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Anesthesiology

COMPARISON OF EFFICACY OF PROPOFOL & KETAMINE AND PROPOFOL & FENTANYL IN PATIENTS UNDERGOING SURGERY.

Dr. Badri Narayana Chigullapally

Associate Professor, Gandhi Medical College and Hospital, Secunderabad, Hyderabad, Telangana, India

ABSTRACT

Introduction: An ideal anaesthesia always provides pleasant induction, minimal adverse conditions, inevitable loss of consciousness and rapid, smooth recovery of protective reflexes. The combination of Propofol, Fentanyl and Ketamine provides complete and balanced anaesthesia with advantages such as high potency, lower doses and fewer side effects. This study designed to compare the efficacy of propofol with fentanyl and propofol in combination with ketamine in patients undergoing surgeries.

Materials and Methods: The present comparative study contains 120 cases undergoing various surgeries belonged to ASA grade I and II of both sexes and age between 2nd to 6th decades were recruited. Based on administered drug combinations cases were divided in to two groups i.e. group 1 administered with propofol & ketamine and group 2 administered with propofol and fentanyl. Oxygen saturation (SpO2), Heart rate, Systolic blood pressure (SBP), diastolic blood pressure (DBP) and respiratory rate was noted for all the participants before the surgical procedure and for every 5min after a surgical procedure.

Results: The onset of induction was rapid in group 1 cases than group 2 cases. The mean pulse rate was significantly decreased after induction at 1 min, 5 min, 10 min, and 20 min. whereas in group 2, the mean pulse rate was decreased at 1 min and increased at 5 min, 10 min and 20 min. The mean respiratory rate and oxygen saturation also stable in both groups.

Conclusion: The drug combination of propofol & ketamine and propofol & fentanyl are efficient in the maintenance of respiratory rate, oxygen saturation and haemodynamic stability. In this regard, drug combination of propofol & ketamine are best drug choice in surgical practice. Acceptance of propofol & ketamine is higher than propofol & Fentanyl.

KEYWORDS : Propofol, Fentanyl, Ketamine, Intravenous anaesthesia, O2 saturation, Arterial pressure.

INTRODUCTION

The Journey of general anaesthesia since its entry has been erratic, long periods of stagnation being occasionally lagged behind by upgrade. Till recent years, inhalational agents are the routine anaesthetic choices which have a lot of drawbacks and shortcomings. Intravenous anaesthesia is a feasible method for both anaesthetist and patient by producing quick loss of consciousness without excitement and distress (1).

A phenol derivative propofol, is a short-acting intravenously administered sedative and hypnotic agent with amnestic properties that causes loss of consciousness reliably and rapidly (2). Ketamine, an NMDA receptor antagonist and has also been found to bind to opioid receptors and sigma receptors (3). It is a phencyclidine derivative which create analgesia without respiratory depression (4-6). Fentanyl is synthetic opioid, contributes hemodynamic stability.

A drug combination of propofol and ketamine have offered effective sedation for spinal anaesthesia and for gynaecologic, CVS and ophthalmologic procedure of all age groups (7). Sedation technique should be like prevent cough, maintaining the spontaneous breathing and hemodynamic stability. Individual drugs or in combination such as opioids, propofol, benzodiazepines, and ketamine are efficient ones (8). The combination of above drugs provides complete and balanced anaesthesia and has advantages such as high strength, minimal complications and minimal quantity usage. The present comparative study was aimed to assess the efficacy of propofol & ketamine and propofol & fentanyl in cases undergoing surgeries.

MATERIAL AND METHOD

The present comparative study was conducted in Department of Anaesthesia in association with Department of General Surgery, OBG and Orthopaedics at Maheshwara Medical College and Hospital, Isnapur and MNR Medical College, Sangareddy during November 2016 to March 2018.

INCLUSION CRITERIA:

A total 120 cases attending various surgeries belonged to ASA grade I and II of both sexes and age between 2nd to 6th decades were recruited.

EXCLUSION CRITERIA:

Cases with Psychiatric, respiratory and cardiovascular complications and hypertension.

Informed consent was obtained from all the participant and study protocol was approved by the institutional ethics committee. Cases undergoing surgeries are divided into two study group's i.e.

