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EFFICACY OF NALBUPHINE PREMEDICATION TO INTRAVENOUS CLONIDINE ON HEMODYNAMIC ALTERATIONS DURING DIRECT LARYNGOSCOPY AND INTUBATION

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ABSTRACT

Background: Abnormal alterations in hemodynamic parameters during direct laryngoscopy can be controlled with the use of suitable premedication.

Aim: The present study was conducted to compare and assess the efficacy of nalbuphine premedication to intravenous clonidine on hemodynamic alterations during direct laryngoscopy and intubations.

Materials and Methods: 58 study subjects undergoing direct laryngoscopy were randomly divided into two groups of 29 subjects each where Group I subject received clonidine (2 μg/kg) and Group II nalbuphine (0.2 mg/kg) given intravenously 10 minutes before anesthesia induction using standard anesthesia technique. The parameters assessed were changes in ECG, blood pressure, and heart rates from baseline to following intubation and laryngoscopy, and at 1, 2, 3, 5, 10, and 15 minutes after intubation. Complications and side-effects were also assessed.

Results: Following premedication, decrease in blood pressure and heart rates was statistically significant in Group I and II where following intubation, increase in mean blood pressure and heart rate were seen immediately in subjects of two groups which was persistent for 5-7 minutes in subjects who received clonidine and for 10 minutes in subjects receiving nalbuphine. This difference was statistically significant.

Conclusion: The present study concludes that premedication of 2 μg/kg intravenous clonidine effectively controlled hemodynamic alterations during intubation and direct laryngoscopy in comparison to subjects who received 0.2mg/kg intravenous nalbuphine given 10 minutes before anesthesia induction.

Keywords: Clonidine, Direct Laryngoscopy, and Intubation, induction, Nalbuphine, premedication.

INTRODUCTION

Intubation and direct laryngoscopy are commonly performed procedures conducted for the prevention of airway from aspiration allowing uninterrupted ventilation under general anesthesia. However, clinical advantages of these procedures are associated with ill effects owing to increased concentration of plasma catecholamine which can lead to hypertension and tachyarrhythmia.[1] Changes in hemodynamic parameters lead to increase chances of ischemia in the myocardium that might be life-threatening in subjects with pre-existing cardiovascular diseases. However, administration of premedications, rapid intubation, and smooth induction can decrease the risk of major alterations in hemodynamic parameters.[2]

The use of ideal technique and appropriate anesthetic agent should have minimal hemodynamic changes, convenient administration, safe, should be applicable in all ages, avoid awareness, allow adequate cerebral flow, and have rapid onset action. Clonidine is one anesthetic agent which is partially an α2 adrenergic agonist that reduces sympathetic nervous system outflow to peripheral tissues from the central nervous system that inhibit

norepinephrine release. Clonidine has antihypertensive, analgesic, and sedative actions with reduced need of anesthetic dose.[3]

Another anesthetic agent is a semi-synthetic agonist-antagonist opioid analgesic, Nalbuphine which is also an antagonist at mu (μ) receptors and an agonist at kappa (κ) receptors. Nalbuphine provides stability of hemodynamic parameters, long anesthesia duration, and decreases the response to hemodynamic changes. Nalbuphine is considered as an ideal anesthetic agent as it is potentially safe even in overdose cases owing to its ceiling effect where even in overdose, respiratory depression is not seen.[4]

The present prospective clinical study was conducted to compare and assess the efficacy of nalbuphine premedication to intravenous clonidine on hemodynamic alterations during direct laryngoscopy and intubations.

Materials and Methods

The present prospective randomized clinical study was conducted to compare and assess the efficacy of nalbuphine premedication to intravenous clonidine on hemodynamic alterations during direct laryngoscopy and intubations. The present study was conducted at…..from…..to….after obtaining clearance from the concerned Ethical committee. The study population was comprised of the subjects undergoing direct laryngoscopy and intubation at the institute. The study included 58 subjects from both genders within the age range of 18-60 years and the mean age of 38.46±6.72 years.

The inclusion criteria for the study were subjects undergoing direct laryngoscopy and intubation, ASA status I and II, and subjects who were willing to participate in the study. The exclusion criteria for the study were subjects with allergies, obese subjects, endocrine disease, neurologic disorders, renal/hepatic disease, uncontrolled diabetes, uncontrolled hypertension, and cardio-pulmonary diseases.

Included 58 subjects were randomly divided into two groups of 29 subjects each where Group I subject received clonidine (2 μg/kg) and Group II nalbuphine (0.2 mg/kg) given intravenously 10 minutes before anesthesia induction using standard anesthesia technique. Both premedications were diluted using 10ml normal saline 10 minutes before anesthesia induction. The anesthesia technique used for laryngoscopy and direct intubation was standard. Anesthesia maintenance was done with oxygen, nitrous oxide, and isoflurane.

