International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Assessment of Total Intravenous Anaesthesia in Laparoscopic Surgery: A Hospital Based Prospective Study

Mahendra Kumar[1], Bharat Choudhary[2*]

[1]Assistant Professor, [2*]Senior Resident,
Department of Anaesthesia, Government Medical College, Barmer, Rajasthan, India.

ABSTRACT

Background: Total Intravenous Anaesthesia (TIVA) is commonly applied during gynecological laparoscopic surgery. Hence; the present study was undertaken for assessing efficacy of Total Intravenous Anaesthesia in Laparoscopic Surgery.

Materials & Methods: A total of 30 patients scheduled to undergo laparoscopic cholecystectomy (LC) were enrolled in the present study. Pre-anaesthetic checkup were done. Solutions of propofol containing different concentrations of sufentanil were prepared. All the hemodynamic parameters were recorded intra-operatively. Separate recording of the time duration required for rescue analgesia was done. Prevalence of postoperative complications was done. All the results were recorded and analyzed by SPSS software.

Results: Mean age of the patients of the present study was 41.7 years. There were 22 females and 8 males in the present study. Mean time to rescue analgesia was 159.15 minutes. Only two patients exhibited nausea and Vomiting.

Conclusion: In patients undergoing LC, Total Intravenous Anaesthesia (TIVA) through sufentanil mixed in propofol delivers adequate anesthesia.

Key words: Total Intravenous Anesthesia, Laparoscopic Cholecystectomy.

***Correspondence to:**

Dr Bharat Choudhary,
Senior Resident,
Department of Anaesthesia,
Government Medical College,
Barmer, Rajasthan, India.

Article History:

Received: 21-05-2019, **Revised:** 20-06-2019, **Accepted:** 17-07-2019

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2019.5.4.062	

INTRODUCTION

Total Intravenous Anaesthesia (TIVA) is commonly applied during gynecological laparoscopic surgery. Total intravenous anaesthesia (TIVA) is an evolved concept of general anaesthesia, which obviates the need for volatile anaesthetics. Propofol, a sedative-hypnotic agent with excellent recovery characteristics at the end of infusion and additional anti-emetic property, has become the drug of choice for TIVA. Newer synthetic opioids (fentanyl congeners) provide excellent analgesia and hence are popular adjuvants in TIVA.[1-3]

Sufentanil has been combined with propofol in Total Intravenous Anaesthesia (TIVA) for various types of surgeries due to its advantages like synergistic action with propofol, rapid induction, less cardiovascular and respiratory depression, and rapid smooth recovery profile.[4,5] Hence; the present study was undertaken for assessing efficacy of Total Intravenous Anaesthesia (TIVA) in Laparoscopic Surgery.

MATERIALS & METHODS

The present study was undertaken in the department of Anaesthesia, Government Medical College, Barmer, Rajasthan, India.

Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 30 patients scheduled to undergo laparoscopic cholecystectomy (LC) were enrolled in the present study.

Inclusion Criteria

- Subjects within the age group of 18 to 65 years

Exclusion Criteria

- Subjects with known drug allergy,
- Subjects with history of any other metabolic disease

Pre-anaesthetic checkup were done. Solutions of propofol containing different concentrations of sufentanil were prepared.

Pre-induction measurement of heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and peripheral oxygen saturation from the anesthesia monitor was taken as the baseline measurement. All the hemodynamic parameters were recorded intra-operatively. Separate recording of the time duration required for rescue analgesia was done. Prevalence of postoperative complications was done. All the results were recorded and analyzed by SPSS software.

RESULTS

In the present study, a total of 30 patients scheduled to under LC were enrolled. Mean age of the patients of the present study was 41.7 years. There were 22 females and 8 males in the present study. Mean time to rescue analgesia was 159.15 minutes. Only two patients exhibited nausea and Vomiting. Baseline and intra-operative hemodynamic parameters was stable. The mean value of SBP, DBP, MAP, SPO2, Heart rate was statistical non-significant during cholecystectomy procedure in our study.

