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Original article

COMPARING CLINICAL EFFICACY OF PROPOFOL KETAMINE COMBINATION VERSUS PROPOFOL ALONE IN AMBULATORY ANAESTHESIA: AN OBSERVATIONAL COMPARATIVE STUDY.

Soubhagya Kumar Das[a], Nagendra Kumar Rajsamant[b], Chittaranjan Thatei[c], Satyajit Jena[d,],*
[a]Assistant Professor, Department of Anaesthesiology, SCB Medical College and Hospital, Cuttack, Odisha, India
[b]Assistant Professor, Department of Surgery, SCB Medical College, Cuttack, Odisha, India
[c]Assistant Professor, Department of CTVS, SCB Medical College, Cuttack, Odisha, India.
[d]Assistant Professor, Department of Obstetrics and Gynaecology, SCB Medical College, Cuttack, Odisha, India,

Abstract

Background:

Propofol alone produces effective anesthesia, but several respiratory and cardiovascular complications are observed with it. Propofol, along with ketamine, is known to reduce the side effects and produce a longer duration of anesthesia. This study aims to compare the efficiency of propofol alone and propofol and ketamine in combination for producing ambulatory anesthesia.

Method:

An observational comparative study was conducted prospectively. 100 patients participated in the study. They were divided into two groups. Group A was given propofol alone, and Group B was given propofol along with ketamine. The hemodynamic stability, duration of analgesia, and effectiveness of anesthesia were compared in both groups.

Results:

The average dose of induction for group A was 2 mg, and for group B was 1.6 mg. The average time for recovery from the induction dose for group A was 3 minutes, and for group B was 10 minutes. The average time of analgesia for group A was 9 minutes, and for group B, it was 49 minutes. Group B had improved hemodynamic stability and a longer duration of analgesia.

Conclusion:

From the findings of the study, it can be concluded that the propofol-ketamine combination for anesthetic gives improved hemodynamic stability, effective anesthesia, and a longer duration of analgesia compared to only propofol. The time of recovery from the induction dose was prolonged in the case of the combination compared to propofol alone.

Recommendation:

Propofol with a combination of ketamine produces effective anesthesia with a reduced adverse drug reaction, hence it should be preferred over propofol alone for ambulatory anesthesia.

Keywords: Ketamine, Propofol, Ambulatory Analgesia
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Corresponding Author: *Satyajit Jena[d,*]*

Assistant Professor, Department Obstetrics and Gynaecology, SCB Medical College, Cuttack, Odisha, India.
Email: drbapi@gmail.com

Introduction

Sedatives and anesthetics in the barbiturate category have a longer duration of action. Ambulatory admission is for minute procedures carried out on outpatients, such as

endoscopies. When the procedure is completed, the patients should be clear from the effects of anesthetics and can be discharged. The primary requirement of ambulatory anesthetics is rapid removal from the body [1].

Other than barbiturates, there are other anesthetics available that are effective in producing the required anesthesia, but many of them have residual effects such as dizziness and light-headedness. Propofol is an intravenous anesthetic that provides anesthesia without producing any residual effects [2]. Owing to its pharmacokinetics, propofol is easily removed from the blood serum. The anesthesia produced by propofol is sufficient, and it does not require any adjuvant gas anesthetics such as nitric oxide. Propofol is an effective anesthetic. The disadvantage of propofol is that it produces adverse drug reactions. The adverse drug reactions of propofol are associated with the respiratory and cardiovascular systems. Bradycardia, respiratory depression, and even apnea in certain cases have been reported after anesthesia with propofol [2]. Propofol produces sufficient anesthesia, but it does not have lasting analgesia. Various adjuvants of propofol have been reported in the literature, one of them ketamine [3, 4].

Ketamine is also an anesthetic. When ketamine is used alone it produces unwanted effects such as delusion and daydreaming. In some cases, severe effects such as laryngospasm and respiratory depression are also reported. However, using ketamine and propofol together reduces the occurrence of respiratory and cardiovascular complications. The analgesia produced with ketamine and propofol is for a longer duration and effective [5]. This study is carried out on the outpatients and the anesthesia produced is ambulatory anesthesia. This study aims to compare and assess the efficiency and tolerability of anesthesia produced by propofol alone and propofol along with ketamine.

Methods

Study design:

A comparative observational study was carried out.

Study setting:

The study was carried out at SCB Medical College in Cuttack, Odisha, India from July 2022 to March 2022.

Participants*:*

A total of 100 participants were enrolled for the study. The patients participating in the study were divided into two groups. Group A was given propofol alone and group B was given propofol along with ketamine.

Inclusion criteria:

The patients were admitted for ambulatory anesthesia for minor operative procedures on fractures. The patients belonging to ASA class 1 and 2 were included in the study.

