

Post-Operative Outcome of Open Cholecystectomy in Patients Receiving Spinal Versus General Anesthesia

IMRAN HAFEEZ¹, MAQSOOD AHMED SIDDIQUI², IMRAN ALI³, KELASH KUMAR⁴, AHMED UDDIN SOOMRO⁵, AQIL QAYOUM⁶

¹Consultant Anesthesia Department of Anesthesia, King Abdullah Medical City Makkah Kingdom of Saudi Arabia

²Associate Professor & Head Department of Anesthesia, Surgical ICU & Pain Management, Ghulam Muhammad Mahar Medical College & Hospital, Sukkur, Pakistan

³Consultant Anaesthesia, Sindh Employees social security Hospital Landhi Karachi, Pakistan

⁴Senior Registrar Department of Anesthesia and Intensive Care, Liaquat University of Medical and Health Sciences Jamshoro, Pakistan.

⁵Associate Professor Department of Anesthesia and ICU, Chandka Medical College Hospital @ SMBMU Larkana, Pakistan

⁶Anesthesia Consultant Department of Anesthesia, Liaquat National Hospital and Medical College Karachi, Pakistan

Corresponding author: Imran Hafeez, Email: drimranhafeez@yahoo.com

ABSTRACT

Aim: The purpose of this study was to analyze the postoperative outcome of open cholecystectomy in patients receiving spinal versus general anesthesia.

Study design: Analytical cross-sectional study

Place and Duration: this study was conducted in King Abdullah Medical City Makkah Kingdom of Saudi Arabia from January 2020 to January 2021.

Methodology: A total of 180 patients that had the surgery of open cholecystectomy under spinal as well as general anesthesia were included in this research. All patients who had pancreatitis, contraindication to spinal anesthesia or general anesthesia, or severe cardiopulmonary diseases were excluded from the study. Patients were randomly distributed into two groups which are SA and GA groups, with each group having 90 patients. The sample size was determined via open epi. After the surgical procedure, patients were followed and analyzed for postoperative outcomes.

Results: A total of 140 patients were female while 40 patients were male. Patients in the SA group did not face post-operative pain till 8 hours. But patients in the GA group complained of postoperative pain after an hour of open cholecystectomy. The postoperative outcome included nausea or vomiting which was common in both groups and post-Dural headaches which were more common in patients of the SA group and was cured without giving any medication. The sore throat was more common in patients of the GA group. However, no respiratory depression was found in patients of both the SA as well as GA groups.

Conclusion: Spinal anesthesia as compared to general anesthesia reveals longer pain-free hours and fewer adverse effects after open cholecystectomy. Nausea or vomiting was common in both groups, and no respiratory depression was found in patients from SA as well as the GA group. Open cholecystectomy needed training due to the factors that lead to conversion to laparoscopic surgery, such as incorrect anatomy and the onset of complications.

Keywords: open cholecystectomy, anesthesia, spinal anesthesia, general anesthesia, postoperative outcome

INTRODUCTION

Open cholecystectomy is the surgery that is usually used to treat symptomatic cholelithiasis, particularly in developing nations due to the absence of laparoscopic apparatus or experience. However, because of the comparatively short surgical time, early mobilization, decreased postoperative discomfort, quick recovery, short hospital stays (LOS), and early back to work, laparoscopic cholecystectomy has long been the gold standard approach for efficient therapy of symptomatic gallstones. General anesthesia (GA) has traditionally been used extensively for both open as well as laparoscopic cholecystectomies. [1]

In certain circumstances, open cholecystectomy is still advised right away without first undergoing a laparoscopic trial. The likelihood of a portal lymph node dissection, in addition to resection of the gallbladder, a piece of the liver, and maybe a part of the bile duct, are some reasons for an open procedure when gallbladder malignancy is suspected or proven. [2]

However, contradictions that apply to any surgical procedure in general also applies to open cholecystectomy. Relative contraindications to laparotomy include significant comorbid disorders like shock, severe cardiac and respiratory disease, anticoagulation, any current neurologic episode, and other life-threatening conditions. Moreover, resection must not start if there is a suspicion of gallbladder malignancy until a comprehensive examination has been carried out, including any possible depth of invasion and metastases. [3]

