



Spinal Anesthesia versus General Anesthesia for open cholecystectomy: Comparison of PERI-operative and post-operative events

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Abstract

Objective: To study perioperative and postoperative events as well as feasibility, effectiveness, safety of patient and surgeons satisfaction for open cholecystectomy under spinal anesthesia (SA) compared to General Anesthesia (GA).

Material and Methods: All admitted and consented patients of grade ASA I and ASA II of either sex with diagnosed cholelithiasis for elective open cholecystectomy randomly divided into 2 groups SA group received spinal anesthesia (SA) using 3.00 ml to 3.5 ml of 0.5% hyperbaric Bupivacane intrathecally and GA group received propofol, Fentanyl Citrate, Atracurium and Halothane during open Cholecystectomy. Other drugs used only to manage anxiety, pain, nausea and vomiting, respiratory complication and for haemodynamic stability. All open cholecystectomy performed by right oblique incision. Intraoperative and postoperative events were observed for 2 days. Main points of study were. Intraoperative complications (Hypotension, bradycardia, Nausea/Vomiting Breathing Difficulty, Patients and Surgeons satisfactions), Post-operative painfree interval, PONV and requirement of analgesia.

Result: 200 patients with diagnosed cholelithiasis for open cholecystectomy admitted from July 2016 to December 2017 in which 150 patients received adequate spinal anesthesia and 50 patients were preferred for GA. INTRA-OPERATIVELY in SA group 18 patients suffered from respiratory difficulty which was relieved by 100% O₂ with ventimask, 39 patients presented with hypotension managed by given injection Mephentermine, only 2 patients received injection Ephedrine, 12 patients presented with nausea and vomiting treated with antiemetic (Injection Ondansetron), 22 experienced pain, injection tramadol was given for pain relief. POST-OPERATIVELY: Both groups of patients were observed for pain free interval and PONV.

Conclusion: Patients undergoing for uncomplicated open Cholecystectomy under spinal-anesthesia is safe and effective technique than G.A. in terms of intraoperative events, post-operative analgesia, PONV, cost effective and in view of surgeons and patients satisfaction.

Introduction

Traditionally for cholelithiasis, open cholecystectomy is frequently performed procedure. Specially in India may be due lack of laparoscopic experience and equipments³ under Spinal Anesthesia (SA).¹ Is an efficient, safe and cost effective alternative to General Anesthesia (GA). In our study we evaluate the intra-operative feasibility, effectiveness, safety of Spinal Anesthesia and post-operative painfree interval, fast recovery, early mobilization¹⁸ PONV in conducting open Cholecystectomy.⁹

Though GA is a gold standard but it can be extremely cost effective and challenging for patients with difficult intubation, recently low thoracic epidural block^{6,17} and combined spinal epidural block¹⁵ have been used frequently in cholecystectomy and found to be safe and effective alternative to GA. With several advantage, in fact SA is better choice than GA¹⁶ as patient has lesser effect on respiratory functions, better post operative pain control¹¹ minimal PONV and lower incidence of deep vein thrombosis¹².

Material and Methods

After the institutional ethics and permission of Authority, study was conducted in Malkhan Singh District Hospital, Aligarh, Uttar Pradesh from July 2016 to December 2017, patients admitted with diagnosed Gallstone/Cholelithiasis for open cholecystectomy of physical status PS I and PS II of either gender between 18 to 60 years of age divided into 2 groups, excluded patients were with acute pancreatitis, cholecystitis, spinal deformity, infection bleeding disorder, and the presence of any condition contra indicating to SA & GA.

After informed consent taken by Nursing Staff/ Anaesthetologist from all the patients undergone for open cholecystectomy, all patients explained properly and standard pre-operative precaution used by given Tablet Diazepam 5mg and Tablet Alprazolam 0.5mg night before surgery to relieve discomfort and anxiety.

In the pre-operative room 500ml Ringer Lactate Solution (RL Solution) was commenced intravenously and Injection Ranitidine, inj. Perinorm and one dose antibiotics of 3rd generation of Cephalosporine administered pre-operatively to prevent the infection.