Exclusion criteria:

Patients belonging to classes 3 and 4 of ASA. Patients with preexisting cardiovascular and respiratory complications were excluded from the study.

Data analysis:

Patients were monitored for their hemodynamic parameters, the induction dose, and recovery from it was noted, complication after the surgery was noted, and time of analgesia post-surgery was noted.

The respiratory rate, oxygen saturation, systolic and diastolic pressure, and pulse rate were recorded as a baseline and during the surgical procedure every 10 minutes, it was recorded. The required intravenous injection of glucopyruate, ondansetron, midazolam, and fentanyl was given. Double-blinded study was carried out the patient in the propofol group was given propofol until induction and then the anaesthesia was maintained with 10 mg of propofol. Similarly, the other group was given propofol and ketamine for induction and later 10 mg of propofol and 10 mg of ketamine were given for the maintenance of anesthesia.

The required emergency medicine, resuscitation machine, and oxygen mask were kept ready. The patients were thoroughly monitored for oxygen saturation, blood pressure, respiratory rate, and pulse rate. The recordings were made every 10 min. Blood pressure higher than 90/150 mm of Hg, blood pressure lower than 80/100 mm of Hg, respiratory rate less than 8/minute, and oxygen saturation less than 93% were treated immediately with available equipment and medicines. Any such complications during and after the surgery were recorded. The time until which analgesia was maintained post-operatively was recorded.

Bias*:*

There was a chance that bias would arise when the study first started, but we avoided it by giving all participants identical information and hiding the group allocation from the nurses who collected the data.

Ethical consideration:

The institutional ethics committee approved this study. Informed and written consent was taken from the

participating subjects before the commencement of the study.

Statistical analysis:

The results obtained from the study were subjected to statistical analysis and a paired T-test was carried out to determine the statistical significance.

Results

100 patients participated in the study; they were divided into two groups. Group A was given propofol alone for anesthesia and group B was given propofol and ketamine. The average of the patients participating in the study was 45 years. Table no. 1, 2 and 3 summarizes the details of the study.

Table no. 1: summary of the study

Parameters	Group A	Group B	T stat	P-value
Average systolic blood pressure (mm of Hg)				
Baseline	118	117	0.21	More than 0.05
10 min during surgery	100	123	-12.96	Less than 0.01
20 min during surgery	109	23	-8.33	Less than 0.01
30 min during surgery	110	123	-7.31	Less than 0.01
Average diastolic pressure (mm of Hg)				
Baseline	75	72	1.43	More than 0.05
10 min during surgery	63	72	-6.61	Less than 0.01
20 min during surgery	71	74	-2.64	Less than 0.05
30 min during surgery	68	75	-5.43	Less than 0.01
Average pulse rate (rate/min)				
Baseline	79	77	1.32	More than 0.05
10 min during surgery	72	77	-3.71	Less than 0.01
20 min during surgery	72	77	-3.37	Less than 0.01
30 min during surgery	73	78	-3.68	Less than 0.01

Table 2: summary of the study (continued)

Parameters	Group A	Group B	T stat	P-value
Average partial oxygen saturation (%)				
Baseline	99	99	1.38	More than 0.05
10 min during surgery	99	99	-12.14	More than 0.05
20 min during surgery	100	99	-5.46	More than 0.05
30 min during surgery	99	99	-6.73	More than 0.05
Average respiratory rate (rate/min)				
Baseline	16	16	1.12	More than 0.05
10 min during surgery	17	15	0.25	Less than 0.01
20 min during surgery	16	16	0.29	More than 0.05
30 min during surgery	16	16	1.59	More than 0.05

Table 3: summary of the study (continued)

Parameters	Group A	Group B	p-values
Induction dose (mg/kg)	2	1.6	Less than 0.01
Average time for recovery from induction dose (min)	3	10	Less than 0.01
Average time of analgesia post-operatively (min)	9	49	Less than 0.01

The baseline values of systolic and diastolic blood pressure, respiratory rate, and pulse rate did not differ significantly. However, when these hemodynamic parameters were determined during the surgery, the values in both groups differed significantly. Oxygen saturation did not differ at any of the time points the p-value for it was more than 0.05. Respiratory rate differed at the first 10 min, after which it was consistently the same till 30 min. systolic blood pressure varied in both groups significantly at all the time points, the p-value at each time point was

less than 0.01. Similarly, diastolic blood pressure varies in both groups significantly at all the time points, the p-value

at each time point was less than 0.01. The pulse rate also varied significantly at all the time points and the p-value at each time point was less than 0.01.

The average dose of induction for group A was 2mg and for group B was 1.6 mg. The average time for recovery from the induction dose for group A was 3 minutes and for group B was 10 minutes. The average time of analgesia for group A was 9 minutes and for group B was 49 minutes.

