World Journal of Pharmaceutical Sciences
ISSN (Print): 2321-3310; ISSN (Online): 2321-3086
Published by Atom and Cell Publishers
Available online at: http://www.wjpsonline.org/
Original Article

Role of spinal anaesthesia and general anaesthesia during laparoscopic cholecystectomy

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Received: 18-10-2016 / Revised: 10-11-2016 / Accepted: 15-11-2016 / Published: 26-11-2016

ABSTRACT

Combining minimal invasive surgical and lesser invasive anesthesia technique reduces morbidity and mortality. The aim of the study is to compare spinal anesthesia with the gold standard general anesthesia for elective laparoscopic cholecystectomy. The study was done in Shantiram medical college and general hospital, nandyal. 50 healthy patients were randomized under spinal anesthesia (n=25) & General Anesthesia (n=25). Hyperbaric 3ml bupivacaine plus 25mcg fentanyl was administered for spinal group and conventional general anesthesia for GA group. Intraoperative parameters and post-operative pain and recovery were noted. Under spinal group any intraoperative discomfort were taken care by reassurance, drugs or converted to GA. Questionnaire forms were provided for patients and surgeons to comment about the operation. None of the patients had significant hemodynamic and respiratory disturbance except for transient hypotension and bradycardia. Operative time was comparable. 4 patients under spinal anesthesia had right shoulder pain, 1 patients were converted to GA and 3 patients were managed by injection midazolam and infiltration of lignocaine over the diaphragm. There was significant post-operative pain relief in spinal group. All the patients were comfortable and surgeons satisfied. Spinal anesthesia is adequate and safe for laparoscopic cholecystectomy in otherwise healthy patients and offers better postoperative pain control than general anesthesia without limiting recovery, but require cooperative patient, skilled surgeon, a gentle surgical technique and an enthusiastic anesthesiologist.

Key Words: Spinal Anesthesia, Laparoscopic Cholecystectomy, General Anesthesia.

INTRODUCTION

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, [1,2] more recently it has been reported as a routine technique for otherwise healthy patients also [3,4]. Laparoscopic Cholecystectomy has become the treatment of choice for cholelithiasis owing to its advantage over the open cholecystectomy like minimally invasiveness of the procedure which is associated with less postoperative pain, reduced hospital stay & early return to daily activities [5,6]. Laparoscopic Cholecystectomy is conventionally performed under General Anesthesia. Recent studies demonstrate that laparoscopic cholecystectomy with low-pressure CO_2 pneumoperitoneum can indeed be safely performed under spinal anaesthesia (SA) [7].

MATERIALS & METHODS

This prospective randomized controlled study was conducted between January 2013 to December 2014 at Shanthiram, Medical College and General Hospital, Nandyal. Written informed consent was taken from the patient after fully explaining the procedure. 50 patients of both sexes posted for elective laparoscopic cholecystectomy with symptomatic gall stone disease were randomized under spinal anesthesia (n=25) & General Anesthesia (n=25) with the following inclusion and exclusion criteria.

Inclusion criteria:

a) ASA Grade I or II
b) Age 18-65 years
c) BMI < 30
d) Normal coagulation profile.

Exclusion criteria:

a) Acute cholecystitis / cholangitis / pancreatitis.

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b) Previous open surgery in the upper abdomen.
c) Known Contraindications for pneumoperitoneum.
d) Known Contraindications for spinal anesthesia.

There was no cut off criteria for body mass index (BMI) per se as an exclusion criterion. Similarly, history of previous open upper abdominal surgery too was not taken as strict criteria for exclusion

Randomisation

Patients were randomised to undergo spinal anaesthesia or general anaesthesia for the cholecystectomy by a random number generator. The individual resident responsible for randomisation was not subsequently involved in the surgery or in the post-operative follow-up. The surgery was performed by the same set of consultant surgeons and anaesthesiologists for patients in both the study groups. The post-operative monitoring and data collection was done by an independent observer who had not been involved in either pre-operative or intraoperative course of events.

On the day of surgery all patients were monitored for non-invasive blood pressure, oxygen saturation and heart rate just before the operation and baseline readings were noted. Intravenous access was obtained with 18G vasofix on the left hand. 500ml of Ringer Lactate was infused for all the patients. Injection ondansetron 4mg and injection midazolam 1mg was given i.v. Nasogastric tube was inserted and bladder was catheterized in all the patients.

Patients in the spinal group were positioned in right lateral position. Spinal anesthesia was given with 26G quincke spinal needle between L_2-L_3intervertebral space. After free and clear flow of CSF 3ml of 0.5% heavy bupivacaine with 25ug fentanyl was injected intrathecally. Patient positioned back to supine position and table was tilted to trendelenberg position. Pin prick test was performed to evaluate the sensory block level. As soon as the sensory block level reached T4 dermatome level the surgeons were allowed to proceed with the surgery. Blood pressure, oxygen saturation, heart rate, respiratory rate were recorded every 5 minutes to all the patients. If mean blood pressure was lower than 60mmHg injection ephedrine 6mg was administered i.v. and heart rate less than 50 beats per minute injection glycopyrrolate 0.02mg administered i.v. Patients who experienced intraoperative discomfort like right shoulder pain were initially reassured, when persisted were given additional drugs midazolam 1mg + fentanyl 25ug and in patients in whom fentanyl failed to stop right shoulder pain, surgeons were asked to spray the right dome of diaphragm with 10ml of 2% lignocaine. All the local anesthetic solutions were dispersed homogeneously over the diaphragmatic surface. In spite of above measures if patient had discomfort and / or surgeons not comfortable it was converted to General Anesthesia.