GA is generally viewed favourably due to its ease and well-established safety profile. However, general anesthesia may be difficult for individuals with difficult intubation, obstructive lung illness, or cardiovascular disease. This approach does have drawbacks as the negative effects on pulmonary functioning and associated post-operative symptoms might effectively contribute to an increased hospital staying days and hence have a significant impact on hospital costs. Regional blocks such as low thoracic,

epidural, spinal, segmental, or thoracic spinal, and combined spinal-epidural blocks have recently been used in laparoscopic cholecystectomy and have been proven to be efficient and safe alternatives to GA with a variety of benefits. [4]

Because all laparoscopic operations are only a modification in access and still need similar anesthesia, the difference between conventional surgery and laparoscopic surgery is said to be very minimal. As a result, it has been claimed that SA is a successful option in both open and laparoscopic cholecystectomy. [5] Furthermore, SA may be a better alternative than GA since it has fewer side effects on the respiratory system, better post-operative pain management, a lower surgical stress response, and a decreased risk of DVT. [6]

However, the outcomes related to both SA and GA have not been properly researched for open cholecystectomy. Therefore, the purpose of this study was to analyze the postoperative outcome of open cholecystectomy in patients receiving spinal versus general anesthesia.

METHODOLOGY

This analytical cross-sectional study was carried out after receiving clearance from the institutional ethics committee and collecting signed informed consent from the patients. Patients that had the surgery of open cholecystectomy under spinal as well as general anesthesia were included in this research. All patients that had pancreatitis, contraindication to spinal anesthesia or general anesthesia, or severe cardiopulmonary diseases were excluded from the study.

A total of 180 patients were taken as a part of this study. Patients were randomly distributed into two groups which are SA and GA groups, with each group having 90 patients. The sample size was determined via open epi. The patients in the SA group were given spinal anesthesia during open cholecystectomy while

the GA group received general anesthesia during open cholecystectomy.

Patients in the SA group were pre-medicated with an injection of ondansetron and midazolam, half an hour prior to open cholecystectomy. SA patients were then anesthetized with bupivacaine and tramadol at the level of L3-L4 or L4-L5 IV space while the patient was in a sitting position. A long needle of about 25 gauge was used in this regard after which patients were placed in the Trendelenburg position for about three minutes. Patients in the GA group were pre-medicated with an injection of ondansetron, glycopyrrolate, midazolam, and tramadol. The patients were then anesthetized with propofol and Vecuronium followed by isoflurane throughout the surgical procedure. After the surgical procedure, patients were followed and analyzed for postoperative outcomes. All the data were computed and analysed by using SPSS version 22

RESULTS

Out of 180 patients, 90 patients were assigned to each group i.e. SA and GA. A total of 140 patients were female while 40 patients were male. The average range of age was 18 to 70 years. No significant differences associated with age, sex, and BMI were observed in both groups. However, there was a significant difference in postoperative pain in both groups. Table I shows the postoperative outcome in both SA and GA groups

Patients in the SA group did not face post-operative pain till 8 hours. But patients in the GA group complained of postoperative pain after an hour of open cholecystectomy as shown in table II.

Postoperative pain was easily managed in the SA group with IM diclofenac and tramadol as compared to the GA group. Patients in the GA group were given nalbuphine and tramadol to manage postoperative pain.

Nausea and vomiting were observed in around 20 patients (22.5%) in both groups which were managed with an injection of ondansetron. The patients in the SA group complained of post-Dural puncture headaches (n= 25) which were alleviated without given any medicines. The patients in the GA group showed sore throats (n= 50). However, none of the patients from both groups revealed respiratory depression. However, some patients also faced intraoperative side effects. Patients in the SA group revealed bradycardia, hypotension, dyspnea, and nausea while patients in the GA group faced bradycardia along with hypertension during open cholecystectomy.