The hemodynamic parameters assessed were ECG changes in St segment and rhythm, peripheral oxygen saturation, systemic blood pressure, and heart rate. These changes were assessed at 1, 2, 3, 5, 10, and 15 minutes after intubation. Complications and side-effects were also assessed. Change in any hemodynamic parameter from 20% or more the baseline value was considered a significant change. Tachycardia and bradycardia were considered at the heart rate of more than 100 or less than 60 respectively. Following surgery, neostigmine i.v and glycopyrrolate were used for anesthesia reversal. Adequacy of reflexes was established with neuromuscular transmission and consciousness levels which were followed by extubation. Postoperatively, nausea and vomiting, respiratory depression, sedation, shivering, and hemodynamic changes were assessed as hemodynamic changes.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$.

RESULTS

The present prospective randomized clinical study was conducted to compare and assess the efficacy of nalbuphine premedication to intravenous clonidine on hemodynamic alterations during direct laryngoscopy and intubations. The study included 58 subjects from both genders within the age range of 18-60 years and the mean age of 38.46±6.72 years. The demographic characteristics of the study subjects are listed in Table 1. It was seen that the mean age of the study subjects from Group I and II respectively were 46.74±12.5 and 48.52±10.8 years. There were 58.62% (n=17) males and 41.37% (n=12) females in Group I, whereas, there were 62.06% (n=18) males and 37.93% (n=11) females in Group II. The mean weight was 59.15±7.7 and 60.21±5.5 kgs for Group I and Group II study subjects. There were 65.51% (n=19) subjects from ASA status I and 34.48% (n=10) subjects from ASA status II in group I, whereas, there were 68.96% (n=20) subjects from ASA I and 31.03% (n=9) subjects from ASA II in group II. All the parameters at baseline were comparable at baseline with respective p-values of 0.08, 0.85, 0.563, 0.46, and 0.71 for age, gender, weight, height, and ASA status (Table 1).

On assessing the study parameters in the two groups of the study subjects at baseline, it was seen that mean arterial pressure was 98.94±10.16 and 98.60±10.76 mmHg for Group I and II respectively, diastolic pressure

was 84.4±7.07 and 82.3±6.2 mmHg for Group I and II respectively, and mean systolic pressure was 128.85±4.38 and 127.5±3.17mmHg for Group I and II respectively. Mean heart rates were 85.4±6.06 and 89.95±7.4 beats/min for Group I and II respectively. All these parameters were statistically comparable with respective p-values of 0.942, 0.217, 0.236, and 0.08 for mean arterial pressure, diastolic B.P, systolic B.P, and heart rates as shown in Table 2.

The study variables assessed postoperatively showed that heart rate at 15 minutes was significantly higher in group II compared to Group I with values of 84.3±4.6 and 88.3±6.62 beats/min with p<0.0001. Heart rate was significantly higher for Group II following premedication, after anesthesia induction, and immediately the following intubation with p<0.0001. Mean arterial pressure was also statistically significantly higher following premedication, after anesthesia induction, and immediately the following intubation with p values respectively 0.03, 0.04, and 0.06. At 15 minutes respective mean arterial pressure for Groups, I and II were 86.1±16.67 and 99.4±12.49 beats/min with p<0.05 (Table 3).

Postoperatively systolic blood pressure was lesser in group I following premedication with p<0.05, which decreased in both groups following induction with more reduction in Group I p=0.04. Immediately following intubation marked increase was seen in both groups with more increase in Group II (p=0.03). Also, at 15 minutes, systolic blood pressure in Group II was significantly higher compared to Group I with p<0.05. Diastolic blood pressure was higher in Group II compared to Group I (p<0.05). Following induction reduction was seen in both groups followed by a marked increase immediately following intubation where for Group I, diastolic pressure was 89.1±8.3 mmHg and for Group II, it was 82.4±16.28 mmHg which was statistically significant with p<0.05. At 15 minutes, diastolic pressure was significantly higher in Group II (86.4±14.44) compared to Group I (82.1±11.49). This was statistically significant with p<0.05 (Table 4).

