IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 10 Ver.VII (Oct. 2015), PP 94-97
www.iosrjournals.org

Comparative study of 100 case of laparoscopic Cholecystectomy for combined general and spinal anesthesia v/s general anesthesia alone (Our experience of 100 cases)

Dr Namita Gupta [1], Dr Priyambada Gupta[2], Dr Dhiraj Agarwal, Dr D Jethwa.
[1] *Department of anesthesia, Assistant professors, M.G. Mahatma Gandhi Medical College Jaipur 302022.*
[2] *Department of anesthesia Associate professor, M.G. Mahatma Gandhi Medical College Jaipur 302022.*

Abstract: *In recent years, laparoscopic surgery has gained popularity in clinical practice. The key element in laparoscopic surgery is creation of pneumoperitoneum and carbon dioxide is commonly used for insufflation. This pneumoperitoneum perils the normal cardiopulmonary system to a considerable extent. The aim of our study was to evaluate the impact of SA combine with GA in maintaining hemodynamic stability in laparoscopic Cholecystectomy. The secondary outcome studied were requirement of inhaled anesthetic, vasodilators, and recovery profile. We conducted a prospective, randomized study in ASAI/II patients posted for laparoscopic Cholecystectomy, who were willing to participate in the study. Patients were randomly assigned to receive SA with GA (group SGA) or plain GA (group GA). Group SGA received 10 mg bupivacaine (heavy) for SA. GA was administered using conventional balanced technique. Maintenance was carried out with nitrous oxide, oxygen, and isoflurane. Comparison of hemodynamic parameters was carried out during creation of pneumoperitoneum and thereafter. Total isoflurane requirement, need of vasodilators, recovery profile, and regression of SA were studied. Patients in group SGA maintained good and excellent MAP values throughout pneumoperitoneum. Group GA showed extra requirement of metoprolol and higher concentration of isoflurane to combat the increased MAP. Recovery was early and quick in group SGA as compare to group GA. There were no adverse/residual effects of SA.*
The hemodynamic changes during pneumoperitoneum can be effectively corrected by combining SA and GA, without any adverse effects.
Keywords: *General anesthesia, laparoscopic Cholecystectomy, spinal anesthesia, pneumoperitoneum*

I. Introduction

Laparoscopic Cholecystectomy has become the gold standard treatment for Cholelithiasis owing to its obvious advantages over open cholecystectomy. This surgery is conventionally performed under general anesthesia [1].

In 1987 Yeager & Colleagues showed that there was a better post operative result in patient who had been anaesthetized with combined regional anaesthesia than those who had received only general anesthesia [2].

Generally used general anesthesia for laparoscopic surgeries leads to increase in systemic vascular resistance (SVR), which is counter managed by increasing anesthetic drugs concentration or by vasodilators [1]. This usually results in deep anesthesia, delayed recovery and also not cost effective. While spinal anesthesia (SA) is whenever used for short laparoscopic surgeries causes blocking of unnecessary increase in SVR due to its sympathectomy action [3]. However, for long laparoscopic procedures only spinal anesthesia time is limiting factor. [4, 5].

Synchronously use of two anesthesia techniques for optimal hemodynamic variables is a widely accepted method. [6] We decided to use this strategy of combining SA with GA for patients undergoing laparoscopic Cholecystectomy in 100 of our patients.

The overall results of our study were to find the effects of SA on hemodynamic changes due to pneumoperitoneum. The other effects to be studied were requirement of isoflurane, blocker (metoprolol) during surgery.

II. Material And Metods-

A combined simple blind clinical study was carried out in patient programmed for Laparoscopic Cholecystectomy. This study include 100 ASA I & II patients, divided into two equal group between May 2015 to September 2015, who ranged in 20 to 60 yrs. This study was carried out only after obtaining written informed consent form patient after full explanation of the procedure. The inclusion criteria were elective lap cholecystectomy, patient of category ASA I & II, BMI < 30 and patient with normal coagulation profile. The exclusion criteria were patient with previous surgery, contraindication to pneumoperitoneum and spinal anesthesia like spinal deformity as well as contracted gall bladder, suspected CBD stone, acute cholecystitis, cholangitis, pancreatitis and patients refusal.

