To study the effectiveness comparison of general anaesthesia and spinal anaesthesia for laparoscopic cholecystectomy

Dr. Mrs.N.V.Kanase[1], Dr. Vijay V Katti[2], Dr. Smith Varghese[3]

[1]Professor, Department of Anaesthesiology, Krishna Vishwa Vidyapeeth, "Deemed To Be University", Karad Malkapur, Karad , Maharashtra, India.

[2]Associte Professor, BLDE(DU) Shri B. M. Patil Hospital, Medical College and Research Center, Vijayapura, Karnataka, India.
(Corresponding author)

[3]Senior Resident, Department of Anaesthesiology, Krishna Vishwa Vidyapeeth, "Deemed To Be University", Karad Malkapur, Karad , Maharashtra, India.

Abstract:

Aim: To study the effectiveness comparison of general anaesthesia and spinal anaesthesia for laparoscopic cholecystectomy. **Materials and methods:** 120 patients were split into two groups at random: the SA group (Group 1) and the GA group (Group 2). Patients who were randomly assigned to the SA group were premedicated with injections of ondansetron 0.1 mg/kg and midazolam 1 mg 30 minutes before to the surgery after determining that the pre-anaesthetic assessment was satisfactory. Patients in the GA group received IV injections of ondansetron 0.1 mg/kg, glycopyrrolate 0.2 mg, midazolam 1 mg, and tramadol 2 mg/kg as premedication. **Results:** There were no significant differences in age, weight, gender and duration of surgery between the groups. The post-operative pain levels between the GA and SA groups showed a significant mean difference. At all time intervals shown in Table 2 observations, the repeated measure ANOVA reveals that pain ratings in the GA group are substantially higher than those in the SA group. According to reports, post-operative discomfort was minor and was readily manageable in the SA group. In contrast to the GA group, where 55 patients (91.67%) received nalbuphine 0.1 mg/kg IV treatment and 5 patients (8.33%) received tramadol 50 mg IV, it was successfully controlled with diclofenac sodium 75 mg IM in 55 patients (91.67%) and tramadol 50 mg IV in 5 patients (8.33%). **Conclusion:** This research demonstrates that spinal anaesthesia is also a suggested alternative to the traditional use of general anaesthetic in open cholecystectomy. Traditionally, general anaesthesia is used. Therefore, it is safe and more effective than general anaesthetic in providing a lengthier post-operative pain-free time, less of a necessity for analgesics or opioids, and no respiratory issues that have been recorded.

Keywords: laparoscopic cholecystectomy, General Anaesthesia, Spinal Anaesthesia

Introduction

Since Philipe Mouret pioneered the laparoscopic cholecystectomy in 1987, general anaesthesia has remained the favoured method of anaesthesia for surgical procedures.[1,2] In order to prevent aspiration, pneumoperitoneum-induced hypercapnia, respiratory and abdominal pain, it is recommended to provide general anaesthesia in conjunction with regulated ventilation.[3] Although neuraxial anaesthesia has been used for diagnostic laparoscopy, it has not been approved for use in normal laparoscopic procedures, and its use is limited to patients whose respiratory condition is too impaired for them to safely undergo general anaesthesia.[4] A feasibility study using segmental spinal anaesthesia for laparoscopic cholecystectomies in healthy patients was carried out by Van Zundert.[5] Spinal anaesthesia has a number of specific advantages, including a lower risk of postoperative nausea and vomiting (PONV), less discomfort after surgery, earlier ambulation, and patients who are more alert and in control after the procedure.[6-8] In a separate investigation, the use of spinal anaesthesia demonstrated similar levels of hemodynamic stability to those of general anaesthesia, but with a diminished neuro-endocrine stress response . In recent years, there has been a rise in the number of elderly and high-risk patients who are undergoing laparoscopic procedures, which are procedures in which regional anaesthesia provides the benefits indicated above as well as an improvement in patient satisfaction.[9] This research was carried out as a result of the need to examine the efficacy of using SA for open cholecystectomy as opposed to GA in terms of minimising post-operative discomfort, the necessity for analgesics,

respiratory problems, and the amount of time spent in the hospital.

