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A COMPARATIVE STUDY OF FENTANYL AND NALBUPHINE ON HAEMODYNAMIC CHANGES DURING INTUBATION IN GERIATRIC PATIENTS

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ABSTRACT

Objective: The haemodynamic changes associated with laryngoscopy and endotracheal intubation are due to mainly sympathoadrenal reflex and release of norepinephrine, epinephrine. So, laryngoscopy and intubation is a challenge to anaesthesiologist with obtundation of pressor response in these patients.

Methods: Seventy patients were randomly selected matching the inclusion criteria and they were randomly allocated in either of two groups (n=35). Group F was given i.v. fentanyl 2mcg/kg and group N given i.v. Nalbuphine 0.2 mg/kg five min before intubation. we excluded the patient whose laryngoscope and intubation time was exceeded 15 secs.

Results: The SBP and DBP,MAP and mean heart rate of the patients of group-N was significantly higher than that of group-F after drug administration to 5 minute after intubation ($p<0.01$).

Conclusion: Intravenous fentanyl (2mcg/kg) controls the stress response to laryngoscopy and intubation better as compared to i.v nalbuphine (0.2mcg/kg) in geriatric patients but the adverse effect profiles are more in fentanyl arm.

KEYWORDS : Geriatric, laryngoscopy and intubation, fentanyl, nalbuphine.

INTRODUCTION:

Laryngoscopy and intubation are associated with increased stress which is deleterious for patients especially with hypertension, ischemic heart disease, raised intraocular and intracranial pressure. Various drugs and induction agents like fentanyl, remifentanil, buprenorphine, esmolol, lignocaine, thiopentone, propofol, magnesium, vasodilators, etc have been tried to prevent haemody namic response but each drug has its own limitations [1,2,3]. Opioids blunt the haemodynamic response, offering a combination of analgesic potency. But, it has a number of well-documented adverse side effects, including nausea, vomiting, drowsiness, dry mouth, respiratory depression, histamine release, and neuroexcitatory and gastrointes tinal effects [4,5]. Commonly, we use fentanyl which has high potency, rapid onset, short duration of action [6] and without any serious side effect.Nalbuphine which is an agonist antagonist opioid (on μ receptors as antagonist and kappa receptor as agonist), also has cardiovascular stability, longer duration of analgesia with less adverse effects[7,8].There are few studies demonstrating the effectiveness of fentanyl and nalbuphine to attenuate haemodynamic response during intubation specially over geriatric patients.

In view of these observations,, the present study has been undertaken to compare the effects of fentanyl and nalbuphine on haemodynamic responses to endotracheal intubation among geriatric patients.

MATERIALS AND METHODS:

After getting Institute's Ethical Committee's permission, 70 patients having age more than 65 years of either sex, ASA physical status I or II scheduled for general anaesthesia requiring orotracheal intubation were included for this study. This study was conducted in Medical college & Hospital, Kolkata. Patient's refusal, known allergic to any study drug, ASA physical status III or more, having anticipated difficult intubation, patient having respiratory, hepatic, renal disease, uncontrolled diabetes, uncontrolled hypertension or patient with beta blocker were considered the important exclusion criteria.

Based in previous study [(15)], we wanted to demonstrate that the use of nalbuphine would be associated with 30% fall of systolic blood pressure from the base line value. Assuming an α error of 0.05 and power of the study of 80% (β=0.8) and a drop out of 10%, 35 patients were included in each group. Seventy patients were randomly allocated into two groups fentanyl (group F) and nalbuphine (group N) according to a computer generated random number table. Allocation concealment was achieved by placing the randomization sequence for each subject in sequentially numbered sealed brown envelops.

Before admission, a routine preanaesthetic check up was done and the patients were selected according the inclusion and exclusion criteria as mentioned earlier. After admission, another preanaesthetic visit was done for every patient on the day before operation to reduce anxiety and written informed consent was taken after explaining the procedure in his own language. All patients received 10 mg oral diazepam, tab ranitidine 150 mg night before operation & were kept nothing per mouth 6-8hrs prior to surgery. On arrival in operation room, an intravenous infusion line was done with 18G cannula and lactated Ringer's solution was started. Monitors were attached to record the pulse rate, systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP), oxygen saturation (Spo2) and ECG till the end of the surgery.