Patient were randomly assigned to receive SA with GA (SGA group) or plain GA (Group GA)

Inside the operation theatre the base line ECG, HR, mean arterial pressure (MAP) and SPO_2 were recorded. After gaining IV access all patients were preloaded with ringers lactate solution 15 ml /kg body weight. SA was given in sitting position with 25 G spinal needle in L3-L4 interspace using 10 mg of bupivacaine solution. Patients were immediately made supine and table height adjusted according to surgeon preference. Motor block assessment was carried out with modified Bromage scale. A waiting period of 20 min or time for maximal spinal action, whichever occurred earlier, was allowed to pass before GA induction. Any cases of failed SA were managed by giving GA and excluded from the study.

Patients were premedicated with glycopyrolate 0.2 mg, midazolam 0.03 mg/kg and fentanyl 1.5 mcg/kg intravenously. All patients receiving ondansetron to prevent post operative nausea and vomiting (PONV). Anesthesia was inducted with 2.5% thiopentone is a dose sufficient to abolish eyelash reflex.Vecuronium 0.1 mg/kg was give to facilitated endotracheal intubation. Anaesthesia was maintained with nitrous oxide and O_2 mixture (50:50) isoflurane, vecuronium. Isoflurane was used in lowest possible concentration necessary to keep MAP & HR ±20% of baseline and at the same time maintaining Bispectral index (BIS) between 40 and 60. Isoflurane requirement was quantified in each patient by measuring inspiratory concentration. The average total inspiratory concentration of isoflurane was calculated by sum of products of inspiratory concentration and times divided by total anaesthesia time. Isoflurane was adjusted in step of 0.2% when needed to keep the hemodynamic parameters to expectable value. When inspiratory concentration needs more than 1%, Inj. metoprolol 0.1 mg/kg was given in titrated dose to maintained MAP. Total dose of metoprolol was also recorded.

Carbon dioxide gas was used for pneumoperitoneum and the pressure was kept between 12 and 15 mm of Hg for all patients. Time of creation of pneumoperitoneum was documented. .

At the end of surgery, neuromuscular blockade was reversed with neostigmine 0.05 mg/kg and glycopyrolate 80 mcg/kg intravenously. Patients were extubated when spontaneously respiration and obeyed simple verbal commands. Post operative analgesia given (inj. diclofenec) in last IV drip. Patients were observed for regression of SA in the postoperative room for the next 2 h, whichever occurred earlier. Patients were observed fore regression of SA in post operative room for next 2 hrs. Which ever occurred earlier.

Parameters recorded

1. Change in MAP in whole time of surgery
2. Average inspiratory concentration of isoflurane
3. Total dose of metoprolol required.
4. Maintaining depth of anaesthesia by BIS
5. Complication in the form of Hypotension MAP ≤20% baseline
   Hypertension MAP >20% baseline
   Bradycardia HR <50 per minute
   PONV

III. Results

100 eligible patients were enrolled in our study with 50 patients in each group. The groups were comparable to each other with respect to demographic profile and surgery. (Table-1)

Table 1- Demographic profile

	SGA GROUP	GA GROUP
AGE (IN YRS)	45.4	46.2
WEIGHT (IN KGS)	56.2	58.1
HEIGHT (IN CMS)	152.9	153.1
ASA I/II	46/4	45/5

Values expressed as mean (SD)

Baseline HR and MAP value were comparable in both groups. No significant post spinal hypotension (MAP <20%) was observed in any of the patients in group SGA (P=0.731). Post intubation and till the completion of surgery heart rate was not changed significantly in each group.

The most significant feature was the rise in MAP in group GA after pneumoperitoneum and this rise was statistically significantly when compared to MAP changes in group SGA (p=0.001). (Table-2)

Table 2- HR and MAP changes during pneumoperitoneum

	SGA GROUP	GA GROUP	P VALUE
MEAN HR (/min)	72.89	73.67	0.84
Baseline MAP mm of Hg	101.98	102.67	0.73
MAP during pneumoperitoneum	94.98	117.89	0.001

The average requirement of isoflurane during pneumoperitoneum was significantly higher in group GA as compared to group SGA (p<0.001). (Table-3)

Table 3- Surgery and anesthesia characteristics

	SGA GROUP	GA GROUP	P VALUE
AVERAGE INSPIRATORY CONCENTRATION OF ISOFLURANE (%)	0.27	0.89	<0.001
RECOVERY TIME (min)	5.78	9.76	0.000
DURATION OF SURGERY (min)	46.87	48.12	0.28

29 patients in group GA (58%) and none in group SGA required metoprolol to combat rise in SVR during pneumoperitoneum. The average dose of metoprolol needed was 4.1mg.
The doses of vecuronium in both groups were comparable.

