuous monitoring of hemodynamic parameters was done using non-invasive multi-parameter monitor.

#### **Following Parameters Were Also Noted In All Cases:**

Anaesthesia time was defined as time interval between spinal puncture to port site dressing.

Surgery time was defined as time from first incision to port closure.

Pneumoperitoneum time was defined as time from CO<sub>2</sub> insufflation through Veress needle till expulsion of all CO<sub>2</sub> at end of the procedure.

Events like shoulder pain, headache, anxiety, abdominal discomfort, nausea and vomiting were noted. Drug consumption and fluid balance were recorded. Patients were encouraged to tell about any shoulder pain, anxiety, abdominal discomfort, nausea, and vomiting during and after procedure.

Patients were kept in the recovery area for 30 min observation period. Patients were kept on IV fluids for 4 hours after surgery. Intramuscular diclofenac (75 mg twice a day) was used for postoperative pain. Inj Pentazocin 30 mg IV was supplemented whenever required. Post-operative consciousness, vitals, Spo<sub>2</sub>, pain, nausea, and vomiting were evaluated. Other post-operative events like abdominal discomfort, post-operative nausea, vomiting, shoulder pain and headache were also recorded.

**Surgical technique:** Surgery was performed using standard 3 port technique.

### **III. Results**

This study included 164 patients, who underwent laparoscopic cholecystectomy under spinal anaesthesia during Feb 2013 to Jan 2014 in our hospital. Table 1 is showing the demographic data. Out of 164 patients 135 were females, the average age was  $37.52 \pm 11.54$  years (22-70years) & average BMI was  $22.82 \pm 2.69$ .

Table 2 is showing the average time of surgery, anaesthesia and pneumoperitonium which was within the normal range. There was not technical difficulty during surgery because of spinal anaesthesia. In four patients conversion to general anaesthesia was done because of extreme anxiety in two patients, failure to achieve the desired level of anaesthesia in one patient and on patients request due to abdominal discomfort in one case. Two patients required conversion from laparoscopy to open surgery because of extensive adhesions in one case and hemorrhage in the second one.

Table- 3 demonstrates intra-operative events. Shoulder pain was recorded in 26 patients (15.8%) which was treated with intravenous fentanyl 50 µg successfully. Anxiety was reported in 6 patients (3.65%) and treated with IV midazolam 1 mg. Abdominal discomfort was there in 23 patients (14.02%) due to distension caused by pneumoperitonium. Nausea was reported in 11(6.7%) and vomiting in 4 (2.43%) patients and was treated with IV ondansetron 4 mg. Hypotension requiring support was recorded in 18 (10.9%) patients, and 12 patients (7.31%) required treatment for bradycardia.

Postoperatively, 6 patients experienced one or more vomiting episodes. Headache was seen in 4 (2.43%) patients and responded to being in a lying posture and increased intake of fluids and salt. Post-operative hypotension was seen in 7 patients (4.26%). All the patients were discharged next day after surgery.

### **IV. Discussion**

Laparoscopic cholecystectomy is usually done in general anaesthesia. Spinal anaesthesia is not been preferred for this procedure due to increased risk of aspiration and hypotension. Although, it is a safe technique for laparoscopic cholecystectomy with better post-operative pain control. It was thought that increased intra-abdominal pressure due to pneumoperitonium increases the risk of aspiration of gastric contents, thus necessitate endotracheal intubation [1,2]. Increased intra-abdominal pressure and head up position can also cause hypotension due to decreased venous return [7,8]. In this study, occurrence of hypotension during surgery was 10.9 %. This is somewhat similar to various previous studies [4,9,10] showing incidence of hypotension 4.3 – 20.5 %. In most of patients it was managed by infusion of saline and Inj Mephentermine (6mg). Intraoperative nausea and vomiting was seen 9.14% (15) patients. It was effectively managed by intravenous Ondansetron (4mg). Out of 164 patients only four (2.43%) required conversion to general anaesthesia. It is similar to other studies showing rate of conversion up to 0-3.6% [3,4,6] Adverse effect of carbon dioxide pneumoperitonium was extensively studied previously and showed that CO<sub>2</sub> get absorbed [11] and dissolved in the blood

decreasing its Ph and arterial oxygen saturation [12,13]. In our study oxygen saturation and respiratory rate were stable and no signs of respiratory acidosis or arterial hypoxemia, similar to other studies [11,14].

In this study shoulder tip pain was seen in 15.8% patients, which is a bit lower than previous studies (25- 43%) [3,4,6,15]. With use of intravenous fentanyl we were able to manage shoulder tip pain effectively. Our patients had lesser pain in post-operative period due to residual effect of spinal anaesthesia.

### Tables

**Table 1:** Demographic data

Total no of cases	164
Sex (M:F)	29:135
Age (yr)	37.52±11.54
Weight (kg)	59.90±7.30
Height (cm)	161.63±4.52
BMI (kg/m <sup>2</sup> )	22.82±2.69
ASA Grade (I:II)	133:31

**Table 2:** Observations

Duration of surgery (min)	40.98±8.6
Duration of anaesthesia(min)	49.31±8.32
Pneumoperitoneum time (min)	38.53±8.10
Conversion to open surgery (n)	2
Conversion to general anaesthesia (n)	4

**Table 3:** Intraoperative events

Events	Number (n)
Shoulder pain	26
Anxiety	6
Abdominal discomfort	23
Nausea	11
Vomiting	4
Hypotension	18
Bradycardia	12

**Table 4:** Postoperative events

Nausea/vomiting	6
Headache	4
Hypotension	7
Urinary retention	Nil

### V. Conclusion

Laparoscopic cholecystectomy done under spinal anaesthesia as a routine anaesthesia of choice is feasible and safe technique. Spinal anaesthesia can be recommended to be the anaesthesia technique of choice for conducting laparoscopic cholecystectomy in hospital setups in developing countries.

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## *Laparoscopic Cholecystectomy Under Spinal Anaesthesia: Experience From Secondary Care Centre*

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