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Original Research Article

Spinal anaesthesia versus general anaesthesia for laparoscopic cholecystectomy: a comparative study

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ABSTRACT

Background: Anaesthesia involves analgesia, unconsciousness, relaxation and suppression of body reflexes. This state can be achieved either by Spinal or General Anaesthesia (GA). In G.A all the four parameters are fulfilled, where as in Spinal Anaesthesia the patient need not be unconscious. This study aimed to compare the effectiveness general anaesthesia to that of spinal anaesthesia in laparoscopic cholecystectomy.
Methods: A period-based study was conducted among 100 patients. Group 1- who received spinal anaesthesia and Group 2- who received general anasthesia. Demographic data, hemodynamic parameters, operation time, visual analog scale (VAS) scores at postoperatively, patient-surgeon satisfaction, side effects, and hemodynamic changes were inquired and recorded.
Results: The mean operation time was 37.08 minutes for Group 1 and 42.12 minutes in group 2. The mean VAS was 1.4 at 4 hours,1.8 at 8 hours and 12 hours and 0.7 at 16 hours in Group 1.In group 2, it was 2.3 at 4 hours and at 16 hours it was 2.7. Pateint satisfaction was more in Spinal Anaesthesia group as compared to General anaesthesia group whereas surgeons satisfaction was more in Group 2. Mean Heart Rate was found to be 87.1 and 88.2 in group 1 & group 2 respectively. 76.2 and 87.6 in group 1 and 2 respectively at 180 min. The result is significant at $p < 0.05$. Mean Systolic BP was found to be 122.5 and 132.4 in group 1 and 2 respectively at 180 min. The result is significant at $p < 0.05$.
Conclusions: Spinal anesthesia may be associated with less postoperative pain and postoperative nausea and vomiting compared with general anesthesia. Patients receiving spinal anesthesia had shorter discharge time and better satisfaction. Difference in mean HR and Systolic BP was found to be statistically significant.

Keywords: Laproscopic cholecystectomy, Spinal anesthesia, General anaesthesia

INTRODUCTION

Laparoscopic cholecystectomy is a gold standard surgical treatment of symptomatic cholelithiasis.[1] It may be due to minimally invasive nature of the procedure and associated with less postoperative pain, reduced hospital stay, and earlier return to daily activities.[2,3] When it is performed under general anaesthesia, it may cause postoperative pain and nausea and vomiting. Spinal anaesthesia is a less invasive anaesthetic technique that has lower morbidity and mortality rates, compared with general anesthesia.[4] Spinal anaesthesia is a less invasive and has lower morbidity and mortality rates as compared to general anaesthesia. Under spinal anaesthesia patient is awake, there is no airway instrumentation, less postoperative pain and absence of nausea and vomiting.[5] Also the cost effectiveness of spinal anaesthesia makes it an attractive choice. The limiting factor for use of spinal anaesthesia in

laparoscopic cholecystectomy was the patient discomfort because of respiratory embarrassment associated with pneumoperitoneum and the shoulder tip pain.[6]

Patients who received spinal anesthesia undergoing laparoscopy interventions are usually awake, felt less pain, and tended to ambulate earlier with no intubation and/or extubation.[7,8] Secondly, the immediate postoperative period is viewed positively by patients due to the absence of general anesthetic side effects (e.g., nausea and vomiting) and less pain experienced due to the effect of persistent neuraxial blockage. Third, patients that have received spinal anesthesia tend to ambulate earlier than patients receiving general anesthesia. Finally, pain related to intubation and/or extubation can be prevented by administering selective spinal anesthesia to patients undergoing laparoscopic interventions. Combining a minimally invasive surgical procedure with a less invasive anesthetic technique appears, theoretically, to further enhance the advantages of LC. Despite the above-mentioned advantages, the use of regional anesthesia for LC has initially remained limited to those patients with pulmonary disease who are at high risk when having general anesthesia.[8,9]

Spinal anesthesia (SA) as an alternate to GA was first used by Hamad MA et al for laparoscopic cholecystectomy.[10] Since all laparoscopic procedures are merely a change in access and still require the same anesthesia; hence the difference from conventional surgery is likely to be small. It is therefore expected that SA can be as effective in open cholecystectomy as in laparoscopic approach. In fact, SA with lesser effect on respiratory functions, better post operative pain control, reduced surgical stress response and lower incidence of deep venous thrombosis, can be a better choice than GA.Spinal anaesthesia is more effective than GA in blunting the neuroendocrine stress and adverse responses to surgery.[11,12]

METHODS

Study area

The study was conducted in the Department of Anaesthesiology and Critical Care GS Medical College.