The changes in BIS were comparable in both the groups till the creation of pneumoperitoneum (P = 0.0988). Thereafter, a wide variation was noted. While in group GA, the excess concentration of isoflurane administered to counteract the increased MAP resulted in unnecessary deepening of anesthesia (BIS < 40), in group SGA, BIS was maintained 40-60 with only minimal concentration of isoflurane.

Duration the surgery was comparable in both groups. The recovery time however showed a significant variability in both the groups, with group GA requiring longer time to extubation as compared to group SGA (P=0.000).

None of the patients in group SGA had PONV, while in group GA, 10 patient have PONV. This was statistically significant. No episode of Bradycardia and Hypotension was noted in either group.

IV. Discussion

Our study shows that pneumoperitoneum access during lap. Cholecystectomy causes a variety of cardio vascular instability that can be successfully managed with a combined SA and GA technique.

The major problems during lap.surgery are mechanical effect of pneumoperitoneum affecting cardiopulmonary function, systemic absorption of CO_2 and patient position [7, 8, and 9]. These hemodynamic repercussions are such as increased in SVR and MAP often necessitating therapeutic intervention [10, 11, 12, and 13].

Combining two anesthesia techniques to add their advantage and limit the side effect of each is not new. O' Malley et al [14] studied the combination of SA & GA, comparison had been made with positive result obtained in patients during lap cholecystectomy. Encouraged by this, we conducted a prospective, randomized study to examine whether combined SA and GA improves hemodynamic stability in patient undergoing lap. Cholecystectomy.

For lap Cholecystectomy however conventional GA is still the technique of choice [1, 15]. But under GA the hemodynamic changes during pneumoperitoneum have to be managed by increasing the anaesthetic concentration or by administrating vasodilators [16, 17]. The former leads to unnecessary deepening of anaesthesia and the later may cause awareness [18]. When SA is used conjugation with GA, the sympathectomy resulting from SA may limit the rise in SVR, thus overcoming the increased MAP. This finding was confirmed in our study when the MAP in group SGA was well maintained during pneumoperitoneum, as against in group GA. Our results are consistent with study conducted by O’Malley et al [14].

It has been resulted from our study that requirement of isoflurane was markedly reduced in SGA v/s GA group. This finding is consistent with O’Malley et al [14].

In our study we found that only minimum concentration of isoflurane was required for maintenance of anaesthesia. This finding may also imply a reduction in the cost of anesthesia, but assessing that was not objective of present study.

The lower use of isoflurane resulted in early awakening and extubation in group SGA as compared to GA (P=0.000). This finding is supported by a study conducted by Lerou and Boogi [19].

The interesting findings in our study is the incidence of PONV which also a major drawback of laparoscopic surgery [20, 21]. 10 patients Group GA had PONV. On the other hand, none of the patients in group SGA suffered from PONV. This probably has to be attributed to anaesthetic concentration, since by using less halogenated agents, consciousness levels is recorded more quickly and secondary affect such as PONV diminishes.

The contributions of our study are comparison of two techniques of anesthesia technique for improving in hemodynamic parameters and prevention of complication and studying the recovery.

V. Conclusion-

To conclude the cardiovascular changes during pneumoperitoneum can be effectively attenuated by combing SA and GA without any side effect. We recommend this conjugation of two anaesthesia techniques in patients undergoing laparoscopic cholecystectomy.

References

[1]. Jean LJ. Anesthesia for laparoscopic surgery. In: Miller RD, editor. Anesthesia. 7th ed. New York: Churchill Livingstone; 2010. pp. 2185–202. Sinha R, Gurwara AK, Gupta SC. Laparoscopic surgery using spinal anesthesia. JSLS 2008;12:133-8.

