DOI: https://doi.org/10.53350/pjmhs22167269

ORIGINAL ARTICLE

Comparison of Analgesic Requirement and Pain Intensity in Lower Segment Cesarean Section (LSCS) with Ketofol and Conventional Induction of General Anesthesia

MISBAH SIDDIQUE KHOSA[1], AISHA SIDDIQA[2], SYEDA TASKEEN EJAZ[3], MIRZA SHAKEEL AHMAD[4], MUHAMMAD ABDUL AZIZ[5], SYED AUSHTAR ABBAS NAQVI[6]

[1]Assistant Prof. of Obstetrics & Gynecology Dept. Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan.
[2]Senior Registrar of Obstetrics & Gynecology Dept. Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan.
[3]WMO of Obstetrics & Gynecology Dept. Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan.
[4]Assistant Prof. of Anesthesia Dept. Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan.
[5]Associate Prof. of Anesthesia Dept. Sahara Medical College, Narowal.
[6]Assistant Prof. of Anesthesia Dept. Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan.
Corresponding author: Misbah Siddique Khosa, Email: drmisbah37@gmail.com, Cell: 0335 7438275

ABSTRACT

Objective: to compare the analgesic requirement and pain intensity in LSCS with ketofol and conventional induction of general anesthesia

Study Type: randomized controlled trial

Study Place and Duration: department of Anesthesiology at Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan, from 1st January 2019 to 30th June 2019.

Material and methods: 100 adult participants (20–40 years) ASA physical status 1 and 2, with no previous case of neurologic or cardiovascular undergoing LSCS operations were enlisted in a randomised prospective comparative study after receiving approval from the ethical research committee. Patients were divided into two groups, each with 50 patients: group P (propofol) and group KP (ketamine) (ketofol). The surgeon picked a closed envelope as the method of randomization. Visual analogue scale was used to assess the postoperative pain where, 0 means no pain, 1-3 means mild pain, 4-7 means moderate pain, and 8-10 means severe pain using a visual analog scale, where 0 means no pain, 1-3 means mild pain, 4-7 means moderate pain, and 8-10 means severe pain. Furthermore, the need for postoperative analgesia was examined, including the need for fentanyl.

Results: The majority of the patient's Group P and Group KP had 0 VAS scoresof28 (56.0%) and 26 (52.0%), respectively, (p=0.475). Intra operation fentanyl was required 3 (6.0%) in Group P and 1 (2.0%) in Group PK, (p=0.307). While, post-operation fentanyl was required 7 (14.0) in Group P and 4 (8.0) in Group PK, (p=0.338).

Conclusion: Ketofol as an induction agent can be used as an alternative which is relatively safe and show less side effects in comparison to propofol alone.

Keywords: Ketamine, propofol, ketofol, pain intensity, analgesia requirement, conventional induction, general anesthesia

INTRODUCTION

In the 1960s, An IV anesthetic ketamine with MOA causing dissociative anesthesia was manufactured from phencyclidine[1]. Advantages i.e. analgesic and amnesic effects, protection of reflexes of the respiratory tract, spontaneous respiration, and muscle tone maintenance contributed to the start of ketamine. On the other hand, there are many side effects of ketamine (i.e. its sympathomimetic effects cause vomiting, development of hallucinations, nausea, rise in B.P., and heart rate and it is argued that it may cause an increase in intracranial pressure)that prohibited its frequent use[2,3]. In Europe during the 1970s, the drug propofol (2,6-di-isopropylophenol)[4], which is more and more utilized in the USA over the past 20 years[4,5]. General anesthesia is produced by the promotion of the GABA effect (neurotransmission inhibition). Recovery, rapid induction, anticonvulsant effects, and antiemetics are its major advantages. In this case, major disadvantages are respiratory depression and hypotension which are dose-dependent[6,7].

It was suggested that the combination of both drugs may develop a mixture comprising additive properties of each drug in such a way that we can reduce the dosage for each of the drugs and on one hand, reduce the disadvantages caused by either of the drugs, and on the second hand, profit from advantages concerning analgesia, hemodynamic stability, hypnosis, and amnesia[8]. The mixture formed is considered to be a sedative agent named ketofol and produces encouraging results in the emergency departments[8]. In the current study, we aim to obtain calculate ketofol, in the case of hemodynamic parameters, and hypnotic criteria, by clinical assessment and the incidence of adverse effects of both ketamine and propofol in comparison to ketofol.

