Research Article

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

ANALYSING THE POTENCY OF NALBUPHINE PREMEDICATION AND INTRAVENOUS CLONIDINE AFFECT HEMODYNAMIC CHANGES DURING DIRECT LARYNGOSCOPY AND INTUBATION

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How To Cite: Kumar S. Analysing The Potency Of Nalbuphine Premedication And Intravenous Clonidine Affect Hemodynamic Changes During Direct Laryngoscopy And Intubation. International Research Journal Of Pharmacy. 2022; 13:9:12-16.

Doi: 0.7897/2230-8407.1303186

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ABSTRACT

Background: Appropriate premedication can regulate abnormal changes in hemodynamic parameters during direct laryngoscopy.

Aim: During direct laryngoscopy and intubations, the effectiveness of nalbuphine premedication versus intravenous clonidine on hemodynamic changes was compared and evaluated in this study.

Methods: 58 research participants undergoing direct laryngoscopy were split into two groups at random, consisting of 29 individuals each. Group I received clonidine (2 μg/kg) and Group II received nalbuphine (0.2 mg/kg) intravenously, with anaesthetic induction carried out using a normal anesthesia procedure 10 minutes prior. Changes in ECG, blood pressure, and heart rates were measured at baseline, immediately after laryngoscopy and intubation, and one, two, three, five, ten, and fifteen minutes later. Additionally evaluated were adverse effects and complications.

Result: After premedication, there was a statistically significant drop in blood pressure and heart rate in Groups I and II. However, after intubation, subjects in both groups experienced an immediate increase in mean blood pressure and heart rate, which persisted for 5-7 minutes in the case of clonidine recipients and for 10 minutes in the case of nalbuphine recipients. There was a statistically significant difference. The current investigation reveals that, compared to participants who received 0.2 mg/kg intravenous nalbuphine administered 10 minutes before to anaesthesia induction, premedication with 2 μg/kg intravenous clonidine effectively reduced hemodynamic abnormalities during intubation and direct laryngoscopy.

Keywords: premedication, clonidine, direct laryngoscopy, induction, and intubation.

INTRODUCTION

Commonly used techniques to avoid airway aspiration and enable continuous ventilation while under general anaesthesia include intubation and direct laryngoscopy. Nevertheless, the therapeutic benefits of these procedures are linked to negative consequences because of elevated plasma catecholamine concentrations that might cause tachyarrhythmia and hypertension.1. Hemodynamic parameter changes raise the risk of myocardial ischemia, which can be fatal in patients with a history of cardiovascular illness. Premedication, quick intubation, and a smooth induction, however, can reduce the likelihood of significant changes in hemodynamic parameters.2.

The optimal procedure and anaesthetic drug should minimize hemodynamic changes, be easily administered, safe, suitable for all age groups, prevent consciousness, permit sufficient cerebral perfusion, and act quickly. One anaesthetic medication that inhibits norepinephrine release by decreasing sympathetic nervous system outflow to peripheral tissues from the central nervous system is clonidine, which is partially an α2 adrenergic agonist. The anaesthetic dose required for clonidine's sedative, analgesic, and antihypertensive effects is decreased.3.

Nalbuphine, a semi-synthetic agonist-antagonist opioid analgesic that is both an agonist at kappa (κ) and an antagonist at mu (μ) receptors, is another anaesthetic drug. Long-lasting anaesthetic, stability of hemodynamic parameters, and a reduced reaction to hemodynamic fluctuations are all provided by nalbuphine. Because of its ceiling effect, which prevents respiratory depression even in overdose situations, nalbuphine is regarded as the perfect anaesthetic agent.4

In order to evaluate and compare the effectiveness of intravenous clonidine versus nalbuphine premedication on hemodynamic changes during direct laryngoscopy and intubations, a prospective clinical trial was carried out.

MATERIALS AND METHODS

In order to evaluate and compare the effectiveness of intravenous clonidine versus nalbuphine premedication on hemodynamic changes during direct laryngoscopy and intubations, a prospective randomized clinical research was carried out. The individuals undergoing direct laryngoscopy and intubation at the institute made up the study population. The research had 58 participants of both sexes, with an average age of 38.46±6.72 years, and a range of ages between 18 and 60.

Subjects undergoing direct laryngoscopy and intubation, ASA status I and II, and study participation willingness were the inclusion criteria for this research. Subjects with allergies, obesity, endocrine problems, neurologic disorders, renal/hepatic illness, uncontrolled diabetes, uncontrolled hypertension, and cardiopulmonary diseases were among the exclusion criteria for the study.

The 58 participants that were included were split into two groups of 29 subjects each at random. Group I received clonidine (2 μg/kg) and Group II received nalbuphine (0.2 mg/kg) intravenously, 10 minutes prior to the normal anaesthetic induction procedure. Ten minutes prior to inducing anesthesia, 10 milliliters of regular saline were used to dilute both premedications. Standard anaesthetic techniques were employed for both direct intubation and laryngoscopy. Isoflurane, nitrous oxide, and oxygen were used to maintain anaesthesia.