Table 1: Age-wise distribution of patients

Age group (years)	Patients	
	n	%
18-30	6	20
31-40	10	33.3
41-50	10	33.3
51-65	4	13.4
MEAN ± SD	41.7 ± 10.3	

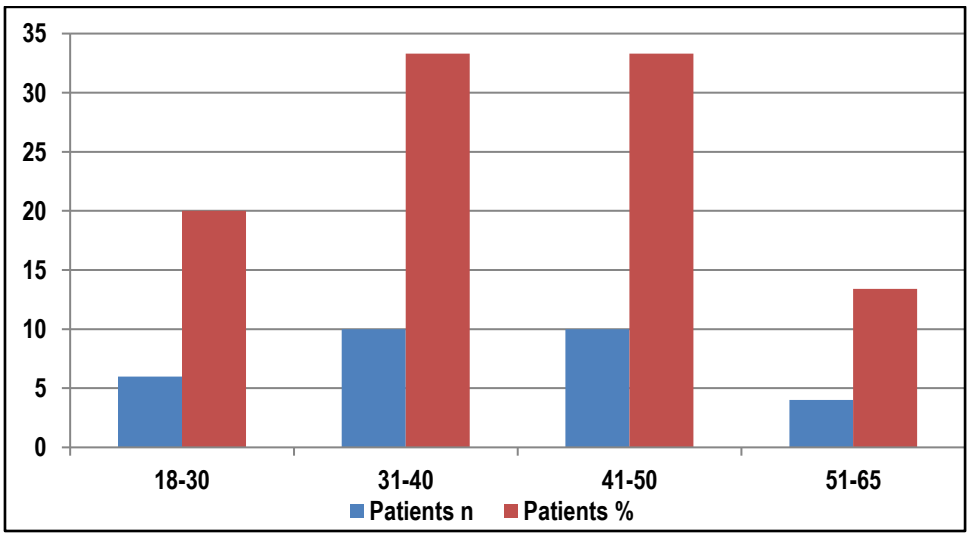

Fig 1: Age-wise distribution of patients

Table 2: Gender-wise distribution

Gender	Patients	
	n	%
Males	8	26.7
Females	22	73.3

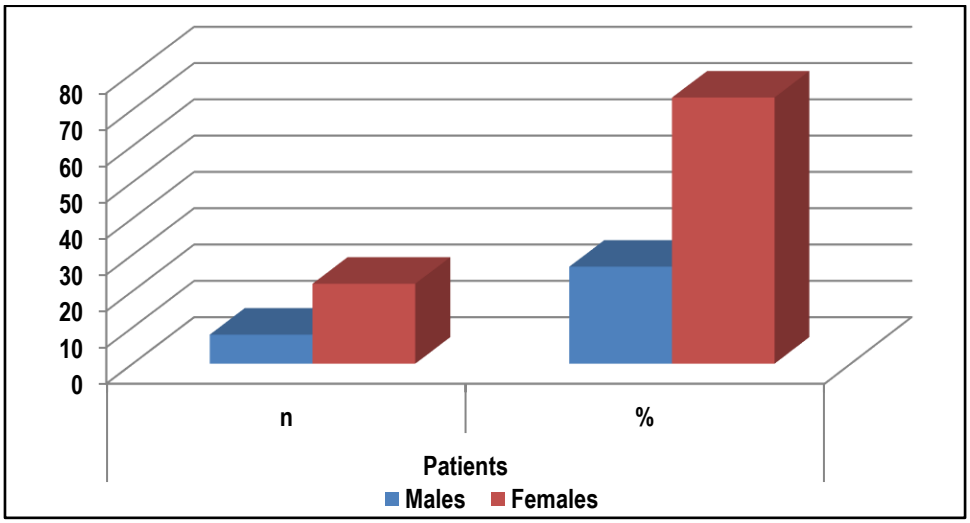

Fig 2: Gender-wise distribution

Table 3: Meant time to rescue analgesia

Parameter	Patients
Meant time to rescue analgesia (minutes)	159.15 ± 82.45

Table 4: Complications

Side effect and complications	Patients	
	n	%
Nausea and Vomiting	2	6.67

DISCUSSION

Total intravenous anaesthesia (TIVA) is an evolved concept of general anaesthesia, which obviates the need for volatile anaesthetics. Propofol, a sedative hypnotic agent with excellent recovery characteristics at the end of infusion and additional anti-emetic property, has become the drug of choice for TIVA. Newer synthetic opioids (fentanyl congeners) provide excellent analgesia and hence are popular adjuvants in TIVA. Sufentanil has been combined with propofol in TI VA for various types of surgeries due to its advantages like synergistic action with propofol, rapid induction, less cardiovascular and respiratory depression, and rapid smooth recovery profile.[5-8]

Herling SF et al assessed outcomes related to the choice of total intravenous anaesthesia (TIVA) or inhalational anaesthesia for adults undergoing transabdominal robotic assisted laparoscopic gynaecological, urological or gastroenterological surgery. They searched the Cochrane Central Register of Controlled Trials (CENTRAL; 2016 Issue 5), Ovid MEDLINE (1946 to May 2016), Embase via OvidSP (1982 to May 2016), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) via EBSCOhost (1982 to May 2016) and the Institute for Scientific Information (ISI) Web of Science (1956 to May 2016). We also searched the International Standard Randomized Controlled Trial Number (ISRCTN) Registry and Clinical