In patients randomized to receive general anesthesia, anesthesia was induced with injection propofol 2mg/kg, injection fentanyl 2ug/kg and injection Vecuronium 0.1mg/kg. After intubation, anesthesia was maintained with oxygen, nitrous oxide and Sevoflurane with IPPV using closed circuit. Intraoperatively all patients were monitored continuously. Pulse, blood pressure, saturation, $ETCO_2$ were noted every 5minutes. At the end of surgery patient was reversed with neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg.

Operation time was recorded for all patients in both the groups. Post operatively were monitored for vitals, pain using VAS score, time for first rescue analgesia and any complication/side effects were noted and treated. Post operatively pain was managed by injection tramadol 50mg i.v. and injection paracetamol 1g i.v. infusion.

Simplified questionnaire forms were developed for patients whose operation was completed with spinal anesthesia and for surgeons to evaluate comments about the operation. Surgeons completed the questionnaire forms immediately after the operation. The patients were asked to complete the questionnaire on 2nd post-operative day.

RESULTS

Between January 2013 to December 2014, 50 patients who fulfilled our criteria were recruited for the study. They were randomized into spinal group (n = 25) and general anesthesia group (n = 25). All the 50 patients, both in GA and Spinal group, operation were completed laparoscopically and there was no need for open surgery. Average time of surgery was 60minutes in GA group and 70 minutes in spinal group, which is not statistically significant with p value of >0.05.

Demographic Profile

Demographic profile	Spinal Group	GA Group
Gender (M: F)	14:11	20:5
Age (years)	36.16 ± 6.50	39.25 ± 9.33
Weight (kgs)	49.89 ± 6.12	50.13± 4.66
Height (cms)	146.11± 4.1	147.13± 4.1
BMI (kg/m^2)	23.16 ± 2.8	24.5 ± 1.78
ASA grade (I: II: III: IV)	19:7:0:0	20:5:0:0

Table no. 1: Showing demographic data between two groups

The two groups were similar regarding demographics.

Intra operative event	No. of patients	Percentage
Shoulder Pain	4	16%
Operative difficulty	2	8%
Hypotension	1	4%
Hypertension	0	NIL
Bradycardia	1	4%
Conversion to GA Anesthesia related Surgical related	2 1 1	8% 4% 4%

Table 2: Showing intraoperative events in the spinal group

Post-Operative Events	Spinal Anesthesia (n=25)	General Anesthesia (n=25)
Nausea / Vomiting	**3**	**4**
Respiratory Depression	**0**	**1**
Pruritus	**1**	**0**
Time for first rescue analgesia	162.13± 15.58 minutes	93±10.11 minutes

Table 3: Showing post-operative events between two groups

Post operatively all the patients were monitored in the recovery room. Vitals like ECG, SPO2, and NIBP were monitored. All the patients in both the groups were hemodynamicallly stable. Adverse/side effects were minimal in both the groups. As for the questionnaire given to the patients in the spinal group on 2nd post-operative day, all the 25 patients responded. Regarding the comfort during the procedure 11 patients answered the question as very well, 9 patients answered the question as well, 5 patients answered the question as moderate. 24 patients were happy with the procedure. 23 patients were satisfied about the technique and would recommend this to their friends. All surgeons agreed that there was no problem with abdominal relaxation. Surgeons encountered little technically difficulty in 2 patients. They all stated there was no difference between spinal and GA for laparoscopic cholecystectomy.

DISCUSSION

Though regional anaesthesia for laparoscopic cholecystectomy has been shown to be safe, and associated with better post-operative pain control, it has not become the anaesthesia procedure of choice. There may be multiple reasons for this. It is

assumed that pneumoperitoneum induces rise in intra-abdominal pressure.

The increased intra-abdominal pressure during pneumoperitoneum, together with the head-up tilt used in upper abdominal laparoscopies, is believed to decrease venous return to the heart [8,9]. Spinal anaesthesia itself induces peripheral vasodilatation. Hence, there is a fear that laparoscopic procedure done under spinal anaesthesia may result in hypotension. Indeed, effects of O_2 pneumoperitoneum on intra-operative haemodynamics under SA is not a well-studied scenario. In our study, we notice that liberal pre-anaesthetic hydration prevents occurrence of hypotension. Sinha *et al*.[4] noted an incidence of hypotension as 20.5% in their series. While we did have hypotension in three cases (5/114, 4.3%), it could be corrected with saline infusion and selective alpha blocker agent (Inj Mephenataramine). Similar results were reported by Prasad et al [10,11]. The answer to the questionnaire regarding the comfort during the procedure almost all patients were well satisfied and happy and would recommend the technique to their friends. All surgeons agreed that there was no problem with abdominal relaxation. They all stated there was no difference between spinal and GA for laparoscopic cholecystectomy.

Acknowledgement: The authors are grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Conflict of Interest: Nil
Source of funding: Nil

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