Materials and methods

The ethics committee's approval was obtained before this research could be conducted. The patients with uncomplicated symptomatic gallstone disease who underwent open cholecystectomy and were familiar with American Society of Anaesthesiologists (ASA) physical status I or II, patients aged between 20 and 75 years of either sex, and patients with a body mass index (BMI) of less than 30 kg/m2 were the various inclusion criteria that were followed in this study. There were a few exclusion criteria for both the SA and GA groups, including pancreatitis, a SA contraindication, hypersensitivity to bupivacaine and tramadol, and serious cardiac illness. Patients who did not want to participate in the trial were also successfully eliminated in a similar manner.

120 patients were split into two groups at random: the SA group (Group 1) and the GA group (Group 2). Patients who were randomly assigned to the SA group were premedicated with injections of ondansetron 0.1 mg/kg and midazolam 1 mg 30 minutes before to the surgery after determining that the pre-anaesthetic assessment was satisfactory. Patients were injected with 3.5 ml of 0.5% (17.5 mg) strong bupivacaine and 25 mg of tramadol for spinal anaesthesia while seated and under aseptic conditions, using a long 25 gauge spinal needle. The patients were then kept in the Trendelenburg posture for three minutes or until the T4 sensory block level was reached. A pin-prick stimulus was used to evenly assess the degree of sensory blockage every 30 seconds. Patients in the GA group received IV injections of ondansetron 0.1 mg/kg, glycopyrrolate 0.2 mg, midazolam 1 mg, and tramadol 2 mg/kg as premedication. Propofol 2 mg/kg and vecuronium 0.14 mg/kg were used for anaesthesia induction, and isoflurane and vecuronium were used for maintenance throughout the entire surgical procedure. All research participants had their hemodynamic parameters, ECGs, and SpO2 constantly monitored during the procedure. After the operation, 2.5 mg of neostigmine and 0.4 mg of glycopyrrolate were administered to reverse the neuromuscular block.

Results

There were no significant differences in age, weight, gender and duration of surgery between the groups. Out of all the 120 patients, 60 patients were allotted in each group, there were 40 females (66.67%) in group 1 and 50 females (83.33%) in group 2, 20 males (33.33%) in group 1 and 10males (16.67%) in group 2. Their age mostly ranged between 20 – 75 years, with a mean of 40.58±6.69years and 43.55±7.48 years in group 1 and group 2. There was no statistically significant difference between both the study groups with respect to age, sex distribution and body mass index (BMI). The post-operative pain levels between the GA and SA groups showed a significant mean difference. At all time intervals shown in Table 2 observations, the repeated measure ANOVA reveals that pain ratings in the GA group are substantially higher than those in the SA group. According to reports, post-operative discomfort was minor and was readily manageable in the SA group. In contrast to the GA group, where 55 patients (91.67%) received nalbuphine 0.1 mg/kg IV treatment and 5 patients (8.33%) received tramadol 50 mg IV, it was successfully controlled with diclofenac sodium 75 mg IM in 55 patients (91.67%) and tramadol 50 mg IV in 5 patients (8.33%). Injections of ondansetron 0.1 mg/kg IV were given to the 9 patients (15%) who had post-operative nausea and vomiting in both the SA and GA groups. Six patients (10%) in the SA group had post-dural puncture headache, but it was alleviated without the use of any drugs. In the SA group, sore throats were not experienced in any instances, while they were experienced by 36 patients (or 60%) of the GA group often. However, neither group had any respiratory depression. The SA group had greater bradycardia and hypotension during surgery. Atropine 0.6mg IV was used to treat 9 patients (15%) with bradycardia less than 50/min. The sole characteristic that was present in both groups and had a higher relative risk for the GA group than the SA was bradycardia. Likewise, mephentermine 6–12 mg IV was used to alleviate hypotension in 12 patients (20%) in the SA group. Other than that, the SA group's patients had stable hemodynamics. It was presumably brought on by a significant amount of T4 sensory block. In contrast, 3 patients (5%) in the GA group received atropine 0.6 mg IV for bradycardia less than 50/min during retraction and abdominal packing of tetra. Six individuals (10%) who received injections of 30 mg of esmolol intravenously (IV) had hypertension.