trials gov for ongoing trials (May 2016). They searched for randomized controlled trials (RCTs) including adults, aged 18 years and older, of both genders, treated with transabdominal robotic assisted laparoscopic gynaecological, urological or gastroenterological surgery and focusing on outcomes of TIVA or inhalational anaesthesia. They found evidence showing no clinically meaningful differences in postoperative pain between the two types of anaesthetics (mean difference (MD) in visual analogue scale (VAS) scores at one to six hours was -2.20 (95% confidence interval (CI) -10.62 to 6.22; P = 0.61) in a sample of 62 participants from one study. Low-quality evidence suggests that propofol reduces postoperative nausea and vomiting (PONV) over the short term (one to six hours after surgery) after RALRP compared with inhalational anaesthesia (sevoflurane, desflurane) (MD -1.70, 95% CI -2.59 to -0.81; P = 0.0002).We found low-quality evidence suggesting that propofol may prevent an increase in intraocular pressure (IOP) after pneumoperitoneum and steep Trendelenburg positioning compared with sevoflurane (MD -3.90, 95% CI -6.34 to -1.46; P = 0.002) with increased IOP from baseline to 30 minutes in steep Trendelenburg. However, it is unclear whether this surrogate outcome translates directly to clinical avoidance of ocular complications during surgery. No studies addressed the secondary outcomes of adverse effects, all-cause mortality, respiratory or circulatory complications, cognitive dysfunction, length of stay or costs. Overall the quality of evidence was low to very low, as all studies were small, single-center trials providing unclear descriptions of methods. It is unclear which anaesthetic technique is superior TIVA or inhalational for transabdominal robotic assisted surgery in urology, gynaecology and gastroenterology, as existing evidence is scarce, is of low quality and has been generated from exclusively male patients undergoing robotic radical prostatectomy.[9]