MATERIAL AND METHOD

This study was conducted at department of Anesthesiology, at Ghazi Medical College & Teaching Hospital, Dera Ghazi Khan, from 1st January 2019 to 30th June 2019. It is a randomized controlled trial.100 adult participants (20–40 years) ASA physical status 1 and 2, with no previous case of neurologic or cardiovascular undergoing LSCS operations were enlisted in a randomised prospective comparative study after receiving approval from the ethical research committee at Nishtar Hospital, Multan and acquiring written informed consent. Patients were not given any premedication, and no drugs were authorised within 12 hours of operation. Pre-oxygenation was initiated for 5 minutes after the patient arrived in the operating theater. Patients were divided into two groups, each with 50 patients: group P (propofol) and group KP (ketamine) (ketofol). The surgeon picked a closed envelope as the method of randomization. To reduce the pain, all the patients are administered 2 ml of lidocaine IV before induction.

The procedure for inducing general anesthesia began with Group P receiving in 20 seconds IV 1% propofol (2mg/kg), with 10mg/ml propofol and so for every 5 kilograms 1 ml propofol syringe. Intravenous ketofol was administered to Group KP. Postoperatively, when the Alderete score reached 10 the patients were discharged after they were transported to the PACU (post-anesthesia care unit) and discharged. Time is required to recover from the lack of verbal interaction. Time is required for the disappearance of the eyelash reflex. Before induction, 2 minutes after initiation, post-intubation, 5 minutes post-intubation, and every 15 minutes until the completion of the surgery, hemodynamic data (mean heart rate and B.P.) were collected. In the PACU, all patients were queried about their memories of events or consciousness, and euphoria and hallucinations were assessed. The occurrence of apnea, as well as postoperative nausea and vomiting, was tracked. Visual analogue scale was used to assess the postoperative pain. Furthermore, the need for postoperative analgesia was examined, including the need for fentanyl.

The Chi-squared (v2) test was used with Yates correction to compare qualitative data. A P-value of less than 0.05 was used to indicate statistical significance. All of the data were examined using SPSS 15.0.

RESULTS

In total, 100 patients were enrolled in this investigation. Patients for the trial were randomly assigned to either Group P or Group KP. The distribution of age, height, weight, and ASA status of both the groups were almost equal, (p>0.050). (Table. I).

The majority of the patient's Group P and Group KP had 0 VAS scoresof28 (56.0%) and 26 (52.0%), respectively, (p=0.475). Intra operation fentanyl was required 3 (6.0%) in Group P and 1 (2.0%) in Group PK, (p=0.307). While, post-operation fentanyl was required 7 (14.0) in Group P and 4 (8.0) in Group PK, (p=0.338). (Table. II). The average blood pressure MAP in mmHg was displayed in Table. III. The differences were statistically significant, (p>0.050). The average time for loss of verbal contact of Group P was less than the Group KP, 32.08±2.62 and 39.69±4.01, respectively, (p=0.000). Similarly, the time for loss of eyelash reflex was shorter than the Group KP of37.76±1.47 and 48.13±2.55, respectively, (p=0.000). (Table. IV).

Table 1: Demographic variables of the study groups

Variable	Group P N (%)	Group KP N (%)	P-value
Age (years)	32.86±3.95	31.86±4.25	0.227
Height	165.78±2.25	166.21±2.55	0.385
Weight	81.74±2.64	80.94±2.22	0.105
ASA status			
I	23 (46.0)	14 (28.0)	0.062
II	27 (54.0)	36 (72.0)	

Table 2: VAS score and fentanyl requirement of the study groups

VAS score	Group P N (%)	Group KP N (%)	P-value
0	28 (56.0)	26 (52.0)	0.475
1-3	12 (24.0)	9 (18.0)	
4-7	7 (14.0)	13 (26.0)	
8-10	3 (6.0)	2 (4.0)	
Fentanyl requirement			
Intra operation	3 (6.0)	1 (2.0)	0.307
Post operation	7 (14.0)	4 (8.0)	0.338