Table 1 Basic parameter

	Group1		Group 2		P value
Basic parameter	**Number / Mean**	**Percentage**	**Number / Mean**	**Percentage**	
Age	40.58±6.69		43.55±7.48		0.58
Weight	55.58±4.85		55.85±6.37		0.36
duration of surgery	53.58±12.52		53.66±11.58		0.14
Gender					0.19
Male	20	33.33	10	16.67	
Female	40	66.67	50	83.33	
BMI	23.89 ± 2.58		23.54 ± 2.11		0.74

Table 2: Post-operative pain scores

Time (hr)	Pain score in Group 1	Pain score in GA	P value
	Mean	Mean	
1	0.03	4.01	0.001
3	0.07	1.68	
6	0.41	3.99	
15	1.52	3.75	
24	3.58	4.21	

Table 3: Analgesia

Analgesia	Group 1		Group 2	
	Number	**%**	**Number**	**%**
Diclofenac	55	91.67		
Tramadol	5	8.33	5	8.33
Nalbuphine	0		55	91.67

Table 4: Intraoperative parameter

Parameter	Group 1		Group 2	
	Number	**%**	**Number**	**%**

Dyspnoea	2	3.33	0	0
Nausea	3	5	0	0
Bradycardia	9	15	3	5
Hypotension	12	20	0	0
Hypertension	0	0	6	10
Dragging pain	3	5	0	0

Discussion

Even though laparoscopic cholecystectomy has become more and more popular and feasible, open cholecystectomy is still often performed in areas without the necessary equipment or medical professionals to execute the procedure effectively.[10] The choices of GA and SA are now available to anaesthesiologists for an efficient open cholecystectomy. Although GA is often used because of its key benefit, which is appropriate muscular relaxation before to surgery.[11] The insufficient muscular relaxation offered by spinal anaesthetic may make it difficult to conduct surgery.Since it may be administered safely in patients with cardio-respiratory co-morbid conditions, it offers an extra benefit over GA.[12] The goal of the current research was to demonstrate that SA may make open cholecystectomy a highly practical procedure. It differs from GA in a number ways, including the significantly longer (8 hours) post-operative pain-free time and the supposedly low usage of opioids for post-operative pain control. Intramuscular diclofenac sodium, a non-steroidal anti-inflammatory medicine, was the primary analgesic utilised for the SA group. A small number of patients also responded well to tramadol, an opioid. However, all of the patients in the GA group received opioids to treat their pain. Tramadol was used for a small number of patients whereas the opioid nalbuphine was used for the rest. Additionally, the SA group's prolonged pain-free period and lower opioid usage may be attributable to the interaction of a number of factors, including the avoidance of endotracheal intubation-related discomfort, the presence of adequate levels of residual analgesia, and a reduced stress response

related to spinal anaesthesia. Additionally, patients' satisfaction with the successful pain management with straightforward analgesics was also influenced by the confidence they had acquired and their improved pain threshold throughout this period of pain relief.[11,13]

Our study's main finding was that it was equivalent to that of Khan et al., who observed that patients in the SA group had longer average pain-free intervals than those in the GA group. Similar to our research, the majority of patients in the SA group were treated with diclofenac sodium. However, Khan et al. treated the GA group's patients with ketorolac, an NSAID with more potency than diclofenac, whereas the majority of the GA group's patients in our trial were handled with nalbuphine (an opioid).[14] In contrast to the six patients in the GA group who complained of sore throats for two days before they went away without therapy, no respiratory issues were reported after surgery in the SA group. Six patients in the SA group, however, developed post-dural puncture headaches for two to three days. In terms of hospital stays, there was no discernible difference between the SA group (3.5 days) and GA group (4.5 days). Patients in SA group 3 had dragging pain owing to mesentery stretch and liver retraction during surgery. This pain was successfully treated with analgesic doses of ketamine and midazolam as well as mild liver retraction. Similar to how two patients in the SA group complained of breathing problems brought on by surgical manipulation during upward retraction and tetra packing, the problems were quickly resolved with oxygen supplementation.[13-16] The predominant intra-operative hemodynamic alterations in the SA group were bradycardia and hypotension, which were treated with atropine IV and mephentermine IV, respectively. Therefore, hypertension that was treated with esmolol IV was the cause of the hemodynamic shift seen in the GA group. This research found that SA group 1 did not have inadequate muscular relaxation, which is a significant issue in open cholecystectomy under spinal anaesthetic and causes complications in surgical process. SA met the needs of surgeons to a great extent. For many apparent reasons, it was

difficult to compare the patient's satisfaction with GA and SA. [17]

Conclusion

This research demonstrates that spinal anaesthesia is also a suggested alternative to the traditional use of general anaesthetic in open cholecystectomy. Traditionally, general anaesthesia is used. Therefore, it is safe and more effective than general anaesthetic in providing a lengthier post-operative pain-free time, less of a necessity for analgesics or opioids, and no respiratory issues that have been recorded.