All patients were premedicated with inj ranitidine 50mg, inj metoclopramide 10mg , inj midazolam 1 mg intravenously 10 mins before giving study drug. Baseline pulse, SBP, DBP, MAP, Spo2, ECG were recorded before premedication.

All patients were blind about their group allocation. The study drugs were prepared according their group allocation. To prevent bias both drugs were prepared by diluting with normal saline and making it 4ml. It was labeled as study drug and handed over to the blinded anaesthesiologist conducting the anaesthesia. Group F was given i.v. fentanyl 2mcg/kg and group N given i.v. nalbuphine 0.2 mg/kg 5 mins before intubation. After administration of study drug, preoxygenation was done for 3 minutes and then induction was done with propofol 2mg/kg i.v. Laryngoscopy and intubation was performed 90 secs after administration of succinylcholine1mg/kg i.v. All patients were intubated with Macintosh curved blade laryngoscope (no. 3/no.4 according to the need of the patient) within a period of 15 seconds and we excluded the patient from our study whose laryngoscope and intubation time was exceeded 15 secs.

Anaesthesia was maintained with O2 –N2O (40%-60%) & isoflurane 1%. Throughout the surgery muscle relaxation was maintained with inj. atracurium besylate. Continuously HR, SBP, DBP,MAP, Spo2 were monitored and recorded before giving the study drug, 5 min after giving the study drug and after intubation (1,3,5,10,15,30,60 min and 2 hr). If any patient developed hypertension (SBP>140mm Hg) during intraoperative period, then he was treated with titrated dose of nitroglycerine and tachycardia (>120HR) was corrected by esmolol after excluding the other causes of hypertension and tachycardia.

At the end of surgery, anaesthesia was reversed with inj neostigmine 0.05 mg/kg and glycopyrrolate 5μg/kg IV and were closely monitored in recovery room.

Patients were observed intraoperatively and postoperatively for any complication like arrhythmias, nausea, vomiting, respiratory depression, sedation, mascular rigidity and pruritus.

The data of 70 patients were analysed with help of Epi Info (TM) 3.5.3. Student t-test showed that there was no significant difference in age, gender, weight and ASA grade of the patients of the two groups.

Table-1: Comparison of heart rate (HR) per minute at different time of the two groups

Time Interval	Group-N (Mean±SD) (n=35)	Group-F (Mean±SD) (n=35)	Test Statistic (t68)	p-value
HR BD	73.71±9.04	73.06±9.20	0.30	0.76 NS
HR AD	69.83±8.37	69.06±9.06	0.37	0.71 NS
HR1	107.31±7.80	100.80±9.82	3.07	0.003*
HR3	105.03±7.06	92.06±10.17	6.19	<0.0001*
HR 5	101.40±8.18	68.03±10.23	15.07	<0.0001*
HR10	75.00±8.66	77.89±9.94	1.29	0.20 NS
HR15	75.45±8.48	77.74±10.98	0.97	0.33 NS
HR30	76.15±9.74	73.86±8.24	1.06	0.29 NS
HR60	77.91±8.34	75.20±7.68	1.41	0.16 NS
HR2 HR	76.46±7.36	74.00±8.49	1.29	0.20 NS

HRBD-T1-Before giving drug
HR AD-T2-5 min after giving drug.
HR1-T3-1 min after intubation.
HR3-T4-3 min after intubation.
HR5-T5-5 min after intubation.
HR10-T6-10 min after intubation.
HR15-T7-15 min after intubation.
HR30-T8-30 min after intubation.
HR60-T9- 60min after intubation.
HR2 HR-T10-2 hr after intubation.
NS – Statistically Not Significant
* Statistically Significant

t-test showed that the heart rate of the patients of Group-N was significantly higher than that of Group-F after 1 minute, 3 minutes and 5 minutes (p<0.01). Otherwise the heart rate for all other time intervals was comparable (Table-1).