Group 1- Cases administered with propofol and ketamine.
Group 2- cases administered with propofol and fentanyl.

Administration of drug: Participants did not receive premedication on the day or before the surgical procedure. Oxygen saturation (SpO2), Heart rate, Systolic blood pressure (SBP), diastolic blood pressure (DBP) and respiratory rate was noted for all the participants before the surgical procedure and for every 5min after a surgical procedure.

For Group 1: Participants are induced with ketamine 0.5mg/Kg weight of the body along with propofol 3mg/Kg weight of the body.

For group 2: participants are induced with fentanyl 1mg/Kg weight of the body along with propofol 3mg/Kg weight of the body.

RESULTS

Among total 120 cases majority cases were between age group 21-30 years (66.6%) in group 1 and 31-40 years (56.6%) in group 2 (Table 1).

TABLE 1: Age and gender-wise distribution of cases.

Age (Years)	Cases distribution					
	Group 1 (n=60)			Group 2 (n=60)		
	Male	Female	Percentage	Male	Female	percentage
21-30	28	12	66.6%	8	10	30%
31-40	7	2	15%	22	12	56.6%
41-50	2	-	3.3%	5	3	13.3%
51-50	6	3	15%	-	-	-

TABLE 2: Distribution of cases based on the type of surgery.

Nature of surgery	Number of patients	
	Group 1	Group 2
Orthopaedic surgery		
Open reduction and internal fixation	10	9
K-nail removal	3	3
Curratage	8	8
Sequestrectomy	8	7
Amputation	2	4
General Surgery		

Skin grafting	11	10
Gynaecological surgery		
MTP and Ligation	18	19

In group 1, time for onset of induction was 42.9±4.98 whereas in group 2 it was 49.01±5.44. Which is statistically significant ($p<0.001$).

TABLE 3: Mean values of total and induction dose of propofol and number of top-up doses of ketamine and fentanyl.

	Group 1 (Mean±S.D)	Group 2 (Mean±S.D)
Induction dose of propofol (mg)	140.2 ± 11.64	158.8 ± 19.54
Total dose of propofol (mg)	217.4 ± 12.11	238.3 ± 14.24**
number of top-ups of ketamine and fentanyl	2.01 ± 2.2	3.33 ± 2.01

FIGURE 1: changes in mean value of pulse rate.

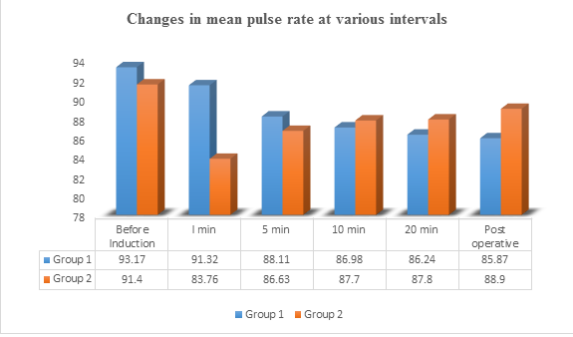

TABLE 4: Values of systolic blood pressure (SBP) and diastolic blood pressure (DBP) before and after induction.

Time interval	Group 1 (Mean±S.D)		Group 2 (Mean±S.D)	
	SBP	DBP	SBP	DBP
Before induction	132.01 ± 8.21	87.28 ± 6.87	131.17 ± 9.76	88.2 ± 5.01
After 1 min	128.2 ± 7.45	86.71 ± 6.99	113.54 ± 8.70	70.1 ± 5.44
After 5 min	127.98 ± 7.52	85.65 ± 6.43	119.79 ± 9.35	70.8 ± 5.83
After 10 min	129.80 ± 7.58	85.33 ± 86.56	127.74 ± 9.47	79.3 ± 6.13
After 20 min	128.34 ± 6.99	84.86 ± 5.89	127.39± 9.76	84.7 ± 6.65
Immediate post-operative	127.36± 7.43	84.43± 5.16	127.45± 8.87	84.7 ± 6.82

TABLE 5: Values of respiratory rate and arterial oxygen saturation before and after induction.