References

1. Vccchio R, MacFayden BV, Palazzo F. History of laparoscopic surgery. Panminerva Med 2000;42:87-90.
2. Spaner SJ. Warnock GL. A brief history of endoscopy, laparoscopy, and laparoscopicsurgery. J Laparoendose Adv Surg Tech A 1997;7:369-73.
3. Pursnani KG, Bazza Y, Calleja M, Mughal MM. Laproscopic cholecystectomy under epidural anaesthesia in patients with chronic respiratory disease. Surg Endosc 1998;12:1082-84.
4. D Writuparna, B Susmita, G Sarmila, S Swarnamukul, M Suchismita, P Saswati. Comparison between general anesthesia and spinal anesthesia in attenuation of stress response in laparoscopic cholecystectomy: A randomized prospective trial 2015-ncbi.nlm.nih.gov.
5. Van zundert AA, Stultiens G, Jakimowicz JJ, Peek D, Ham van der, Korsten HHM et al.Laproscopic cholecystectomy under segmental thoracic spinal anaesthesia: a feasibility study. Br J Anaesth 2007;98(5):682-86.
6. Bessa SS, Katri KM, Abdel-Salam WN, El-Kayal el-SA, Tawfik TA. Spinal versus general anesthesia for day-case laparoscopic cholecystectomy: A prospective randomized study. J Laparoendosc Adv Surg Tech A. 2012;22:550-5.
7. Lennox PH, Chilvers C, Vaghadia H. Selective spinal anesthesia versus desflurane anesthesia in short duration outpatient gynecological laparoscopy: A pharmacoeconomic comparison. Anesth Analg. 2002;94:565-8.
8. Yukesk YN, Akat AZ, Gozalan U, Daglar G, Pala Y, Canturk M, et al. Laparoscopic Cholecystectomy under spinal anaesthesia. Am J Surg. 2008;195:533-6.
9. Aono H, Takeda A, Tarver SD, Goto H. Stress responses in three different anesthetic techniques for carbon dioxide laparoscopic cholecystectomy. J Clin Anesth. 1998;10: 546-50.
10. F Hussain Talpur K Altaf Taf, Arshad Mahmood Malik, Ahmed Khan Sangrasi, Amir Iqbal Memon,Abdul Aziz Leghari, Jawed Naeem Qureshi. Comparative study of conventional open versus laparoscopic cholecystectomy for symptomatic cholelithiasis. Pak J Med Sci Jan - Mar 2011;27(1):33-7
11. Shaikh GS, Shaikh SM, Bhatti Y, Deenari RA, Baloch I, Soomro Q. Risk factors resulting in conversion of laparoscopic to open cholecystectomy. Med Channel Apr - Jun 2010;16(2):302-5
12. Tzovaras G, Fafoulakis F, Pratsas K, Georgopoulou S, Stamatiou G, Hatzitheofilou C. Laparoscopic cholecystectomy under spinal anesthesia: a pilot study. SurgEndosc. 2006;20:580–582.
13. Sinha R, Gurwara AK, Gupta SC. Laparoscopic cholecystectomy under spinal anesthesia: a study of 3,492 patients. J Laparoendosc Adv Surg Tech A. 2009;19:323–327.
14. 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.
15. Shaikh GS, Shaikh SM, Bhatti Y, Deenari RA, Baloch I, Soomro Q:Risk factors resulting in conversion of laparoscopic to open cholecystectomy.Med. Channel. 2010;16:302-5.
16. Pursnani KG, Bazza Y, Calleja M, Mughal MM:Laparoscopic cholecystectomy under epidural anesthesia in patients with chronic respiratory disease.Surg.Endosc. 1998; 12:1082-4.
17. Zahoor MU, Masroor R,Khurshid T, Azhar R, Yasin MMA:Thoracic epidural anaesthesia for open cholecystectomy.J. Coll. Physicians Surg. Pak. 2011;21:654-8