



## A CLINICAL COMPARATIVE STUDY BETWEEN GENERAL ANAESTHESIA AND SPINAL ANAESTHESIA FOR LAPAROSCOPIC CHOLECYSTECTOMY IN ELECTIVE SUEGERIES.

Dr Dipjyoti Shyam<sup>1\*</sup>, Dr Mridupaban Nath<sup>2</sup>, Dr Anupananda Choudhury<sup>3</sup>

<sup>1\*</sup> Assistant Professor, Department of Anaesthesiology & Critical Care, Diphu Medical College & Hospital, Diphu 782460, Assam, India. Email: drdjshyam.ds@gmail.com

<sup>2</sup> Associate Professor, Department of Anaesthesiology & Critical Care, Diphu Medical College & Hospital, Diphu 782460, Assam, India.

<sup>3</sup> Professor & Head of the Department, Department of Anaesthesiology & Critical Care, Diphu Medical College & Hospital, Diphu 782460, Assam, India.

**\*Corresponding Author:** Dr Dipjyoti Shyam

<sup>\*</sup> Assistant Professor, Department of Anaesthesiology & Critical Care, Diphu Medical College & Hospital, Diphu 782460, Assam, India. Email: drdjshyam.ds@gmail.com

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### Abstract

**Background and Objectives:** Laparoscopic cholecystectomy(LC) is conventionally performed under general anaesthesia(GA), but there are studies which have found spinal anaesthesia(SA) as a safe alternative<sup>[2]</sup>. The objective of this study was to compare the ease of performing Laparoscopic Cholecystectomy under General Anaesthesia and Spinal Anaesthesia.

**Material and Methods:** The study was conducted in 60 patients who were candidate of elective surgeries for laparoscopic cholecystectomy(LC) with low tension pneumoperitonium with CO<sub>2</sub> and divided into two random groups (30 in each group) of general anaesthesia(GA) and spinal anaesthesia(SA) In General Anaesthesia (n=30), Propofol, Fentanyl, Atracurium, Sevoflurane and Tracheal intubation were done. In Spinal Anaesthesia (n=30), Hyperbaric Bupivacaine 15 mg and fentanyl 20 µg to achieve a sensorial level of T<sub>3</sub> were used<sup>[1]</sup>. Intraoperative hemodynamic parameters, postoperative pain, complications, recovery, patient satisfaction, and cost were compared between the two groups<sup>[1]</sup>.

**Results and Observation:** Induction of anaesthesia were done between two randomly divided patients (n=30 for GA and n=30 for SA) and there were no conversion from spinal to general anaesthesia<sup>[3]</sup>. Pain was significantly lower at 2, 4, and 6 hours after the procedure for spinal anaesthesia group as compared to those who received general anaesthesia. The cost of the spinal anaesthesia was significantly lower than that of the general anaesthesia. All patients were discharged after 24 hours<sup>[1]</sup>.

**Conclusion:** Laparoscopic cholecystectomy done under spinal anesthesia is safe and feasible and does not require any change in technique and, at the same time, has a number of advantages, as compared to general anesthesia, and should be the anesthesia of choice.

**Keywords:** Anaesthesia, General, Spinal, Laparoscopic

## Introduction:

Laparoscopic cholecystectomy was introduced in 1988 and since then it is considered as gold standard technique for the surgical management of cholelithiasis and has gained worldwide acceptance<sup>[1,2]</sup>. Laparoscopic cholecystectomy under spinal anaesthesia alone has been reported occasionally in the past and these reports included patients unfit to receive general anaesthesia, mainly with chronic obstructive airway disease<sup>[3]</sup>. LC is conventionally done under general anaesthesia and may be associated with postoperative pain and nausea and vomiting (PONV)<sup>[2]</sup>. Spinal anaesthesia is commonly used anaesthetic technique that has good safety profile and has several advantages over general anaesthesia. These advantages include the patient being awake and oriented at the end of the procedure, less postoperative pain and the ability to ambulate earlier than patients receiving general anaesthesia<sup>[2]</sup>. Moreover, the incidences of nausea and vomiting are less with selective spinal anaesthesia than with general anaesthesia<sup>[6]</sup>.