Peripheral oxygen saturation, systemic blood pressure, heart rate, and ECG alterations in St segment and rhythm were the hemodynamic parameters evaluated. After intubation, these changes were evaluated 1, 2, 3, 5, 10, and 15 minutes later. Side effects and complications were evaluated as well. Any hemodynamic parameter change that deviated from the baseline value by 20% or more was deemed significant. Bradycardia and tachycardia were defined as heart rates more than or equal to 100 and 60, respectively. Neostigmine IV and glycopyrrolate were administered to reverse anaesthesia after surgery. Extubation was performed once adequate reflexes, neuromuscular transmission, and awareness levels had been determined. Hemodynamic alterations were evaluated after surgery, along with nausea and vomiting, respiratory depression, drowsiness, shivering, and other symptoms. Using SPSS software version 21 (Chicago, IL, USA) for statistical assessment and one-way ANOVA and t-test for result formulation, the gathered data were examined. The data were presented as a mean, standard deviation, percentage, and number. At $p<0.05$, the significance threshold was maintained.

RESULTS

In order to evaluate and compare the effectiveness of intravenous clonidine versus nalbuphine premedication on hemodynamic changes during direct laryngoscopy and intubations, a prospective randomized clinical research was carried out. The research had 58 participants of both sexes, with an average age of 38.46±6.72 years, and a range of ages between 18 and 60. Table 1 contains a list of the study individuals' demographic details. The study participants from Group I and II had mean ages of 46.74±12.5 and 48.52±10.8, respectively. Group I consisted of 58.62% (n=17) men and 41.37% (n=12) females, while Group II had 62.06% (n=18) males and 37.93% (n=11) females. For study subjects in Group I and Group II, the mean weight was 60.21±5.5 kg and 59.15±7.7 kg, respectively.

In group I, there were 68.96% (n=20) subjects from ASA status I and 31.03% (n=9) subjects from ASA II; in group II, there were 65.51% (n=19) individuals from ASA status I and 34.48% (n=10) subjects from ASA level II. With corresponding p-values of 0.08, 0.85, 0.563, 0.46, and 0.71 for age, gender, weight, height, and ASA status, all the characteristics were comparable at baseline (Table 1).

Upon evaluating the study parameters in the two study subject groups at baseline, it was observed that the mean arterial pressure for Groups I and II was 98.94±10.16 and 98.60±10.76 mmHg, respectively; the mean diastolic pressure was 84.4±7.07 and 82.3±6.2 mmHg, and the mean systolic pressure was 128.85±4.38 and 127.5±3.17

mmHg, respectively. Group I and II had mean heart rates of 85.4±6.06 and 89.95±7.4 beats/min, respectively. Table 2 indicates that all of these indicators were statistically equivalent, with corresponding p-values of 0.942, 0.217, 0.236, and 0.08 for heart rates, diastolic and systolic blood pressure, and mean arterial pressure, respectively.

After the procedure, the study variables were evaluated, and the results showed that group II's heart rate at 15 minutes was substantially higher than group I's, with values of 84.3±4.6 and 88.3±6.62 beats/min, respectively, and $p<0.0001$. After premedication, anaesthetic induction, and right after intubation, Group II's heart rate was substantially greater ($p<0.0001$). Additionally, after premedication, after induction of anaesthesia, and right after intubation, mean arterial pressure was statistically substantially higher (p values of 0.03, 0.04, and 0.06, respectively). Groups I and II had respective mean arterial pressures of 86.1±16.67 and 99.4±12.49 beats/min at 15 minutes, with $p<0.05$ (Table 3).

After premedication group I had a lower postoperative systolic blood pressure ($p<0.05$). Both groups experienced a decrease in blood pressure following induction, with Group I seeing a greater reduction ($p=0.04$). Both groups showed a noticeable increase right after intubation, with Group II showing a larger increase ($p=0.03$). Furthermore, at 15 minutes, Group II's systolic blood pressure was $p<0.05$ greater than Group I's. Group II had a greater diastolic blood pressure than 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). Both groups saw a reduction after induction, which was followed by a noticeable increase just after intubation. Group I's diastolic pressure was 89.1±8.3 mmHg, while Group II's was 82.4±16.28 mmHg, both of which were statistically significant with $p<0.05$. Group II had a substantially higher diastolic pressure (86.4±14.44) at 15 minutes than Group I (82.1±11.49). With $p<0.05$, this was statistically significant (Table 4).

DISCUSSION

In order to evaluate and compare the effectiveness of intravenous clonidine versus nalbuphine premedication on hemodynamic changes during direct laryngoscopy and intubations, a prospective randomized clinical research was carried out. The research had 58 participants of both sexes, with an average age of 38.46±6.72 years, and a range of ages between 18 and 60. The study's findings revealed that the mean arterial pressure for Groups I and II was 98.94±10.16 and 98.60±10.76 mmHg, respectively; the mean diastolic pressure was 84.4±7.07 and 82.3±6.2 mmHg, respectively; and the mean systolic pressure was 128.85±4.38 and 127.5±3.17 mmHg, respectively. Group I and II had mean heart rates of 85.4±6.06 and 89.95±7.4 beats/min, respectively.