Time interval	Respiratory rate (Mean±S.D)		O_2 saturation (Mean±S.D)	
	Group 1	Group 2	Group 1	Group 2
Before induction	14.9 ± 2.47	14.9± 1.98	97.9 ± 1.04	96.9 ± 1.07
After 1 min	15.2 ± 2.97	13.02 ± 1.64	98.2 ± 1.10	97.2 ± 1.22
After 5 min	15.5 ± 2.68	13.5± 1.58	98.4 ± 0.75	97.5 ± 1.45
After 10 min	14.9 ± 2.01	14.4 ± 2.22	98.4 ± 0.89	97.5 ± 1.65
After 20 min	14.8 ± 1.98	14.7 ± 3.41	98.6 ± 0.92	98.6 ± 1.10
Immediate post-operative	14.4 ± 2.18	14.8 ± 1.68	98.8 ± 0.97	98.7 ± 1.08

The recovery time in group 1 was 4.98±1.67 and in group 2 was 4.01± 1.87 respectively and is statistically significant. Pain while injection was a most common complication, observed followed by nausea & vomiting, apnoea and episodes of desaturation in few cases.

TABLE 6: Patient feedback on the procedure.

Feedback	Group 1 (n=60)		Group 2 (n=60)	
	No.	Percentage	No.	Percentage
Good	43	71.6%	39	65%
Satisfactory	9	15%	15	25%
Not satisfied	3	5%	2	3.3%
No comments	5	8.3%	4	8.3%

DISCUSSION

An ideal anaesthesia should have a unique properties like rapid induction, secure operating conditions, poorly associated complications and fast recovery of protective reflexes and motor functions (9). Total intravenous anaesthesia is widely accepted anaesthesia technique inhuman practice. The present study was designed to assess the efficacy, induction properties and recovery status of combinations propofol & ketamine with propofol & fentanyl. Among total 120 cases majority cases were between age group 21-30 years (66.6%) in group 1 and 31-40 years (56.6%) in group 2. In both groups, male patients were more than female patients.

The onset of induction was 42.9±4.98 in group 1, whereas as in group 2 it was 49.01±5.44. The onset of induction was rapid in group 1 cases than group 2 cases. Propofol, a sedative-hypnotic agent having a rapid onset, a minimal period of action and less post-surgical complications (10). It is rapid in action due to its lipophilic nature which crosses blood-brain barrier quickly. Studies suggested that a mixture of Propofol and ketamine are pharmaceutically compatible at 1:1 to 1:5 ratio and maintains haemodynamic stability (11-14).

The induction dose and total dose of propofol was less in group 1 than group 2. In addition, the number of top-ups of ketamine (in group 1) was less than fentanyl (in group 2) (Table 3). The mean pulse rate was significantly decreased after induction at 1 min, 5 min, 10 min, and 20 min. whereas in group 2, the mean pulse rate was decreased at 1 min and increased at 5 min, 10 min and 20 min which was statistically significant (Figure 1).

A study by Vashishta K et al. stated that haemodynamic variables (SBP & DBP) are stable in propofol and ketamine group initially, but after 15 min of induction haemodynamic variables are increased by 4.39 % (SBP) and 7.45% (DBP) (15). The SBP and DBP were stable in group 1 during an entire surgical procedure. Whereas in group 2 highly significant ($p<0.001$) fall in DBP at 1 min and 5 min and a significant fall ($p<0.005$) at 10 min after induction (Table 4).

In view of the respiratory rate, it was found stable in both groups. The mean oxygen saturation also stable in both groups (Table 5). The results of this study are comparable with the study by Vashishta K et al., where respiratory rate and oxygen saturation was stable during the perioperative period (15). The overall patient feedback showed propofol and ketamine drug combination was effective than propofol and fentanyl. Almost 71.6% cases were satisfied with ketamine and propofol.

CONCLUSION

The results of this study conclude that the drug combination of propofol & ketamine and propofol & fentanyl are efficient in the maintenance of respiratory rate, oxygen saturation and haemodynamic stability. But there was a slight fluctuation in the diastolic blood pressure in propofol & fentanyl group. In this regard, drug combination of propofol & ketamine are best drug choice in surgical practice. In comparison, the propofol & ketamine drug combination gained more patient acceptance.

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