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Original Research Article

A Comparison of Two Prophylactic Doses of Ephedrine to Attenuate the Hemodynamic Responses in Adults Receiving Propofol and Fentanyl in General Anaesthesia

Dr. Raju Singh Rathor[1] (Senior Resident), Dr. Pravin Kanoje[2] (Junior Resident), Dr. Sandeep Rathore[3] (Assistant Professor)

Department of Anaesthesiology, Gandhi Medical College Bhopal, M.P.[1,2&3]
Corresponding Author: Dr. Pravin Kanoje

ABSTRACT

Induction of general anaesthesia with propofol and fentanyl could result in hypotension and bradycardia. Various methods are being used to prevent these adverse effects. The aim of our study was to compare the effect of prophylactic administration of ephedrine against the hypotensive effect of propofol & fentanyl and also to assess propofol-fentanyl-related complications.This prospective, hospital based study was conducted among a total of 60 patients, both genders, age 20 years up to 60 years with ASA grade I and II presented for elective surgery under general anaesthesia. Patients were randomly allocated into one of two groups (30 patients in each): As per the anaesthesiologist choice As per the anaesthesiologist choice group 1 receiving

iv ephedrine 0.1 mg/kg, and group 2 receiving 0.2 mg/kg respectively.in the anesthetic room an intravenous cannula (20G) was secured in the non operative arm and intravenous fluid (ringer lactate or normal saline) started. subsequently, the patient was shifted to operating room , made to lie supine and all standard ASA monitors was attached. All patients pre-medicated with ondasetron 0.08-0.1mg/kg, midazolam 0.02mg/kg and fentanyl 1-2 microgm/kg intravenously. Heart rate, blood pressure (systolic, diastolic and mean) and oxygen saturation were recorded. Induction of anesthesia was done with propofol 2-3 mg/kg. alterations in systolic and diastolic blood pressures (SBP, DBP), mean arterial pressure (map), and heart rate (hr) were calculated at the time of induction and after induction 2, 4 and 6 min. then intubation was made. **Results** baseline hemodynamic variables were comparable between two groups. Patients received 0.1 ephedrine mg/kg, had more drop in blood pressure both systolic and diastolic, map, and hr compared to patients received 0.2 mg/kg ephedrine with no significant rise in side effects. the numbers of patients with hypotension were significantly lower in the group received ephedrine 0.2 mg/kg compared to group received 0.1 mg/kg (p-value 0.05). C**onclusion** - Administration of small dose of ephedrine with propofol could attenuate propofol/fentanyl hypotensive and bradycardic effects.

Key words: propofol, Ephedrine fentanyl bradycardia, hypotension, SBP, MAP.

1. INTRODUCTION

Propofol is widely used IV induction agent of choice during general anaesthesia. It has rapid action and rapid recovery. Due to the hypotensive effect of propofol when it combined with fentanyl it causes more hypotension in well hydrated patients. Fentanyl is very potent

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analgesic and cause hypotension and bradycardia. Propofol and fentanyl combination lead to more hypotension. Cardiovascular effects of propofol are increased when combined with fentanyl. Ephedrine is a non catacholamine sympathomimetic alkaloid with potent alpha and beta agonist and act by both direct and indirect mechanism .it increases BP, HR, contractility and cardiac output .ephedrine has been used to decrease hypotensive effect of induction anaesthesia with propofol and fentanyl.

The aim of our study was to compare the effect of prophylactic administration of ephedrine against the hypotensive effect of propofol & fentanyl and also to assess propofol-fentanyl-related complications.

Study design: PROSPECTIVE HOSPITAL BASED study

Sample size: (60)

Group 1: receiving 0.1 MG/KG EPHEDRINE (n=30)
Group 2 : receiving 0.2 MG/KG EPHEDRINE (n=30)

Inclusion criteria	**exclusion criteria**
Age > 20 yrs	Age < 20yrs
Age < 50 yrs	Age > 50 yrs.
Both sex	Pregnancy
ASA I – II undergoing elective surgery	Allergy to propofol & fentanyl
All the patients who were scheduled for various elective surgeries under general anaesthesia	

2. METHODOLOGY

It is a prospective hospital based study. A total of 60 patients, both genders, age 20 years up to 60 years with ASA grade I and II presented for elective surgery under general anaesthesia after approval from hospital ethics committee with written and informed consent of patients.
The patients were allocated into two groups (30 patients each), As per the anaesthesiologist choice group 1 receiving iv ephedrine 0.1 mg/kg, and group 2 receiving 0.2 mg/kg respectively. In the anesthetic room an intravenous cannula (20G) was secured in the non operative arm and intravenous fluid (ringer lactate or normal saline) started. Subsequently, the patient was shifted to operating room, made to lie supine and all standard ASA monitors were attached. All patients premedicated with ondasetron 0.08-0.1mg/kg, midazolam 0.02mg/kg and fentanyl 1-2 microgm/kg intravenously. In the operating room, routine monitoring hr, ECG, spo2, and NIBP were established. Baseline cardiovascular parameters, i.e., heart rate, blood pressure (systolic, diastolic and mean) and oxygen saturation were recorded. Induction of anesthesia was done with propofol 2-3 mg/kg. Alterations in systolic