## DISCUSSION

General anaesthesia is the technique of choice for laparoscopic cholecystectomies. Several studies conducted globally have indicated regional anaesthesia is safe and economical for laparoscopic cholecystectomies and has good postoperative analgesia. The present study has confirmed the feasibility of performing Laparoscopic cholecystectomy safely under SA without any conversion to GA. But there are few concerns, associated with SA like raised IAP that results in regurgitation of gastric content. There is also fear of Hypotension that can occur following SA due to peripheral vasodilatation leading to decrease venous return and also as a result of raised IAP and reverse Trendelenburg position<sup>(1,2)</sup>

In our study, we had hypotension in 10 cases (33.33%), which was corrected by IV fluids and inj ephedrine 6mg IV boluses. Kalaivani V. et al.<sup>(3)</sup> noted an incidence of hypotension as 36%. Sinha. et al.<sup>(4)</sup> noted an incidence of hypotension as 20.5% in their series. Tzovares et al; found that intraoperative hypotension is a well known adverse effect of spinal anaesthesia and it is easily managed and didn't affect the planned procedure<sup>(5)</sup>

The mean/median operative time for laparoscopic cholecystectomy performed under SA in various other studies ranged from 16.4 to 47.4 min (6–8). In our study there was no statistically significant difference in mean operative time between SA and GA groups suggesting optimum motor relaxation of abdominal muscles that didn't interfere with the surgical view and thus not prolonging the operative time significantly. Bessa et al., also found similar results<sup>(6)</sup>

Although several studies have shown that laparoscopic cholecystectomy is well tolerated by the patients under spinal anaesthesia, however right shoulder tip pain can be very agonising during intraoperative period. Pain and discomfort over right shoulder is probably attributed to diaphragmatic irritation by the CO<sub>2</sub> pneumoperitoneum. In our study 18 patients (60%) complained of right shoulder tip pain which was subsequently managed by reassurance and keeping the intraabdominal pressure to 8–10 mmHg. In severe cases inj ketamine (1mg/kg) and midazolam (0.02mg/kg) was administered IV and none of them were converted to GA. Kalavani V et al.<sup>(3)</sup> reported intraoperative right shoulder pain 24% out of which 8% required conversion to GA. Hamad et al.<sup>(7)</sup> reported intraoperative right shoulder tip pain in 10% of patients. Mehta et al.<sup>(9)</sup> reported right shoulder pain in 7 (23%) cases. Tzoveres et al.<sup>(5)</sup> encountered right shoulder tip pain in 12.3% but none of them required conversion to GA. Yuksaket al.<sup>(10)</sup> encountered right shoulder pain in 50% of cases which is similar to our studies. 3 patients (10.3%) were converted to GA and 5 Patients (17.2%) required additional spraying of diaphragm with 2% lidocaine to control pain.

There was statistically no significant difference found in MAP in both the groups but 5 patients in SA group developed bradycardia intraoperatively that was managed by inj atropine 0.6 mg IV

Although the incidence of PONV was not statistically significant in both groups but 6 (20%) patient developed PONV in SA group and 7 (23%) complained of PONV in GA group. Bessa et al.<sup>(6)</sup> has encountered PONV in 22.2% in the GA group as compared to only 6.9% of patients in SA group.

Postoperative urinary retention requiring catheterisation was seen in 4 (13.33%) patients in SA group. This is related to regional anaesthesia blocking sacral nerve fibres with rate up to 20% in some series.<sup>(11)</sup>

The pain assessed in postoperative period was significantly lower in SA group as compared to GA group which can be attributed to residual effect of local anaesthetic and the addition of long acting adjuvant, buprinorphine. Earlier studies have reported that Laparoscopic cholecystectomy done under SA results in significantly less postoperative pain and analgesia request compared to that performed under GA.<sup>(6,8)</sup>

## CONCLUSION

This study confirms the feasibility, safety and better postoperative control of spinal anaesthesia for patients undergoing elective laparoscopic cholecystectomy operation in otherwise healthy patients