[2]. Yeager MP, Glass DD, Neff RK, Brinck-Johnsen T. Epidural anesthesia and analgesia in high risk surgical patients. Anesthesiology 1987; 66: 729-36

[3]. Vaghadia H, Viskari D, Mitchell GW. Selective spinal anesthesia for out patient laparoscopy. Can J Anaesth. 2001;48:256–60. [PubMed]

[4]. Rodgers A, Walker N, Schug S, McKee A, Kehlet H, van Zundert A, et al. Reduction of post operative mortality and morbidity with epidural and spinal anesthesia: Results from overview of randomized trials.BMJ. 2000;321:1493. [PMC free article] [PubMed]

[5]. Calvo-Soto P, Trujillo-Hernández B, Martínez-Contreras A, Vásquez C. Comparison of combined spinal and general anesthesia block and epidural and general anesthesia block in laparoscopic cholecystectomy. Rev Invest Clin. 2009;61:482–8. [PubMed]

[6]. Vaghadia H, Mc Leod DH, Mitcheel GW. Small dose of hypobaric lidocaine and Fentanyl for outpatients laparoscopy. Anesthesia Analg. 1997;85:59.

[7]. Hayel Gharaibeh,Anaesthetic management of laparoscopic surgery Eastern Mediterranean Health Journal1998;4(1):185-8.

[8]. Gautam B.Spinal anaesthesia for laparoscopic cholecystectomy:A feasibility and safety study.Kathmandu University Medical Journal2009;7(4):360-8.

[9]. van Zundert AAJ,Stultiens G,JakimowiczJJ,Peek D,van der Ham WGJM,Korsten HHM, et al.Laparoscopic cholecystectomy under segmental thoracic spinal anaesthesia:a feasibility study. Br J Anaes2007 98(5):682-6.

[10]. Odeberg S, Ljungquist O, Svenberg T, Gannedahl P, Bäckdahl M, von Rosen A, et al. Hemodynamic effects of pneumoperitoneum and the influence of posture during anesthesia for laparoscopic surgery. Acta A naesthesiol Scand. 1994;38:276–83. [PubMed]

[11]. Safran DB, Orlando R. Physiological effects of pneumoperitoneum. Am J Surg. 1994;167:281–6.[PubMed]

[12]. Joris J, Lamy M. Neuroendocrine changes during pneumoperitoneum for laparoscopic cholecystectomy.Br J Anaesth. 1993;70:A33.

[13]. Feig BW, Berger DH, Doughtery TB, Dupuis JF, His B, Hickey RC, et al. Pharmacological intervention can reestablish baseline haemodynamic parameters during laparoscopy. Surgery. 1994;116:733–9. [PubMed]

[14]. O'Malley C, Cunningham AJ. Physiological changes during laparoscopy. Anesthesiol Clin North Am.2001;19:1–19.

[15]. Chui PT, Gin T, Oh TE. Anesthesia for laparoscopic general surgery. Anaesth Intensive Care.1993;21:163–71. [PubMed]

[16]. Johannsen G, Anderson M, Juhl B. The effect of general anesthesia on the haemodynamics events during laparoscopy with CO2 onsufflation. Acta Anaesthesiol Scand. 1989;33:132. [PubMed]

[17]. Newton DE. Awareness in anesthesia. In: Atkinson RS, Adam P, editors. Recent advances in anesthesia and analgesia, No.18. New York: Churchill Livingstone; 1994. pp. 39–58.

[18]. Wong J, Song D, Blanshard H, Grady D, Chung F. Titration of isoflurane using BIS index improves early recovery of elderly patients undergoing orthopedic surgeries. Can JAnesth. 2002;49:13–8. [PubMed]

[19]. Lerou JG, Booij LH. Model based administration of inhalational anesthesia. Developing a system model.Br J Anaesth. 2001;86:12–28. [PubMed]

[20]. Fisburne JI. Anesthesia for laparoscopy: Considerations, complications and techniques. J Reprod Med.1978;21:37–40. [PubMed]

[21]. Malins AF, Field JM, Nesling PM, Cooper GM. Nausea and vomiting after Ondansetron, metoclopromide and placebo. Br J Anaesth. 1994;72:231–3. [PubMed]