Table-2: Comparison of SBP (mmHg) at different time of the two groups

Time Interval	Group-N (Mean±SD) (n=35)	Group-F (Mean±SD) (n=35)	Test Statistic (t68)	p-value
SBP BD	116.97±6.31	117.46±8.15	0.27	0.78 NS
SBP AD	109.29±6.53	105.60±8.26	2.07	0.04*
SBP1	151.71±4.99	146.40±9.20	3.00	0.004*
SBP3	149.97±5.95	131.40±8.53	10.56	<0.0001*
SBP5	144.63±8.27	118.23±10.10	11.96	<0.0001*
SBP10	119.28±7.62	119.26±9.77	0.009	0.99 NS
SBP15	118.27±8.06	118.86±9.38	0.28	0.77 NS
SBP30	117.47±8.27	118.60±9.38	0.53	0.59 NS
SBP60	117.02±7.53	116.66±10.03	0.17	0.86 NS
SBP2 hr	118.75±5.45	118.71±8.11	0.02	0.98 NS

SBP BD-T1-Before giving drug
SBP AD-T2-5 min after giving drug.
SBP1-T1-1 min after intubation.
SBP3-T4-3 min after intubation.
SBP5-T5-5 min after intubation.
SBP10-T6-10 min after intubation.
SBP15-T7-15 min after intubation.
SBP30-T8-30 min after intubation.
SBP60-T9- 60 min after intubation.
SBP2 hr-T10-2 hr after intubation.

NS – Statistically Not Significant
* Statistically Significant

t-test showed that the SBP (table 2), DBP and MAP of the patients of group-N was significantly higher than that of group-F after drug administration to 5 minute after intubation (p<0.01). Otherwise there was no significant difference in SBP, DBP and MAP for all other time intervals (p>0.05)

There was no difference in the proportion of patients with chest wall rigidity, bradycardia and respiratory depression of the two groups (p>0.05) but with nausea, vomiting, pruritus of group-F was significantly higher than that of the patients of group-N (p<0.01).

DISCUSSION-

In our study the MAP of the patients of Group-N was significantly higher than that of group-F after 1 minute, 3 minutes and 5 minutes (p<0.01). Otherwise there was no significant difference in mean heart rate for all other time intervals (p>0.05). Khan and Hameedullah et al.[7] conducted a similar study and observed a significant decrease in heart rate response in fentanyl group after induction, tracheal intubation and incision. Contrast to our study Bhandari R et al.[11] observed that a decrease in mean HR after drug administration in fentanyl group as opposed to increase in HR in nalbuphine group. William M. Splinter et al. [10] conducted a study on haemodynamic responses to laryngoscopy and tracheal intubation in geriatric patient observed that fentanyl reduced the rises in HR. In our study the mean SBP of the patients of group-N was significantly higher than that of group-F after drug administration to 5 minute after intubation (p<0.01). Otherwise there was no significant difference in mean SBP for all other time intervals (p>0.05). Sharma N et al. [9] conducted a study showed that nalbuphine group had significant rise in SBP during intubation compared to fentanyl group .

In our study the DBP of the patients of Group-N was significantly higher than that of Group-F after 1 minute to 5 minute after intubation (p<0.01). Otherwise there was no significant difference in mean DBP for all other time intervals (p>0.05). In their study Sharma N et al. [9] showed that group N had significant rise in DBP during intubation compared to group F. In our study the mean MAP of the patients of group-N was significantly higher than that of group-F after drug administration to 5 minute after intubation (p<0.01). Contrast to our study Bhandari R et al. [11] observed that a better control of MAP in nalbuphine group compared to fentanyl group in response to intubation.

CONCLUSION:

Intravenous fentanyl (2mcg/kg) controls the pressor response to laryngoscopy and intubation better as compared to i.v nalbuphine(0.2mg/kg) in geriartic patients but the adverse effect profiles are more in fentanyl arm.

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