ORIGINAL RESEARCH PAPER VOLUME-6 | ISSUE-7 | JULY-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"COMPARISON OF TOTAL INTRAVENOUS ANAESTHESIA WITH PROPOFOL, PROPOFOL-THIOPENTONE ADMIXTURE AND PROPOFOL-KETAMINE ADMIXTURE, FOR SHORT SURGICAL PROCEDURE"

Anaesthesiology

Dr Nihar Sharma Department of Anesthesiology,S.M.S. Medical College,Jaipur,India

Dr Siddharth Sharma Department of Anesthesiology,S.M.S. Medical College,Jaipur,India

ABSTRACT

Background and Objective: In the present study propofol alone and admixtures of propofol-ketamine and propofol-thiopentone was compared for short surgical procedures.

Methods: This was a randomized double blinded study conducted in 75 ASA I and II patients aged 15- 55 years, randomly assigned in three groups (25 each).

GROUP 1. 1% propofol and 1.25% thiopentone admixture

GROUP 2. 1% propofol and 0.5% ketamine admixture

GROUP 3. 1% propofol alone

Intraoperative hemodynamics and recovery and discharge profile were noted.

Conclusion: Combination of propofol-thiopentone and propofol-ketamine results in better hemodynamic profile intraoperatively as compared to propofol alone; out of the two admixtures propofol-ketamine provides better hemodynamic stability.

The mean recovery time was prolonged in group1 and 2 than group 3.

The incidence of complications was comparable in all three groups. The incidence of apnea was less in propofol-ketamine group.

KEYWORDS:

propofol,ketamine,thiopentone,total intravenous anaesthesia.

Since last few decades outpatient anesthesia in form of short surgical procedures is gaining wide acceptability. For daycare procedures it is important to provide fast recovery with minimal postanesthetic cognitive and psychomotor impairment, and, to be able to accurately judge when patients can be safely discharged. Ambulatory surgery is advantageous for patients as well as surgical team. Total intravenous anesthesia has recently become very popular in ambulatory surgery.

An intravenous anesthetic regime used in short surgical procedures should provide quick recovery and early discharge with minimum side effects. Of all the intravenous anesthetic agents propofol is used most commonly in daycare surgery due to its favorable properties of rapid and smooth recovery and decreased incidence of nausea and vomiting[1].Its main disadvantages are cardiovascular instability[2], dose dependent respiratory depression and pain on injection. Thiopentone and ketamine are also widely used but have disadvantages like longer recovery time, emergence delirium, postoperative nausea and vomiting etc.

So the combination of propofol with either thiopentone or ketamine could be used as an alternative with the rationale being that using lower doses of each agent may result in reduction of the undesirable adverse effects of either agents while maintaining optimal conditions for performing procedures.[3]

The study aims to compare among the three groups for following characteristics:

~Tolerance

~Intraoperative hemodyanamics

~Recovery and discharge profile

METHODS: The study was carried out in 75 patients of ASA grade I and II between the age 15 to 55 yrs of either sex undergoing minor short surgical procedures with duration of surgery not exceeding 30 minutes on a daycare basis. All the patients were subjected to a detailed pre-anesthetic evaluation to rule out any major respiratory, cardiovascular, central nervous system, renal or metabolic disorders. Patients were inquired about history of past illness and drug therapy. Routine investigations were carried out during the evaluation.

Patients with known allergy to used drugs, patients with any clinically significant systemic illness and uncooperative patients were excluded from the study. Written informed consent was obtained from all patients. After recording baseline pulse rate, blood pressure, respiratory rate, SpO_2, a suitable vein was cannulated and intravenous fluid was started to maintain patency of cannula. All patients were premedicated with Inj. Midazolam 0.03mg/kg iv and fentanyl 1µg/kg iv given 5-10 minutes prior to induction. All the patients were then randomized to receive one of the following solutions.

Group I: Admixture containing equal volumes of 1% propofol and 1.25% thiopentone.

Group II : Admixture containing equal volume of 1% propofol and 0.5% ketamine

Group III : 1% propofol alone.

The study drug was injected at a rate of 0.4ml/sec till there was a loss of consciousness. The total induction dose of the drug was recorded in all three groups. Top up for maintaining anesthesia was given as 2 ml increments of the study drug as and when judged by lighter planes of anesthesia which was evidenced by increase in heart rate > 20% of baseline value. Intraoperative heart rate, systolic blood pressure, SpO_2 were monitored at 1, 3, 5 and 10 minutes and thereafter every 5 minutes till the end of procedure.