Subrahmanyam M et al evaluated effectiveness of different concentrations of Sufentanil mixed in propofol for TI VAin laparoscopic cholecystectomy. Sixty adult patients of ASA physical status I or II (randomly divided into 3 groups of twenty each) undergoing elective laparoscopic cholecystectomy were included in this randomized control study. At induction, patients in all groups received i.v. bolus of Sufentanil 1ìg kg-1 and continuous infusion of 100 ìg kg-1 min -1. Anaesthesia was maintained with propofol infusion titrated in a range of 75 to 125ìg kg-1 min -1. Groups S 1 and S2 received propofol with Sufentanil added at 1ìg ml -1 and 2 ìg ml -1 concentrations respectively, while group P received propofol without Sufentanil. Additional Sufentanil boluses (10 ìpg) were given to patients in all groups when there was an increase in the heart rate by more than 20 beats per minute or mean arterial pressure by more than 15% above baseline. Perioperative haemodynamic parameters, recovery times and postoperative analgesia were compared across the three groups of patients. Haemodynamic parameters (heart rate, systolic and diastolic blood pressures) were not significantly differ-ent across the three groups of patients in the perioperative period. The mean value of SBP, DBP, MAP, SPO_2, Heart rate was statistical non-significant during cholecystectomy procedure in our study. Fewer Group S2 patients required additional Sufentanil boluses to maintain adequate depth of anaesthesia compared to other two groups. Group S2 patients had better post-operative analgesia (p=0.01) but prolonged recovery time (p=0A01) compared to the other two groups. Sufentanil mixed with propofol provides better haemodynamic stability in laparoscopic cholecystectomies, with lesser requirement for additional Sufentanil boluses, and good postoperative analgesia.[10]

CONCLUSION

From the above results, the authors concluded that in patients undergoing LC, TIVA through sufentanil mixed in propofol delivers adequate anesthesia. However; further studies are recommended.

REFERENCES

1. Paralikar SJ, Paralikar JH. High-altitude medicine. Indian J Occup Environ Med 2010; 14: 6–12.

2. Safar P, Tenicela R. High altitude physiology in relation to anesthesia, and inhalation therapy. Anesthesiology 1964; 25: 515–31.
3. Tulandi T, Saleh A. Surgical management of ectopic pregnancy. Clin Obstet Gynecol 1999; 42: 31–8.
4. Hoshikawa Y, Tsutsumi N, Ohkoshi K, Serizawa S, Hamada M, Inagaki K, et al. The effect of steep Trendelenburg positioning on intraocular pressure and visual function during robotic assisted radical prostatectomy. The British Journal of Ophthalmology 2014;98(3):305-8.
5. Hwang JW, Oh AY, Hwang DW, Jeon YT, Kim YB, Park SH. Does intraocular pressure increase during laparoscopic surgeries? It depends on anesthetic drugs and the surgical position. Surgical Laparoscopy, Endoscopy & Percutaneous Techniques 2013;23(2):229-32.
6. Kakar PN, Jyotirmoy D, Mittal RP, Vijaya P. Robotic invasion of operation theatre and associated anaesthetic issues: a review. Indian Journal of Anaesthesia 2011;55(1):18-25.
7. Kalmar AF, Foubert L, Hendrickx JFA, Mottrie A, Absalom A, Mortier EP, et al. Influence of steep Trendelenburg position and CO(2) pneumoperitoneum on cardiovascular, cerebrovascular, and respiratory homeostasis during robotic prostatectomy. British Journal of Anaesthesia 2010;104(4):433-9.
8. Bosteels J, Van Herendael B, Weyers S. The position of diagnostic laparoscopy in current fertility practice. Hum Reprod Update 2007; 13: 477–85.
9. Herling SF, Dreijer B, Wrist Lam G, Thomsen T, Møller AM. Total intravenous anaesthesia versus inhalational anaesthesia for adults undergoing transabdominal robotic assisted laparoscopic surgery. Cochrane Database Syst Rev. 2017 Apr 4;4:CD011387.
10. Subrahmanyam M, Sree Lakshmi B. Comparison of Total Intravenous Anaesthesia Using Propofol with or without Sufentanil in Laparoscopic Cholecystectomies. Indian J Anaesth 2009; 53:467-74.

Source of Support: Nil.

Conflict of Interest: None Declared.

Cite this article as: Mahendra Kumar, Bharat Choudhary. Assessment of Total Intravenous Anaesthesia in Laparoscopic Surgery: A Hospital Based Prospective Study. Int J Med Res Prof. 2019 July; 5(4):255-58. DOI:10.21276/ijmrp.2019.5.4.062