After shifting in operative room non-invasive monitoring (Heart rate, Blood pressure, Pulse oximetry) was established and patients were catheterized with Folly's catheter.

Randomized Spinal Anesthesia (SAB) was given with full aseptic precaution in sitting position in L₂-L₃ space with 26 gauge spinal needle with 3.00, 3.5ml of 0.5% hyperbaric Bupivacaine intrathecally after confirming free flow of cerebrospinal fluid (CSF). The patient was placed in Trendelenburg position for 3 to 5 minutes or till the level of sensory block of T₄ was achieved, the level of sensory block was assessed with pinprick stimulus. In patients received general anesthesia (GA) injection Atropine or Injection Glycopyrolate + fentanyl + Midazolam was given in pre-medication, induction was done after pre-oxygenation for 2-3 minutes with injection Propofol 2 mg/kg. Injection Succinylcholine 1 to 2 mg/kg and OT intubation was done with PVC ETT after checked and fixed ETT, balanced Anaesthesia/ Maintenance Anaesthesia was continued with IPPV + N₂O + O₂ + Intermittent halothane + Atracurium. Neuromuscular block was antagonized with Injection Neostigmine 5ml + Injection Atropine Sulphate after the end of surgery.

Open Cholecystectomy was performed by right oblique incision. All patients were monitored haemodynamically and for any complaint of pain, vomiting, and respiratory distress throughout the procedure under SA.

Defined hypotension less than 20% of pre-operative MAP was treated with injection Mephentermine 6mg I/V and repeated as per need. Heart rate of less than 60 per minute was treated with 0.6mg Atropine, for complaint of Hypoxia oxygen (O₂) was administered by ventimask at a flow rate of 2 to 4 lt/min and patients were

advised to report events such as discomfort, abdominal pain, headache nausea/vomiting. each events was treated accordingly.

There was no case of open cholecystectomy under SA with any specific region converted to GA. Operating surgeon were requested for any technical difficulty associated with procedure during the operation. In post-operative period I/V crystalloid fluid was given for the next 24 hours and all patients were monitored for respiratory distress, heart rate, B.P., Urine output, Pain and PONV. On complain of post-operative pain analgesia was provided with intramuscular Diclofenac Sodium, post-operative pain was assessed by visual analog scale (VAS=0, No pain) VAS 1-3=Mild Pain, VAS 4-5= Moderate Pain and VAS 6-10= Severe Pain)

If patient could not felt pain relief & persisted for 30 minutes with VAS score more than 3, intravenous Tramadole was given. For severe pain (VAS>6) Injection Butorphanol Tartrate was used intravenously.

The catheter removed and patients were allowed orally for liquid and soft diet the day after surgery. Patients from our hospital usually discharged after removal of striches on 8th day but on request overall 20-30% patients discharged from the hospital on the 4th day.

The patients discharged within satisfactory condition without any mortality and mobility at the time of discharge.

Result

200 patients with diagnosed Cholelithiasi of grade ASA I & ASA II. Out of these 200 patients, 150 patients under went open Cholecystectomy under SAB(SA Group) and 50 patients preferred GA(GA Group) under spinal anaesthesia was performed without any significant difficulty in all patients except only 3 patients in SA group supplemented with Injection Ketamine+Injection Medazolam+Injection Glycopyrolate. As they complaint of dragging sensation during intra-abdominal packing and liver retraction.

Intra Operative

Hypotension 26%, Abdominal Pain 15%, Breathing difficulty 12%, Breadycardia 14%, Nausea and Vomiting 8% was most frequent incident in SA group which were treated easily by injection Mephentermine 6mg, Injection Tramadol, 100% O₂ by ventimask, Injection Atropine, and Injection Ondensetron I/V accordingly

Table: 1

Sr. No.	Intra-Operative events in SA Group	No. of Patients	Percentage of events
01	Hypotension	39	26%
02	Abdominal Pain	22	15%
03	Breathing Difficulty	18	12%
04	Breadycardiya	21	14%
05	Nausea/Vomiting	12	8%
Total No. of Patients		112	75%
Total No. of Patients in SA group		150	25% uneventful

25% patients remain un-eventfull in SA group post-operatively painfree interval was more than 3 Hours in SA group as compared to 1 Hour in GA group.