DISCUSSION

The present prospective randomized clinical study was conducted to compare and assess the efficacy of nalbuphine premedication to intravenous clonidine on hemodynamic alterations during direct laryngoscopy and intubations. The study included 58 subjects from both genders within the age range of 18-60 years and the mean age of 38.46±6.72 years. The study results showed that mean arterial pressure was 98.94±10.16 and 98.60±10.76 mmHg for Group I and II respectively, diastolic pressure was 84.4±7.07 and 82.3±6.2 mmHg for Group I and II respectively, and mean systolic pressure was 128.85±4.38 and 127.5±3.17mmHg for Group I and II respectively. Mean heart rates were 85.4±6.06 and 89.95±7.4 beats/min for Group I and II respectively. All these parameters were statistically comparable with respective p-values of 0.942, 0.217, 0.236, and 0.08 for mean arterial pressure, diastolic B.P, systolic B.P, and heart rates. These results were consistent with the results of Altan A et al in 2005 and Bhalerao Pm et al in 2017 where comparable study parameters at baseline were assessed by the authors in their studies.

The study variables assessed postoperatively showed that heart rate at 15 minutes was significantly higher in group II compared to Group I with values of 84.3±4.6 and 88.3±6.62 beats/min with p<0.0001. Heart rate was significantly higher for Group II following premedication, after anesthesia induction, and immediately the following intubation with p<0.0001. Mean arterial pressure was also statistically significantly higher following premedication, after anesthesia induction, and immediately the following intubation with p values respectively 0.03, 0.04, and 0.06. At 15 minutes respective mean arterial pressure for Groups, I and II were 86.1±16.67 and 99.4±12.49 beats/min with p<0.05. These results were in agreement with the studies by Priti M Chawda et al in 2010 and Jiwanwall M et al in 2017 where heart rate following nalbuphine was higher compared to clonidine premedication.

Postoperatively systolic blood pressure was lesser in group I following premedication with p<0.05, which decreased in both groups following induction with more reduction in Group I p=0.04. Immediately following intubation marked increase was seen in both groups with more increase in Group II (p=0.03). Also, at 15 minutes, systolic blood pressure in Group II was significantly higher compared to Group I with p<0.05. Diastolic blood pressure was higher in Group II compared to Group I (p<0.05). Following induction reduction was seen in both groups followed by a marked increase immediately following intubation where for Group I, diastolic pressure was 89.1±8.3 mmHg and for Group II, it was 82.4±16.28 mmHg which was statistically significant with p<0.05. At 15 minutes, diastolic pressure was significantly higher in Group II (86.4±14.44) compared to Group I (82.1±11.49). This was statistically significant with p<0.05. These results were similar to

the findings of Arora S et al in 2015 and Chaudhari MJ et al in 2015 where authors reported higher blood pressure using nalbuphine compared to clonidine as premedication.

Conclusion

Within its limitations, the present study concludes that premedication of 2 μg/kg intravenous clonidine effectively controlled hemodynamic alterations during intubation and direct laryngoscopy in comparison to subjects who received 0.2mg/kg intravenous nalbuphine given 10 minutes before anesthesia induction. However, the present study had a few limitations including a small sample size, short monitoring time, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

REFERENCES

1. Freye E, Levy JV. Reflex activity caused by laryngoscopy and intubation is obtunded differently by meptazinol, nalbuphine, and fentanyl. Eur J Anaesthesiol. 2007; 24:53-8.
2. Giovannitti JA, Thomas SM, Crawford JJ. Alpha-2 adrenergic receptors agonist: a review of current clinical applications. Anesth Prog. 2015;62:31-8.
3. Deepshikha C Tripathi, Komal S Shah, Santosh R Dubey, Shilpa M Doshi, Punit V Raval. Hemodynamic stress response during laparoscopic cholecystectomy: Effect of two different doses of intravenous clonidine premedication. J Anaesthesiol Clin Pharmacol. 2011;27:475–80.
4. Ray M, Bhattacharjee DP, Hajra B, Pal R. Effect of clonidine and magnesium sulphate on anaesthetic consumption, haemodynamics and postoperative recovery: A comparative study. Ind J Anaesth. 2010;54:137-41.
5. Altan A, Turgut N, Yildiz F, Turkmen A, Ustiin H. Effects of magnesium sulphate and clonidine on propofol consumption, haemodynamics and post-operative recovery. British Journal of Anaesthesia. 2005;93:438- 41.
6. Bhalerao PM, Thombre SK, Kapse US, Targe KV. Intravenous clonidine for suppression of haemodynamic response to the laparoscopy-a prospective randomized, placebo-controlled, single-center study. Int J Adv Med. 2017;4:788-92.
7. Priti M Chawda, Mayuresh K Pareek, Ketan D Mehta. Effect of Nalbuphine on Haemodynamic Response to Orotracheal Intubation. J Anaesth Clin Pharmacol. 2010;26:458-60.
8. Jiwanmall M, Joselyn AS, Kandasamy S. Intravenous clonidine as a part of balanced anesthesia for controlled hypotension in functional endoscopic sinus surgery: A randomized controlled trial. Indian J Anaesth. 2017;61:418–23.
9. Arora S, Kulkarni A, Bhargava AK. Attenuation of hemodynamic response to laryngoscopy and orotracheal intubation using intravenous clonidine. Journal of Anaesthesiol Clin Pharmacol. 2015;31:110-4.
10. Chaudhari M.J, Bhatia U, Patel N, Patel K. Efficacy of nalbuphine in preventing hemodynamic response to laryngoscopy and intubation in comparison to clonidine. NHL Journal of Medical Science. 2015;4:58-64.