All patients were observed for the following complications: pain at the site of injection, hiccough, coughing, laryngospasm or bronchospasm, apnea, nausea, vomiting, desaturation. Onset of apnea (time interval from induction) and its duration were recorded. Apnea was defined as loss of spontaneous respiratory effort for 20 seconds or more. The lungs were ventilated manually via face mask, if the duration was more than 20 sec or if SpO_2 decreased to less than 90%.

At the end of procedure the study drug was discontinued and time was noted. Patients were shifted to recovery room after patients started following verbal command.Patients were discharged from recovery room when criterion of discharge was met(post anaesthesia discharge score>9). Indoor patients were discharged to their respective wards.

Data are expressed as the number of patients or mean ± SD. For statistical analysis between groups, unpaired t tests were utilized. . $P<0.05$ was considered as statistically significant.

OBSERVATION AND RESULTS

There was no significant difference in mean age or weight among patients in three groups.

Intra operative hemodynamic data was recorded and analyzed. There was a statistically significant fall in the heart rate from the preinduction baseline value in the propofol group ($p<0.05$). The mean heart rate increased after induction in Group II.

Table 1. Comparision of mean heart rate and systolic BP±SD at

different time interval

Time	Heart rate(per min)			Systolic BP (mm Hg)		
	Gp1	Gp2	Gp3	Gp1	Gp2	Gp3
Preinduction	84.0 ±8.9	84.16 ±8.28	83.6 ±7.7	122.8 ±10.44	124.4 ±14.12	123.52 ±11.27
1 min	84.16 ±9.21	88.56 ±8.61	80.4 * ±7.51	113.6 ±10.65	122 ±14.0	108.56* ±10.78
3 min	82.4 ±9.29	89.92 ±8.48	78.56* ±7.75	110.24 ±10.54	120.48 ±14.11	107.44* ±10.74
5 min	83.44 ±8.44	90.16 ±8.24	80.08* ±7.93	109.68 ±10.5	118.24 ±14.2	108.16 ±10.16*
10 min	85.52 ±8.95	88.4 ±8.08	80.16* ±7.87	108.72 ±10.68	119.44 ±14.18	105.84* ±10.82
15 min	81.7 ±8.59	87.3 ±8.54	79.36* ±7.74	110.11 ±11.89	118.26 ±14.63	107.52 ±10.51*
20min	78.2 ±7.86	82.6 ±9.01	79.25 ±8.51	111.8 ±7.91	115.4 ±18.19	114.3 ±11.55
25 min	81.0 ±4.24	84 ±0.00	88.5 ±6.61	111.0 ±4.24	100 ±0.00	115.3 ±7.53

(*p value<0.05=significant)

The systolic blood pressure fell from preinduction baseline value in all the three groups, the fall was highest in Group III and least in Group II. The arterial oxygen saturation fell in all three groups after induction, highest fall was noted in Group III and least in group II.

Table 2. COMPARISON OF RECOVERY CHARACTERISTICS

	Group I	Group II	Group III
Eye opening*	8.92±1.82	10.92±1.89	6.92±1.82
Response to simple commands*	14.24±2.15	16.44±2.04	12.28±2.17
Speech*	14.32±1.91	16.32±1.91	12.36±1.89
Orientation to person and place*	14.76±1.79	16.76±1.90	12.88±1.76

*all data measured in minutes, expressed as mean±SD

The mean time for eye opening, response to simple command, speech, orientation to person and place were shorter in group III.

Table 3. Comparison of postanesthesia discharge scores at different time interval

	15 min	30 min	60 min	90 min	120 min	180 min
Group I	8.48 ±0.92	8.96 ±0.61	9.40 ±0.51	9.72 ±0.46	10±0.00	10±0.00
Group II	8.64 ±0.49	9.04 ±0.61	9.60 ±0.50	9.84 ±0.37	10±0.00	10±0.00
Group III	9.2 ±0.41	9.6±0.5	10±0.00	10±0.00	10±0.00	10±0.00

Post Anaesthetic Discharge Scoring System was used which considers six criteria: vital signs, ambulation, nausea/vomiting, pain, bleeding and voiding. Each criterion is given a score ranging from 0 to 2. Only patients who achieve a score of 9 or more are considered ready for discharge. Group III attained mean score of 9.2 at 15 min. Group I and Group II attained similar scores at 60mins and 30 mins respectively.