Table 3: Blood pressure MAP in mmHg of the study groups

Variable	Group P N (%)	Group KP N (%)	P-value
Baseline	80.31±3.61	79.89±3.64	0.560
After induction	78.28±3.05	78.08±3.53	0.749
After intubation	82.66±2.63	83.04±2.16	0.432
5''	80.91±4.43	79.52±4.74	0.135
20''	84.11±4.84	82.91±4.07	0.182
35''	81.97±4.41	81.72±4.35	0.771
50''	83.01±4.49	82.82±3.87	0.818
65''	84.14±2.11	84.07±2.01	0.870
80''	80.13±2.65	79.89±2.63	0.643
Extubation	86.49±3.59	86.56±3.03	0.919

Table 4: Time for losing verbal contact and eyelash reflex of the study groups

Variable	Group P N (%)	Group KP N (%)	P-value
Time to loss of verbal contact	32.08±2.62	39.69±4.01	0.000
Time for loss of eyelash reflex	37.76±1.47	48.13±2.55	0.000
Apnea	4 (8.0)	8 (16.0)	0.092
Nausea or vomiting	2 (4.0)	3 (6.0)	0.652

DISCUSSION

For many years, anesthesiologists have used a combination of propofol and ketamine with great effectiveness. In comparison to propofol and ketamine alone, there is very little information in the scientific research about the usage of ketofol as an induction drug[9,10]. Frey et al.,[11] discovered that utilising ketofol resulted in a lesser time till sedation achieved compared to propofol. The difference between our results and theirs may be due to the fact that we used an equal dose of propofol and ketamine in this investigation.

If we compare the result with other groups, the KP group had more stable vitals in this study. Arora et al.[12] for investigated 10 adults (more than 18 years of age) patients for the proposed method of sedation with ketofol in a 1:1 ratio and found that the mixture was hemodynamically stable. Akin et al.[13] also discovered ketofol's hemodynamic stability in youngsters undergoing cardiac catheterization. These findings are similar with the findings of HUI. et al.[14], who reported that utilizing different combinations of propofol and ketamine enhanced cardiovascular stability when compared to using either drug alone.

In a 2005 study by Akin et al., 20% of patients experienced apnea at a dosage of 1.5 mg/kg of propofol[9]. Since it has already been established that potential side effects are dose-dependent and might be decreased when both drugs are used together, apnea was not noticed in any of the cases with ketofol[9]. Mortero and colleagues[15] found that combining low-dose ketamine with propofol sedation decreased the effects of propofol on hypoventilation while preserving the integrity of laryngeal and pharyngeal reflexes and ventilatory response to CO2. Propofol's antiemetic properties were evident in the mixture in the case of PONV, as evidenced by the decrease in the number of patients experiencing vomiting and nausea from two in the K group to zero in the KP group. No vomiting was reported by Willman and Andolfatto in 2007[10] when they gave 114 patients intravenous ketofol (1:1 mixture of ketamine and propofol, each 10 mg/mL) for procedural sedation and analgesia for predominantly orthopaedic procedures in an emergency department. There were no reported cases of nausea or vomiting in Singh et al. [16]'s study as well.

The results gathered are convincing for the usage of such an induction agent with minimal side effect, the only limitation we faced was the small number of patients. We should also search for the optimum combined dosages of the drugs used in the combination.

No significant differences in post-operative pain and analgesia requirements were seen between the two groups. A prior study found that postoperative pain was higher in the ketofol group than in the propofol group at 0 and 2 hours postoperatively, but it was reduced at 4 and 6 hours in the ketofol group as compared to the propofol group, but the difference was statistically insignificant at both events[17]. Similar findings have also been published[18-20].

CONCLUSION

Ketofol as an induction agent can be used as an alternative which is relatively safe and show less side effects in comparison to propofol alone.

REFERENCES

1- Nowacka A, Borczyk M. Ketamine applications beyond anesthesia–A literature review. European journal of pharmacology. 2019 Oct 5;860:172547.

2- Coralic Z, Sawe HR, Mfinanga JA, Cortez A, Koehl J, Siroker H, Reynolds TA. Ketamine procedural sedation in the emergency department of an urban tertiary hospital in Dar es Salaam, Tanzania. Emergency Medicine Journal. 2018 Apr 1;35(4):214-9.

3- Khalil AM, Botros JM, Boules ML, Ragab SG. Reliable and Rapid Smooth Extubation After" Ketamine-Propfol Mixture" for Induction of General Anesthesia in Laparoscopic Drilling of Polycystic Ovary: A Randomized, Double-blind, Comparative Study. Anesthesiology and Pain Medicine. 2021 Apr;11(2).