S. No	Variables	Group I (n=29)	Group II (n=29)	p-value
1.	**Heart Rate (beats/min)**			
a)	Baseline	85.4±6.06	89.95±7.4	0.08
b)	Following premedication	80.61±5.65	86.3±6.30	<0.0001
c)	After induction	74.95±9.6	83.2±8.52	<0.0001
d)	Immediately following intubation	74.95±7.6	83.2±8.52	<0.0001
e)	At 15 mins	84.3±4.6	88.3c6.62	<0.0001
2.	**Mean arterial pressure (mmHg)**			
a)	Baseline	98.94±10.16	98.60±10.76	0.942
b)	Following premedication	94.63±13.13	98.2±10.67	0.03
c)	After induction	90.64±14.64	89.6±11.94	0.04
d)	Immediately following	102.15±15.04	106.4±14.34	0.06

	intubation			
e)	At 15 mins	86.1±16.67	99.4±12.49	<0.05

S. No	Characteristics	Group I (n=29)	Group II (n=29)	p-value
1.	**Age (years)**	46.74±12.5	48.52±10.8	0.08
2.	**Gender % (n)**			
a)	Males	58.62 (17)	62.06 (18)	0.85
b)	Females	41.37 (12)	37.93 (11)	
3.	**Weight (kg)**	59.15±7.7	60.21±5.5	0.563
4.	**Height (cm)**	154.69±4.6	153.81±5.2	0.46
5.	**ASA status % (n)**			
a)	I	65.51 (19)	68.96 (20)	0.71
b)	II	34.48 (10)	31.03 (9)	

Table 1: Demographic characteristics of the study subjects

S. No	Parameters	Group I (n=29)	Group II (n=29)	p-value
1.	**Mean arterial pressure (mmHg)**	98.94±10.16	98.60±10.76	0.942
2.	**Diastolic BP (mmHg)**	84.4±7.07	82.3±6.2	0.217
3.	**Systolic BP (mmHg)**	128.85±4.38	127.5±3.17	0.236
4.	**Heart rate (beats/min)**	85.4±6.06	89.95±7.4	0.08

Table 2: Baseline parameters in the two groups of the study subjects

S. No	Variables	Group I (n=29)	Group II (n=29)	p-value
3.	**Heart Rate (beats/min)**			
f)	Baseline	85.4±6.06	89.95±7.4	0.08
g)	Following premedication	80.61±5.65	86.3±6.30	<0.0001
h)	After induction	74.95±9.6	83.2±8.52	<0.0001
i)	Immediately following intubation	74.95±7.6	83.2±8.52	<0.0001
j)	At 15 mins	84.3±4.6	88.3±6.62	<0.0001
4.	**Mean arterial pressure (mmHg)**			
f)	Baseline	98.94±10.16	98.60±10.76	0.942
g)	Following premedication	94.63±13.13	98.2±10.67	0.03
h)	After induction	90.64±14.64	89.6±11.94	0.04
i)	Immediately following intubation	102.15±15.04	106.4±14.34	0.06
j)	At 15 mins	86.1±16.67	99.4±12.49	<0.05

Table 3: Mean arterial pressure and heart rate in the two groups of the study subjects

S. No	Variables	Group I (n=29)	Group II (n=29)	p-value
1.	**Systolic Blood Pressure (mmHg)**			
a)	Baseline	128.85±4.38	127.5±3.17	0.236
b)	Following premedication	122.01±8.0	128.65±7.0	<0.05
c)	After induction	116.4±4.34	118.4±4.84	0.04
d)	Immediately following intubation	136.6±5.8	137.4±7.66	0.03
e)	At 15 mins	118.41±3.4	127.32±3.18	<0.05
2.	**Diastolic blood pressure (mmHg)**			
a)	Baseline	84.4±7.07	82.3±6.2	0.217

b)	Following premedication	80.7±12.47	82.7±13.46	<0.05
c)	After induction	76.7±13.34	82.4±16.28	<0.05
d)	Immediately following intubation	89.1±8.3	94.2±12.12	<0.05
e)	At 15 mins	82.1±11.49	86.4±14.44	<0.05

Table 4: Systolic and Diastolic blood pressure in the two groups of the study subjects