Study period

The study was carried out over a period of one year, from January 2021 to December 2022.

Study design

This was a prospective comparative study.

Study population

The study population consisted of patients aged 18–70 years who presented to the Department of Surgery and were scheduled to undergo cholecystectomy during the study period.

Inclusion criteria

Patients were included in the study if they belonged to the American Society of Anesthesiologists (ASA) physical status classification I or II, were aged between 20 and 70 years, and were willing to participate in the study after providing written informed consent.

Exclusion criteria

Patients were excluded from the study if they had a body mass index greater than 35 kg/m², a history of previous open surgery involving the upper abdomen, or the presence of any medical condition that contraindicated elective surgery or spinal anaesthesia.

Sample size

A period-based sampling method was employed, and a total of 100 patients were enrolled in the study.

Group allocation

The participants were divided into two groups based on the type of anaesthesia administered. Group 1 comprised 50 patients who underwent cholecystectomy under spinal anaesthesia, while Group 2 included 50 patients who underwent the procedure under general anaesthesia.

Methodology

After approval from the medical ethical committee and obtaining an informed consent from 100 patients. Taking the patients to the operation theatre, an intravenous line was secured in the right upper limb and infusion of 500 ml of Ringer's Lactate solution started. Blood pressure cuff, ECG electrode and capnography monitor were applied. The initial pulse, blood pressure (BP), respiratory rate, ECG and end tidal CO 2 (EtCO 2) were noted. All the patients were premeditated with Inj. Glycopyrrolate 4 mcg/kg, Inj. Midazolam 0.02 mg/kg and Inj. Ondensetron 0.08 mg/kg intravenously (i.v.).

In Group 1 (spinal anesthesia), the patient was first made to lie in supine position and all the monitors were attached. Oxygen was then administered through ventimask at 3 L/minute. Then the patient was made to lie in left lateral decubitus position. A 25-G Quincke spinal needle was introduced in subarachnoid space at L3-L4 interspace under all aseptic and antiseptic precautions. After confirming free flow of cerebrospinal fluid, 0.3 mg/kg of hyperbaric Bupivacaine 0.5% was injected intrathecally in cephalad direction at a velocity of 0.1 ml/second. Then, after keeping the patient in the 15 o Trendelenberg position for 5 minutes, the patient was again made to lie in a supine position. Approximately 10 minutes after intrathecal injection, the level of analgesia was checked. During this period, 500 ml of 0.9% Ringer's Lactate was infused. A segmental sensory (pin-prick) block, extending between T4 and L5 dermatomes, was obtained without any respiratory distress.

Laparoscopic cholecystectomy was performed using the same techniques in both the groups with standard 4 trocar insertion. After painting and draping, Inj. Bupivacaine plain (0.2%) 20 ml was injected subcostally under diaphragm equally on both sides in both the groups.[9,10] Pneumoperitoneum was established by using the open (Hassen) technique with carbon dioxide at maximum intra-abdominal pressure of 12 mm Hg. Intraoperatively, the patients randomly allocated to general anesthesia group received fentanyl citrate 2 µg/kg i.v. as an adjuvant while those allocated to spinal anesthesia group were given 25 µg i.v. as bolus and when required. All the patients were monitored continuously both for clinical observation and noninvasive hemodynamic monitoring like electrocardiography, pulse, blood pressure, respiratory rate, pulse oxymetry and EtCO 2 which were recorded at 15-minute interval. Operative times as well as any intraoperative events such as shoulder pain, headache, nausea, and discomfort were recorded.