## REFERENCES

1. Gutt CN, Oniu T, Mehrabi A, Schemmer P, Kashfi A, Kraus T, et al. Circulatory and respiratory complications of carbon dioxide insufflation. *Dig Surg*. 2004;21(2):95–105.
2. Hirvonen EA, Poikolainen EO, Pääkkönen ME, Nuutinen LS. The adverse hemodynamic effects of anesthesia, head-up tilt, and carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy. *Surg Endosc*. 2000 Mar;14(3):272–7.
3. Kalaivani V et al. Laparoscopic Cholecystectomy Under Spinal Anaesthesia vs. General Anaesthesia: A Prospective Randomised Study - PMC [Internet]. [cited 2023 Jan 17]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4190755/>
4. Sinha R, Gurwara AK, Gupta SC. Laparoscopic cholecystectomy under spinal anesthesia: a study of 3492 patients. *J Laparoendosc Adv Surg Tech A*. 2009 Jun;19(3):323–7.
5. Tzovaras G, Fafoulakis F, Pratsas K, Georgopoulou S, Stamatiou G, Hatzitheofilou C. Laparoscopic cholecystectomy under spinal anesthesia: a pilot study. *Surg Endosc*. 2006 Apr;20(4):580–2.
6. Bessa SS, Katri KM, Abdel-Salam WN, El-Kayal ESA, Tawfik TA. Spinal versus general anesthesia for day-case laparoscopic cholecystectomy: a prospective randomized study. *J Laparoendosc Adv Surg Tech A*. 2012;22(6):550–5.
7. Hamad MA, El-Khattary OAI. Laparoscopic cholecystectomy under spinal anesthesia with nitrous oxide pneumoperitoneum: a feasibility study. *Surg Endosc*. 2003 Sep;17(9):1426–8.
8. Tzovaras G, Fafoulakis F, Pratsas K, Georgopoulou S, Stamatiou G, Hatzitheofilou C. Spinal vs general anesthesia for laparoscopic cholecystectomy: interim analysis of a controlled randomized trial. *Arch Surg Chic Ill 1960*. 2008 May;143(5):497–501.
9. Mehta PJ, Chavda HR, Wadhwa AP, Porecha MM. Comparative analysis of spinal versus general anesthesia for laparoscopic cholecystectomy: A controlled, prospective, randomized trial. *Anesth Essays Res*. 2010;4(2):91–5.
10. Yuksek YN, Akat AZ, Gozalan U, Daglar G, Pala Y, Canturk M, et al. Laparoscopic cholecystectomy under spinal anesthesia. *Am J Surg*. 2008 Apr;195(4):533–6.
11. Postherniorrhaphy Urinary Retention—Effect of Local, Regional, and General Anesthesia: A Review | Regional Anesthesia & Pain Medicine [Internet]. [cited 2023 Jan 18]. Available from: <https://rapm.bmj.com/content/27/6/612.share>
12. Luiz Eduarddo Imbelloni, TSA<sup>1</sup>, Fornasari M<sup>2</sup>, J C Fialho<sup>3</sup>, R S Anna<sup>4</sup>, J A Cordeiro<sup>5</sup>. "General Anesthesia versus Spinal Anesthesia for Laparoscopic Cholecystectomy." *Rev Bras Anesthesiol* 2010;60: 3: 217-227.
13. Gan Yu<sup>1</sup>, Qin Wen<sup>2</sup>, Li Qiu<sup>1</sup>, Li Bo<sup>1</sup>, Jiang Yu<sup>1</sup>. "Laparoscopic cholecystectomy under spinal anaesthesia vs. General anaesthesia: a meta-analysis of randomized controlled trials." *BMC Anesthesiology*(2015) 15:176.
14. Mehta PJ<sup>1</sup>, Chavda HR<sup>1</sup>, Wadhwa AP<sup>1</sup>, Porecha MM<sup>2</sup>. Comparative Analysis of Spinal versus General anesthesia for Laparoscopic Cholecystectomy: A controlled, prospective, randomized trial. *Anesth Essays Res*. 2010 Jul-Dec;4(2):91-95.
15. Rajeev Sinha<sup>1</sup>, A K Gurwara, S C Gupta, Laparoscopic cholecystectomy under spinal anesthesia: a study of 3492 patients. *J Laparoendosc Adv Surg Tech A*. 2009 Jun;19(3):323-7.
16. Samer S Bessa<sup>1</sup>, Khaled M Khatri, Wael N Abdel-Salam, El-Saed A El-Kayal, Tarek A Tawfik, Spinal versus general anesthesia for day-case laparoscopic cholecystectomy: a prospective randomized study. *J Laparoendosc Adv Surg Tech A*. Jul-Aug 2012;22(6):550-5.
17. Lennox PH, Vaghadia H, Henderson C, Martin L, Mitchell GW. Small-dose selective spinal anesthesia for short-duration outpatient laparoscopy: Recovery characteristics compared with desflurane anesthesia. *Anesth Analg* 2002;94(2):346-50