Thus the mean recovery and discharge time was prolonged in Group I and Group II as compared to Group III.

The incidence of pain on injection was comparable in all the three groups. The incidence of apnea was less in Group II. One patient in Group II had emergence phenomenon.

DISCUSSION

The very idea of faster recovery and early ambulation has attracted patients towards daycare surgery. Quick recovery increases the morale of both the patient and the whole surgical team. Shortage of inpatient beds and cost containment are important factors to be addressed specially when one considers total intravenous anaesthesia for short surgical procedures in developing countries.

Propofol has got some potential disadvantages, which can be offset by combining it with other induction agents like thiopentone and ketamine.

It is postulated that combining propofol with ketamine may preserve sedation efficacy while minimizing their respective adverse effects. This is due partly to the fact that many of the adverse effects are dose dependent, and when used in combination the doses administered of each can be reduced. Also the cardiovascular effects of each are opposing in action, thus theoretically balancing each other out when used together .The theoretical advantage of ketamine-propofol admixture producing a more stable hemodynamic and respiratory profile was tested and found to be true by Ramakrishna Rao et al[4].

Likewise, combination of thiopentone-propofol has been demonstrated to give better hemodynamic stability and comparable recovery profile as compared to either of these agents alone. The probable reason for the synergistic hypnotic effect[5] of thiopentone and propofol may be due to similar binding sites on GABA receptors for both of these drugs.

Intraoperative hemodynamics were compared between the three groups and was found to be most stable in group II. This may be because of the cardiostimulant effects of ketamine which counterbalances the depressant effect of propofol. Group I showed a less fall in the heart rate and blood pressure then group III because of decreased quantity of propofol being administered during induction with presumably decreased effect on afterload and myocardium. The fall in blood pressure in Group III following induction appears to be both due to vasodilation and myocardial depression of propofol which is dose dependent.

Incidence of apnea was less in Group I and II as less amount of propofol was used in the combination whereas the mean recovery and discharge time were prolonged in the same groups. Some of the previous studies had demonstrated superior recovery and discharge profiles in the admixture groups.

Sharieff et al (2007)[6] studied propofol-ketamine admixture for fracture reduction in the pediatric emergency department. They found that admixture has effective sedation with rapid recovery.

Conclusion

-The use of combination of propofol-thiopentone and propofol-ketamine when compared with propofol alone results in better hemodynamic profile intraoperatively as compared to propofol alone. Out of the two admixtures propofol-ketamine is better one as it offers better hemodynamic stability.

-Early recovery as assessed by eye opening, response to simple command, speech and orientation to person and place was achieved in group III.

-Group III achieved post anaesthesia discharge score of 9.2±0.41 at 15 minutes. Admixture groups achieve similar discharge scores later.

-Incidences of complication like pain on injection were comparable in all the three groups. The incidence of apnea was less in propofol-ketamine admixture group.

REFERENCES:

1. Mackenzie N and Grant I:A comparision of new emulsion formulation of propofol with methohexitone and thiopentone for induction of anaesthesia in day cases. Br. J. anaesthesia 1985:57,725-731.
2. Mayer M, Ochman O, Deonicke A, Angste.Influence of propofol-ketamine versus propofol-fentanyl anaesthesia in hemodynamics and analgesia.Anaesthetist 1990;39:609-616.
3. Kalpana S Vora,Prabhodhchandran M. S. et al: Comparision of admixtures of propofol-thiopentone, propofol-ketamine, and propofol in ambulatory surgery. Journal. Anaesth. Clinical Pharmacology 2005;21(4):413-418.
4. Ramakrishna Rao A,Vinay kumar S,Hima Bindu A et al:Comparative study between propofol and propofol with ketamine in ambulatory anesthesia.IOSR journal of dental and medical sciences.Feb 2015.14(2)01-09.
5. Jones D, Prankard R et al: Propofol-thiopentine admixture hypnotic dose,pain on injection and effect on blood pressure. Anaesth Intensive care 1999.Aug 27(4):346-56.
6. Sharieff, Ghazala Q,Trocinski,Douglas R et al: Ketamine-propofol combination sedation for fracture reduction in pediatric emergency department. Pediatric emergency care, Dec 2007, 23(12), 881-884.