Postoperative pain was assessed at 4, 8, 12 and 24 hours by using the Visual Analogue Scale (VAS) after completion of procedure. Other postoperative events, either related to surgical or especially to anesthetic procedure, such as discomfort, nausea and vomiting, shoulder pain, urinary retention, pruritus, headache and other neurological sequel, were recorded. Operative time in both groups as well as any intraoperative adverse effects like bradycardia, hypotension, nausea, vomiting, headache, and abdominal discomfort were recorded in group 1. Drug consumption and fluid intake were also recorded.

RESULTS

Table 1 shows that in Group 1 among 50 patients, the mean age was found to be 47.32 years and Group B was 46.33 years. Majority of them were females in both the groups. The mean operation time was 37.08 minutes for Group 1 and 42.12 minutes in group 2.

Table 1: Demographic profile of patients (n=100).

	Group 1 (Spinal anaesthesia), N=50	Group 2 (General anaesthesia), N=50	P value
Age (in years), Mean±SD	47.32±11.32	46.33±12.54	
Sex			
Female	32	29	The p value is 0.538509. The result is not significant at p 0.05.
Male	18	21	
ASA			
I	28	37	The p value is 0.059172. The result is not significant at p<0.05
II	22	13	
Operative time mean (in minutes)	37.08	42 .12	
BMI (Mean±SD)	27.08±3.1	29.23±4.2	

Table 2: Side effects.

Variable	Group 1, N=50	Group 2, N=50
Nausea/vomitting	07	08
Dizziness	00	09
Pruritis	01	00
Urine retention	02	00
Headache	13	05

Above Table 2 shows that nausea was seen in both the groups. Dizziness was seen among 09 patients of group 2. Pruritis was see in only 1 patient of Group 1 and urine retention was seen in 2 patients of group 1. Headache was seen in 13 patients of group 1 and 05 patients of group 2.

Table 3 shows that out of 5 the mean VAS was 1.4 at 4 hours, 1.8 at 8 hours and 12 hours and 0.7 at 16 hours in Group 1. In group 2, it was 2.3 at 4 hours and at 16 hours it was 2.7

Patient satisfaction was more in spinal anaesthesia group as compared to general anaesthesia group whereas surgeons satisfaction was more in Group 2.

Table 3: Postoperative VAS, patient and surgeon satisfaction among both groups.

Variable	Group 1	Group 2
Postoperative VAS (Mean±SD)		
4 hrs	1.4±1.1	2.3±1.4
8 hrs	1.8±1.2	3.7±1.8
12 hrs	1.8±1.2	3.9±1.7
16 hrs	0.7±0.3	2.7±1.2
Patients satisfaction (Mean±SD)		
Scale of 0-5	4.1±2.3	3.6±1.8
Surgeons satisfaction (Mean±SD)		
Scale 0-5	3.2±0.8	3.8±0.6

Table 4: Hemodynamic changes in patients: pulse/heart rate.

Mean HR	Group 1	Group 2	
Baseline (minutes)	87.1	88.2	The t value is -2.69644. The p value is 0.007381. The result is significant at p <0.05.
0	81.7	98.1	
10	71.8	92.3	
20	69.5	86.4	
30	72.7	80.56	
60	75.2	73.3	
90	68.1	71.2	
120	65.2	72.2	
150	73.9	86.4	
180	76.2	87.6	

Table 5: Hemodynamic changes in patients: systolic blood pressure.

Mean systolic BP	Group 1	Group 2	
Baseline (minutes)	133.3	132.8	The t value is -2.17408. The p value is 0.021642. The result is significant at p <0.05
0	124.8	145.8	
10	108.9	130.6	
20	102.4	122.4	
30	96.1	112.5	
60	95.7	105.5	
90	94.2	102.2	
120	98.4	112	
150	112.5	128.4	
180	122.5	132.4	

Table 6: Hemodynamic changes in patients: diastolic blood pressure.