Table-1: post-operative outcome in both SA and GA groups

Type of Anesthesia		SA	GA	Total
Post-operative Outcomes	Nausea and Vomiting	10	10	20
	Post-dural Puncture headaches	25	0	25
	Sore throat	0	50	50
Total		35	60	95

Table-2: post-operative pain in both SA and GA groups

Post-operative pain		after 1 hour	after 8 hours	Total
Type of Anesthesia	SA	0	90	90
	GA	90	0	90
Total		90	90	180

DISCUSSION

Even though the practicality and prevalence of laparoscopic cholecystectomy have increased, open cholecystectomy continues to be used in regions where suitable technology and competence in conducting laparoscopic cholecystectomy are lacking. [7]

The choices of GA and SA nowadays are available to anesthesiologists for an efficient open cholecystectomy. However, GA is widely used because of its key benefit, sufficient muscle relaxation during a surgical procedure. Spinal anesthesia does not

give appropriate muscular relaxation, which may make surgery more challenging. Butit offers an advantage against GA as it can be administered safely in individuals with cardio-respiratory comorbidities. [8] This current study aimed to assess outcomes in open cholecystectomy when SA and GA are used respectively to the patient's condition.

SA differs from GA in a number of ways, including the significantly longer (8 hours) post-operative pain-free time and the supposedly low usage of opioids for postoperative pain control. The most often utilized analgesic for the SA group was injectable diclofenac sodium, a nonsteroidal anti-inflammatory medication, whereas some patients were adequately handled with tramadol, an alternative opioid. Opioids, on the other hand, were utilized to treat pain in patients of the GA group. [9] Some were treated with tramadol, whereas most of the patients were treated with nalbuphine (an opioid).

Additionally, the SA group's extended pain-free period and lower opioid usage may be associated with the interaction of several variables, including a reduced stress response due to spinal anesthesia, the absence of discomfort from endotracheal intubation, and the existence of appropriate levels of remaining analgesia. [10] Furthermore, the patients' enhanced pain threshold, as well as confidence acquired throughout this pain-free time, added to their satisfaction with the efficient pain treatment with basic analgesics. [11] According to a study, in terms of peri-operative complications, post-operative pain reduction as well as surgeon satisfaction, spinal anesthesia is safer and more efficient than general anesthesia for uncomplicated open cholecystectomy. [12]

According to another research, the decision between spinal anesthesia and general anesthesia may be influenced by the patient's parameters, the anesthesia, and the surgical procedure. An acceptable substitute for general anesthesia is spinal anesthesia. In this research, spinal anesthesia was found to be more sufficient and safer for patients with good health. According to their advice, it offers desirable post-operative pain control without hindering recovery, reduced post-operative nausea and vomiting, as well as cost-effectiveness. [13]

On the other hand, in accordance with another research, when general anesthesia is induced, gas exchange is disrupted. This impairment can be attributed to how general anesthesia affects ventilation patterns, lung and chest wall mechanics, lung volumes, shunt fractions, and ventilation and perfusion relationships. [14]

There was no respiratory depression in the SA group post-surgery, but several individuals in the GA group reported a sore throat for two days, which went away without any medicine; however, 25 patients in the SA group suffered post-dural puncture headaches lasting 2 to 3 days following surgery. There was no statistically significant difference in hospital stays between the SA (3 days) as well as GA groups (4 days).

This study found no evidence of inadequate muscular relaxation, which is a significant issue in open cholecystectomy performed under spinal anesthesia and which can complicate the surgical operation in the SA group. Surgeons were very pleased with SA. [15]

CONCLUSION

This study shows that spinal anesthesia is also a suggested alternative to the widely used general anesthesia during open cholecystectomy. Spinal anesthesia as compared to general anesthesia reveals longer pain-free hours and fewer adverse effects. As in this study, few patients showed nausea or vomiting was common in both groups and post-Dural headaches were common in patients of the SA group which were cured without giving any medication. The sore throat was more common in patients of the GA group. However, no respirator depression was found in patients of both the SA as well as GA groups.

However, Safe Open cholecystectomy needed training due to the factors that lead to conversion to laparoscopic

cholecystectomy, which are typically atypical anatomy, the onset of complications, or anesthesia issues that demand quick judgments and competent treatment to avoid devastating consequences.