With corresponding p-values of 0.942, 0.217, 0.236, and 0.08 for mean arterial pressure, diastolic blood pressure, systolic blood pressure, and heart rates, each of these indicators was statistically equivalent. These findings aligned with those of Altan A et al. (2005) and Bhalerao Pm et al. (2017), whose authors evaluated similar study parameters at baseline in their investigations.

After the procedure, the study variables were evaluated, and the results showed that group II's heart rate at 15 minutes was substantially higher than group I's, with values of 84.3±4.6 and 88.3±6.62 beats/min, respectively, and $p<0.0001$. After premedication, anaesthetic induction, and right after intubation, Group II's heart rate was substantially greater ($p<0.0001$).

Additionally, after premedication, after induction of anesthesia, and right after intubation, mean arterial pressure was statistically substantially higher (p values of 0.03, 0.04, and 0.06, respectively). Groups I and II had respective mean arterial pressures of 86.1±16.67 and 99.4±12.49 beats/min at 15 minutes, with $p<0.05$. These findings were consistent with studies conducted in 2010 by Priti M. Chawda et al. and in 2017 by Jiwanwall M. et al., which found that the heart rate after nalbuphine was higher than the heart rate after clonidine premedication.

Following premedication, group I had a lower postoperative systolic blood pressure ($p<0.05$). Following induction, both groups experienced a decrease in blood pressure, with Group I seeing a greater reduction ($p=0.04$). Both groups showed a significant increase right after intubation, with Group II showing a greater increase ($p=0.03$).

Additionally, at 15 minutes, Group II's systolic blood pressure was $p<0.05$ substantially higher than Group I's. Group II had a greater diastolic blood pressure than Group I ($p<0.05$). Both groups saw a reduction after induction, which was followed by a noticeable increase just after intubation. Group I's diastolic pressure was 89.1±8.3 mmHg, while Group II's was 82.4±16.28 mmHg, both of which were statistically significant with $p<0.05$.

Group II had a substantially higher diastolic pressure (86.4±14.44) at 15 minutes than Group I (82.1±11.49). With $p<0.05$, this was statistically significant. These outcomes were in line with those of Arora S. et al. (2015) and Chaudhari MJ et al. (2015), who found that premedication with nalbuphine was associated with greater blood pressure than with clonidine.

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.

TABLES

Characteristics	Group I (n=29)	Group II (n=29)	p-value
Age (years)	46.74±12.5	48.52±10.8	0.08
Gender % (n)			
Males	58.62 (17)	62.06 (18)	0.85
Females	41.37 (12)	37.93 (11)	
Weight (kg)	59.15±7.7	60.21±5.5	0.563
Height (cm)	154.69±4.6	153.81±5.2	0.46
ASA status % (n)			
I	65.51 (19)	68.96 (20)	0.71
II	34.48 (10)	31.03 (9)	

Table 1: Demographic characteristics of the study subjects

Parameters	Group I (n=29)	Group II (n=29)	p-value
Mean arterial pressure (mmHg)	98.94±10.16	98.60±10.76	0.942
Diastolic BP (mmHg)	84.4±7.07	82.3±6.2	0.217
Systolic BP (mmHg)	128.85±4.38	127.5±3.17	0.236
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

Variables	Group I (n=29)	Group II (n=29)	p-value
Heart Rate (beats/min)			
Baseline	85.4±6.06	89.95±7.4	0.08
Following premedication	80.61±5.65	86.3±6.30	<0.0001
After induction	74.95±9.6	83.2±8.52	<0.0001
Immediately following intubation	74.95±7.6	83.2±8.52	<0.0001
At 15 mins	84.3±4.6	88.3±6.62	<0.0001
Mean arterial pressure (mmHg)			
Baseline	98.94±10.16	98.60±10.76	0.942
Following premedication	94.63±13.13	98.2±10.67	0.03
After induction	90.64±14.64	89.6±11.94	0.04
Immediately following intubation	102.15±15.04	106.4±14.34	0.06
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

Variables	Group I (n=29)	Group II (n=29)	p-value
Systolic Blood Pressure (mmHg)			
Baseline	128.85±4.38	127.5±3.17	0.236
Following premedication	122.01±8.0	128.65±7.0	<0.05
After induction	116.4±4.34	118.4±4.84	0.04
Immediately following intubation	136.6±5.8	137.4±7.66	0.03
At 15 mins	118.41±3.4	127.32±3.18	<0.05
Diastolic blood pressure (mmHg)			
Baseline	84.4±7.07	82.3±6.2	0.217
Following premedication	80.7±12.47	82.7±13.46	<0.05
After induction	76.7±13.34	82.4±16.28	<0.05
Immediately following intubation	89.1±8.3	94.2±12.12	<0.05
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