Mean diastolic BP	Group 1	Group 2	
Baseline (minutes)	84.84	82.3	The t value is -1.61815. The p value is 0.061509. The result is not significant at p <0.05
0	79.75	98.6	
10	63.54	86.5	
20	61.23	75.4	
30	62.3	69.9	
60	60.4	60.3	
90	59.6	65.4	
120	64.53	68.7	
150	79	85.8	
180	83.5	87.2	

Mean heart rate was found to be 76.2 and 87.6 in group 1 and 2 respectively at 180 min (Table 4).

Mean systolic BP was found to be 122.5 and 132.4 in group 1 and 2 respectively at 180 min (Table 5).

Mean systolic BP was found to be 83.5 and 87.2 in group 1 and 2 respectively at 180 min (Table 6).

DISCUSSION

In our study, the mean age was found to be 47.32 years in Group 1 and in Group 2 was 46.33 years. Majority of them were females in both the groups. The mean operation time was 37.08 minutes for Group 1 and 42.12 minutes in group 2. the mean VAS was 1.4 at 4 hours, 1.8 at 8 hours and 12 hours and 0.7 at 16 hours in Group 1. In group 2, it was 2.3 at 4 hours and at 16 hours it was 2.7. Patient satisfaction was more in spinal anaesthesia group as compared to general anaesthesia group whereas surgeons satisfaction was more in Group 2.

CONCLUSION

Spinal anaesthesia is associated with less postoperative pain and postoperative nausea and vomiting compared with general anesthesia.Patients receiving spinal anesthesia had shorter discharge time and better satisfaction.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bessa SS, Katri KM, Abdel-Salam WN, El-Kayal ES, Tawfik TA. Spinal versus general anesthesia for day-case laparoscopic cholecystectomy: a prospective randomized study. J Laparoendosc Advan Surg Tech. 2012;22(6):550-5.
2. Lichten JB, Reid JJ, Zahalsky MP, Friedman RL. Laparoscopic cholecystectomy in the new millennium: How far have we come?. Surg Endosc. 2001;15(8):867-72.
3. Grace PA, Quereshi A, Coleman J, Keane R, McEntee G, Broe P, et al. Reduced postoperative hospitalization after laparoscopic cholecystectomy. J Brit Surg. 1991;78(2):160-2.
4. Bessa SS, El-Sayes IA, El-Saiedi MK, Abdel-Baki NA, Abdel-Maksoud MM. Laparoscopic cholecystectomy under spinal versus general anesthesia: a prospective, randomized study. J Laparoendosc Advan Surg Tech. 2010;20(6):515-20.
5. Yuksek YN, Akat AZ, Gozalan U, Daglar G, Pala Y, Canturk M, et al. Laparoscopic cholecystectomy under spinal anesthesia. Am J Surg. 2008;195:533-6.
6. Berberoglu M, Dilek ON, Ercan F, Kati I, Ozmen M. The effect of CO2 insufflation rate on the postlaparoscopic shoulder pain. J Laparoendosc Adv Surg Tech A 1998;8:273-7.
7. Pursnani KG, Bazza Y, Calleja M, Mughal MM. Laparoscopic cholecystectomy under epidural anesthesia in patients with chronic respiratory disease. Surgical Endoscopy. 1998;12(8):1082-4.

8. Lennox PH, Vaghadia H, Henderson C, Martin L, Mitchell GWE. Small-dose selective spinal anesthesia for short-duration outpatient laparoscopy: recovery characteristics compared with desflurane anesthesia. Anesthes Analges. 2002;94(2):346-50.
9. Gramatica L, Brasesco OE, Mercado Luna A, Martinessi V, Panebianco G, Labaque F, et al. Laparoscopic cholecystectomy performed under regional anesthesia in patients with chronic obstructive pulmonary disease. Surg Endosc. 2002;16:472-5.
10. Hamad MA, El-Khattary OA. Laparoscopic cholecystectomy under spinal anesthesia with nitrous oxide pneumoperitoneum: a feasibility study. Surg Endosc. 2003;17(9):1426-8.
11. Tzovaras G, Fafoulakis F, Pratsas K, Georgopoulou S, Stamatiou G, Hatzitheofilou C. Laparoscopic cholecystectomy under spinal anesthesia: a pilot study. Surg Endosc. 2006;20(4):580-2.

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