Discussion

The requirement of propofol dose decreased significantly when the other agent was used along with it. In the study propofol required alone was 2 mg and the propofol with ketamine decreased to 1.6 mg. The difference in the dose was statistically significant. Similarly, a study found that 1.75 mg of propofol produced sufficient anesthesia when ketamine was given with it [6].

The systolic blood pressure fall was observed at all the time points for group B whereas group A had shown a significant fall only during the First 5 minutes. Similarly, the fall in the diastolic blood pressure was at the first 5 minutes for group B but group A had a fall in the diastolic blood pressure at all the time points. The fall in the pulse rate was observed in group A at all the time points but group B had a fall only at the first 5 minutes. The findings of the study were consistent with the findings of the other studies conducted in this domain [7, 8].

The oxygen saturation in both groups did not vary significantly. The respiratory rate decreased only for the first 5 minutes in group B but in group A it did not decrease much. The muscle relaxation produced in group B was more efficient than that in group A. no cases of apnea, hypoventilation, delirium, or hypertension were reported during the study. This finding was by the other studies [8, 9].

More than 50% patients of the group A required analgesia in the first hour of the operation. In of group B, only 10% of the patients required analgesia in the first hour. The average time of analgesia produced in group A was 9 min and group B was 49 min. A similar study conducted to compare the effective analgesia produced by propofol alone and propofol along with an adjuvant concluded that with adjuvant there is a longer duration of analgesia produced [10].

The study found that the recovery time required from the induction dose was longer for group A compared to group A and the difference was statistically significant. However, such substantial was not found in the other studies conducted in this domain [11, 12].

Conclusion

From the findings of the study, it can be concluded that the propofol ketamine combination for anesthetic gives improved hemodynamic stability, effective anesthesia, and longer duration of analgesia compared to only propofol. The time of recovery from the induction dose was prolonged in case of combination compared to propofol alone.

Limitation

Dose variation effects were not evaluated in this study. Also, the hemodynamic was not recorded post-operatively.

Recommendation

Propofol with a combination of ketamine produces effective anesthesia with a reduced adverse drug reaction, hence it should be preferred over propofol alone for ambulatory anesthesia.

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List of abbreviation

ASA- American society of anesthesiology

WHO- World Health Organization

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No conflict of interest

References

1. Kaushik Saha, Saigopal M, Rajini Sundar, Palaniappan M, Anil C Mathew. Comparative evaluation of propofol-ketamine and propofol-fentanyl in minor surgery. Indian J Anaesth. 2001; 45(2):100-103.
2. Briggs P, Clarke RST, Dundee JW, Moore J. "Use of di – iso propyl phenol as main agent for short procedures. British Journal of Anaesthesia. 1981; 53:11 97.
3. Shiba Goel MD, Neeraja Bharadwaj MD, Kajal Jain MD. Efficacy of ketamine and midazolam as co-induction agents with propofol for laryngeal mask insertion in children. Pediatric Anesthesia 2008; 18:628-634.
4. Fernando Martinez-Taboada and Elizabeth A Leece. Comparison of propofol with ketofol, a

propofol-ketamine admixture, for induction of anaesthesia in healthy dogs. Veterinary Anaesthesia and Analgesia. 2014; 41:575-582.
5. Fernando SF Cruz, Adriano B Carregaro, Alceu G Raiser, Marina Zimmerman, Rafael Lukarsewski and Renata PB Steffen. Total intravenous anesthesia with propofol and S (+)-ketamine in rabbits. Veterinary Anaesthesia and Analgesia. 2010; 37:116-122.
6. Koch M, De Backer D, Vincent JL, Barvais L, Hennart D, Schmartz D. Effects of propofol on human micro circulation. Br J Anaesth. 2008; 101(4):473-8.
7. Guit TBM, Koning HM, Coster ML. Ketamine and analgesia for total intravenous anesthesia with propofol. Anesthesia. 1999; 46:24-27.
8. Rosendo F. Mortero *et al.* The effects of small-dose ketamine on propofol sedation: respiration, post-operative mood, perception, cognition and pain. Anesth. Analg. 2001; 92:1465-9.
9. Knox JWD, Bovill JG, Clarke RSJ, Dundee JW. Clinical studies of induction agents XXXVI: KETAMINE. Br J Anaesth 1970; 42:875.
10. Diwale DB, Moulick NB, Bhatt PN, Matta JS, Bhalla SK. Comparative evaluation of ketamine and ketamine-diazepam in cardiac catheterization. Ind J Anaesth 1983; 31(2):132-139.
11. Schutter J, Stanski DR, White PF. Pharmacodynamics modelling of the EEG effect of ketamine in man. Journal of Pharmacokinetic Bio pharm. 1967; 15:241.
12. Sherry N. Rizk, Enas M. Samir. Use of ketofol to control emergence agitation in children undergoing adenotonsillectomy. Egyptian Journal of Anaesthesia. 2014; 30(1), 13-19.

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