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and diastolic blood pressures (SBP, DBP), mean arterial pressure (map), and heart rate (hr) were calculated at the time of induction and after induction 2, 4 and 6 min. then intubation was made.

3. RESULTS

Baseline hemodynamic variables were comparable between two groups. Patients received 0.1 ephedrine mg/kg, had more drop in blood pressure both systolic and diastolic, map, and hr compared to patients received 0.2 mg/kg ephedrine with no significant rise in side effects. The numbers of patients with hypotension were significantly lower in the group received ephedrine 0.2 mg/kg compared to group received 0.1 mg/kg (p-value 0.05).

Demographic data which included age (in years), weight (in kg), sex among the 2 groups not found to be clinically significant.

Preoperative hemodynamic parameters which included heart rate (b/min), NIBP (mmHg), SBP (mmHg), DBP (mmHg), MAP (mmHg) and oxygen saturation was also found to be comparable in both the groups

Table 01: COMPARISON OF SBP DURING THE STUDY PERIOD

TIME	GROUP 1	GROUP2	P VALUE
0 MIN	124.20 ±10	127.26±6.40	0.1634
2 MIN	104.56±10.2	112.37±6.39	0.0008
4 MIN	98.38±7.80	114.06±8.3	0.0000
6 MIN	108.20±5.58	116.72±5.44	0.0000

Table 02: COMPARISON OF DBP DURING THE STUDY PERIOD

TIME	GROUP 1	GROUP2	P VALUE
0 MIN	74.96±6.80	76.24±8.73	0.5289
2 MIN	56.48±6.46	62.48±9.44	0.0057
4 MIN	55.56±7.33	64.57±6.46	0.0000
6 MIN	58.67±6.42	63.76±7.80	0.0077

Table 03: COMPARISON OF MAP DURING THE STUDY PERIOD

TIME	GROUP 1	GROUP2	P VALUE
0 MIN	94.76±8.66	95.66±20	0.8219
2 MIN	66.84±10	75.84±9.80	0.0008

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4 MIN	70.22±4.56	76.92±4.66	0.0000
6 MIN	72.10±4.98	78.84±6.84	0.0001

Table 04: COMPARISON OF HR DURING THE STUDY PERIOD

TIME	GROUP 1	GROUP2	P VALUE
0 MIN	87.90±10.42	86.60±11.52	0.6484
2 MIN	90.64±8.20	89.96±7.86	0.7442
4 MIN	86.94±6.55	87.94±7.40	0.0001
6 MIN	87.52±7.50	89.56±7.46	0.2952

Table 05: THE NUMBER OF PATIENTS DEVELOPING HYPOTENSION AND TIME OF ONSET OF HYPOTENSION

TIME	GROUP 1	GROUP 2	P VALUE
2 MIN	11(37%)	8(27%)	0.4050
4 MIN	10(33%)	6(20%)	0.2429
6 MIN	14(47%)	20(67%)	0.1180

4. DISCUSSION

Induction of anesthesia with propofol combined with fentanyl in ASA-I and II patients is associated with significant systemic arterial hypotension. Prophylactic IV injection of ephedrine in a dose of 0.1 mg/kg significantly minimized in group 1, but did not eliminate the decrease of BP. The dose of 0.2 mg/kg in group 2 was much better as compared to group 1 because decrease in BP less in group 2. In this study, we observed that prophylactic IV dose of ephedrine was effective in limiting the hypotension during propofol induction in doses 0.1 mg/kg and 0.2 mg/kg. But ephedrine did not eliminate the reduction in BP associated with induction of anesthesia with propofol and fentanyl. In our study we found comparable results to those of Eldemrdash, A.M. and Al-Azhary et al. they found that both group after giving prophylactic IV ephedrine The use of prophylactic doses of ephedrine could attenuate the propofol-fentanyl hypotensive effect during the induction of general anesthesia without tachycardia..0.1 mg/kg and 0.2 mg/kg respectively, amplitude of reduction in BP was decreased in both the group.\

5. CONCLUSIONS

The use of small doses of ephedrine could attenuate the propofol-fentanyl hypotensive effect during the induction of general anaesthesia without tachycardia.

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