Table: 2 SA Group

Time Interval of pain complain (In Min.)	No. of Patients withcomplain of pain	Percentage (%)
180-210 min	42	28.00%
211-240 min	76	50.66%
241-271 min	18	12.00%
271-300 min	14	9.33%
Total Patients:	150	

226.2±26.5 +=31% p<.001

Table: 3 GA Group

Time Interval of Pain complain(In Min)	No. of Patients	Percentage(%)
60-90 min	26	52%
91-120 min	17	34%
121-150 min	04	8.0%
151-180 min	03	6.0%
Total Patients	50	

95.6±25.9 p

Mean and standard deviation is 226.2±26.5 in SA group and for GA group it is 95.6±25.9 and it is tested by t-test and it is highly significant and p<0.001

Table : 4 PONV in SA & GA group

	PONV	No PONV	Total No. of patients
Spinal (SA)group	12	138	150
GA group	16	34	50
Toatl No. of Patients	28	172	200

$$X^2 = 17.9$$

It has been tested by chi square test and it is highly significant and $p < 0.001$

Post-operative PONV was 8% in SA group while it was 30% in GA Group. Overall surgeons were satisfied and preferred SA approach for open cholecystectomy.

Discussion

Open Cholecystectomy in District hospitals is still preferred and very common under SA compared to laparoscopic Cholecystectomy where expertise and technologies required which are limited^{3,18}. In adequate muscle relaxation is one of the most important problem of open cholecystectomy under regional anesthesia causing difficulty in operation¹⁰. General anesthesia for open cholecystectomy provides adequate muscle relaxation for surgery. Though it may be associated with so many complications as difficulty in intubation traumatize the airway leading to edema and fluid exudation. Introduction of pathogens may leading to respiratory problems. If patient is suffering from co-morbid conditions which may be increase the cost of operation and hospital stay. GA is usually preferred due to adequate muscle relaxation for open cholecystectomy in comparison with spinal anesthesia but an advantage over GA for it can avoid oral and teeth injury, sore throat during laryngoscopy and other hazards¹³ and can be used safely in patients with cardiorespiratory co-morbid conditions.^{7,14}

Intraoperative hemodynamic changes are common undesired consequences of SA. In our study (26%) patients suffered from intra operative hypotension and (14%) from bradycardia. Occuring hypotension and bradycardia in our patients was easily treated with Inj. Mephentermine and Atropine I/V respectively. In

our study no patient has significant pre-existing respiratory disease hence only (12%) patient complained of mild breathing difficulty may be due to surgical manipulation which was easily managed with oxygen supplement. Intraoperatively (15%) patients had abdominal pain while it was (20%) in Laoutid J et al may be due to stretch on mesentery during intraabdominal packing and liver traction, which was managed with gentle retraction of liver and I/V analgesic Inj. Tramadol. In our study the result was compared to Jaouad Laoutid⁵ and Khan et al⁸ where they also reported longer average Post Operative painfree interval for open cholecystectomy under SA. They managed majority of the patients in SA group by NSAID.^{1,2} In our study Inj. Diclofenac sodium was often sufficient to use.

PONV was rarely present (8%) in SA group. While it was reported (30%) under GA group.

Open cholecystectomy in district hospital is preferred and very common under SA may be because of feasibility, safety, cost effective, longer post operative painfree interval and minimal post operative nausea and vomiting PONV (8%) in SA group in compared to GA. As it is more costly, post operative painfree interval is short and reported PONV was (30%) in GA group. While Laoutid Jet al PONV was reported 10% in SA group and 50-70% under GA group, especially in laparoscopic cholecystectomy^{4,19}. It was the most important that surgical team was very satisfied with the sufficient abdominal relaxation during the operation.^{1,2}

Conclusion

In conclusion conducting elective open Cholecystectomy under SA is not only safe and effective but also provide prolonged post-operative analgesia without respiratory problems and PONV.

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