4- De Wit F, Van Vliet AL, De Wilde RB, Jansen JR, Vuyk J, Aarts LP, De Jonge E, Veelo DP, Geerts BF. The effect of propofol on haemodynamics: cardiac output, venous return, mean systemic filling pressure, and vascular resistances. British Journal of Anaesthesia. 2016 Jun 1;116(6):784-9.

5- Duprey MS, Al-Qadheeb NS, O'Donnell N, Hoffman KB, Weinstock J, Madias C, Dimbil M, Devlin JW. Serious cardiovascular adverse events reported with intravenous sedatives: a retrospective analysis of the MedWatch adverse event reporting system. Drugs-real world outcomes. 2019 Sep;6(3):141-9.

6- Miller KA, Andolfatto G, Miner JR, Burton JH, Krauss BS. Clinical practice guideline for emergency department procedural sedation with propofol: 2018 update. Annals of emergency medicine. 2019 May 1;73(5):470-80.
7- Jalili M, Bahreini M, Doosti-Irani A, Masoomi R, Arbab M, Mirfazaelian H. Ketamine-propofol combination (ketofol) vs propofol for procedural sedation and analgesia: systematic review and meta-analysis. The American journal of emergency medicine. 2016 Mar 1;34(3):558-69.
8- Foo TY, Mohd Noor N, Yazid MB, Fauzi MH, Abdull Wahab SF, Ahmad MZ. Ketamine-propofol (Ketofol) for procedural sedation and analgesia in children: a systematic review and meta-analysis. BMC emergency medicine. 2020 Dec;20(1):1-4.
9- Akin A, Esmaoglu A, Tosun Z, et al.. Comparison of propofol with propofol–ketamine combination in pediatric patients undergoing auditory brainstem response testing. Int J Pediatr Otorhinolaryngol 2005;69:1541–5.
10- Willman EV, Andolfatto G. A prospective evaluation of ‘‘ketofol’’ (ketamine/propofol combination) for procedural sedation and analgesia in the emergency department. Ann Emerg Med 2007;49(1):23–30.
11- Frey K, Sukhani R, Pawlowski J, et al.. Propofol versus propofol ketamine sedation for retrobulbar nerve block: comparison of sedation quality, intraocular pressure changes, and recovery profiles. Anesth Analg 1999;89:317.
12- Arora S, Martin CL, Fernandez MM, Wagner JG, Hertbert M. Combining ketamine and propofol (ketofol) for emergency sedation in emergency department. Ann Emerg Med 2007;50(3):s121.
13- Akin A, Esmaoglu A, Guler G, et al.. Propofol and propofol ketamine in pediatric patients undergoing cardiac catheterization. Pediatr Cardiol 2005;26:553–7.
14- Hui TW, Short TG, Hong W, Suen T, Giu T, Plummer J. Additive interactions between propofol and ketamine when used for anesthesia induction in female patients. Anesthesiology 1995;82:641–8.
15- Mortero RF, Clark LD, Tolan MM, 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.
16- Singh R, Batra YK, Bharti N, Panda NB. Comparison of propofol versus propofol-ketamine combination for sedation during spinal anesthesia in randomised clinical trial of efficacy and safety. Pediatr anesth 2010;20:439–44.
17- Sabertanha A, Shakhsemampour B, Ekrami M, Allahyari E. Comparison of infusion of propofol and ketamine-propofol mixture (Ketofol) as anesthetic maintenance agents on blood pressure of patients undergoing orthopedic leg surgeries. Anesthesiology and Pain Medicine. 2019 Dec;9(6).
18- Frizelle HP, Duranteau J, Samii K. A comparison of propofol with a propofol-ketamine combination for sedation during spinal anesthesia. Anesth Analg. 1997;84(6):1318–22.
19- Jaafarpour M, Vasigh A, Khajavikhan J, Khani A. Effect of ketofol on pain and complication after caesarean delivery under spinal anaesthesia: A Randomized double-blind clinical trial. J Clin Diagn Res. 2017;11(3):UC04–7.
20- Willman EV, Andolfatto G. A prospective evaluation of "ketofol" (ketamine/propofol combination) for procedural sedation and analgesia in the emergency department. Ann Emerg Med. 2007;49(1):23–30.