Funding source: None

Permission: It was taken from the ethical review committee of the institute

Funding: None

REFERENCES

1. Damor M, Verma R, Jingar H, Roat R. EFFECTIVENESS OF SPINAL ANESTHESIA VERSUS GENERAL ANESTHESIA FOR OPEN CHOLECYSTECTOMY: AN INSTITUTIONAL BASED STUDY.
2. Al Masri S, Shaib Y, Edelbi M, Tamim H, Jamali F, Batley N, Faraj W, Hallal A. Predicting conversion from laparoscopic to open cholecystectomy: a single institution retrospective study. *World journal of surgery*. 2018 Aug; 42(8):2373-82.
3. Jones MW, Guay E, Deppen JG. Open cholecystectomy. InStatPearls [Internet] 2021 Apr 30. StatPearls Publishing.
4. Kuju RB, Dongol Y, Verma R. Effectiveness of Spinal Anaesthesia versus General Anaesthesia for Open Cholecystectomy. *Journal of Nepal Health Research Council*. 2016 May 1; 14(33):93-8.
5. Kundu SK, Malek A, Islam H. Laparoscopic Cholecystectomy: A Comparison between Spinal Anaesthesia and General Anaesthesia. *Sch J App Med Sci*. 2021 Aug; 8:1295-300.
6. Prasad CG, Mannur PP, Suresh G. Spinal anaesthesia versus general anaesthesia for laparoscopic cholecystectomy--a prospective randomized controlled study. *Journal of Evolution of Medical and Dental Sciences*. 2014 Feb 10; 3(6):1361-9.
7. Sutcliffe RP, Hollyman M, Hodson J, Bonney G, Vohra RS, Griffiths EA, Fenwick S, Elmasry M, Nunes Q, Kennedy D, Khan RB. Preoperative risk factors for conversion from laparoscopic to open cholecystectomy: a validated risk score derived from a prospective UK database of 8820 patients. *Hpb*. 2016 Nov 1; 18(11):922-8.
8. Gautam B. Spinal anaesthesia for laparoscopic cholecystectomy: A feasibility and safety study. *Kathmandu University Medical Journal*. 2009; 7(4):360-8.
9. Larsson V, Nordenson C, Karling P. Long-term postoperative opioid prescription after cholecystectomy or gastric by-pass surgery: a retrospective observational study. *Scandinavian Journal of Pain*. 2021 Jul 1; 21(3):569-76.
10. Laoutid J, Sakit F, Jbili N, Hachimi MA. Low dose spinal anesthesia for open cholecystectomy: a feasibility and safety study. *International Surgery Journal*. 2017 Mar 25; 4(4):1417-21.
11. Hallway A, Vu J, Lee J, Palazzolo W, Waljee J, Brummett C, Englesbe M, Howard R. Patient satisfaction and pain control using an opioid-sparing postoperative pathway. *Journal of the American College of Surgeons*. 2019 Sep 1; 229(3):316-22.
12. Khan MN, Ashraf MN, Khan HD. Spinal anesthesia versus general anesthesia for open cholecystectomy: comparison of postoperative course. *Ann Pak Inst. Med Sci*. 2013; 9:95-8.
13. Zahid MA. Spinal Anaesthesia Vs General Anaesthesia for Open Cholecystectomy Operation Interim Analysis of a Controlled Randomized Trial. *TAJ: Journal of Teachers Association*. 2011 Jun 30; 24(1):30-3.
14. Das W, Bhattacharya S, Ghosh S, Saha S, Mallik S, Pal S. Comparison between general anesthesia and spinal anesthesia in attenuation of stress response in laparoscopic cholecystectomy: A randomized prospective trial. *Saudi journal of anaesthesia*. 2015 Apr; 9(2):184.
15. Singh C, Nigam A, Bihari R, Khan A, Kumar D. Spinal Anesthesia versus General Anesthesia for open cholecystectomy: Comparison of PERI-operative and post-operative events. *J Med Sci Clin Res*. 2018 Jul 30; 6(7):1090-5.