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ATTENUATION OF PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION: COMPARITIVE STUDY BETWEEN NITROGLYCERIN SPRAY AND LIDOCAINE SPRAY

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ABSTRACT **AIM:** Laryngoscopy and tracheal intubation provoke transient but marked sympathetic response. We conducted this study to compare the effect of NTG SPRAY AND LIDOCAINE SPRAY before laryngoscopy and endotracheal intubation, on hemodynamic responses in normotensive patient.

MATERIALS AND METHODS: In a prospective randomized controlled trial, 100 adult patients of ASA I, II, 18-60 year posted for elective general surgery under general anesthesia with intubation were randomly allocated to two groups as Group A – receiving 1 NITROGLYCERIN spray (0.4mg/spray)and Group B – receiving LIDOCAINE spray(10mg/spray) one minute before intubation. SBP, DBP,MAP, heart rate were recorded at baseline, just before intubation ,immediately after intubation, and every minute for 10 mins .

RESULTS: The rise in SBP was significantly higher in Lidocaine group from the time of Laryngoscopy till 4 mins ($p<0.05$).There is significant attenuation in DBP caused by NTG spray in the immediate post intubation period ($p<0.05$) .There is significant increase in MAP in Lidocaine group in the immediate post intubation period ($p<0.05$).

CONCLUSIONS: Lignocaine as compared to nitroglycerine is more effective in attenuating the HR and BP changes to laryngoscopy & intubation.

KEYWORDS : Hemodynamic responses, nitro-glycerin spray , lignocaine spray

INTRODUCTION

Laryngoscopy and tracheal intubation are noxious stimuli that provoke transient but marked sympathetic response manifesting as hypertension, tachycardia, arrythmia, myocardial ischemia. Although these cardiovascular manifestations during anaesthesia are recognized, there is little documented evidence on the mechanism of their production.

Typically blood presure begins to increase after 15 seconds of laryngoscopy and become maximum after 30 seconds of direct laryngoscopy. These circulatory responses are exaggerated in hypertensive patients (Prys – Roberts 1971).

Many methods have been suggested to attenuate these responses e.g. premedicating the patient with drugs that tend to block the response to laryngoscopy and intubation with antihypertensive drugs, increasing concentration of volatile anaesthetic agents during mask ventilation before intubation.Numbers of drugs have been used in an attempt to attenuate these undesirable hemodynamic responses.

The drugs used were directed towards blocking the reflex are which includes - topical and systemic local anesthetic, narcotic analgesics like fentanyl, remifentanyl, vasodilators like nitroglycerine, sodium nitroprusside, isosorbide dinitrate, alpha blockers, beta blockers like esmolol, metoprolol, centrally acting drugs like Clonidine, calcium channel blockers like verapamil, nifedipine sublingually a few minutes before induction, diltiazem, ACE inhibitors like enalapril orally, captopril sublingually prior to laryngoscopy or induction with propofol. Currently, no single drug has been able to completely inhibit the stress response to laryngoscopy and intubation. However, combination drug therapy may be able to better blunt this response.

The present study is undertaken with an objective to study and compare the effect of NTG SPRAY AND LIDOCAINE SPRAY before laryngoscopy and endotracheal intubation, on hemodynamic responses (heart rate, systolic, diastolic and mean arterial blood pressure) in normotensive patient.

MATERIALS AND METHOD

After institutional ethical committee approval, a prospective randomized controlled study was conducted 100 ASA physical status I and II patients of both sexes, aged 18-60 years scheduled for elective general surgery under general anesthesia. All the patients under study were subjected to a detailed preanesthetic evaluation to rule out any anatomical or systemic disorders. After taking informed consent from each patient, history of past prolonged illness and drug therapy was elicited. Routine and relevant special investigations were carried out. Exclusion criteria were patients with known allergy to anesthetic or any other drug, atrio-ventricular conduction block, congestive heart failure, cardiac arrhythmias, hypertension or other cardiovascular disease and receiving anti hypertensives, sympathomimetics, vagomimetics, antidepressant drugs and phosphodiesterase inhibitors, anticipated difficulty in intubation, severe obesity (body mass index >35 kg/m^2).

The patients were randomized into two groups of 50 each, using random number table. The patients were distributed into two groups by age group matching to eliminate the effect of age. Treatment was randomly allocated to the patients. The patients belonging to Group A received 1 puff of 0.4mg/spray of Nitroglycerin Spray Sub-lingually while the patients belonging to Group B received 1 puff of 10% Lidocaine Spray in the oropharynx.

STATISTICAL ANALYSIS

Data were entered and analyzed using MS Excel and Epi Info 6 system. Qualitative or categorical data were presented as number (proportion) and compared using Chi-square test. Quantitative or continuous variables were presented as mean ± standard deviation and compared using Student's *t*-test and analysis of variance. $P < 0.05$ was considered as statistically significant.

RESULTS

The present study was conducted in 100 patients belonging to ASA physical status class I and II scheduled for elective surgeries at B.J. Medical College & Civil Hospital , Ahmedabad.

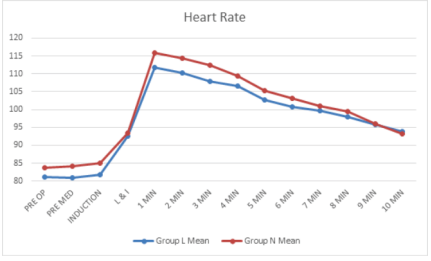
The patients were randomly divided into two groups of 50 patients each.

GROUP	DRUG	DOSE
N	Nitroglycerin	0.4 mg/spray
L	Lidocaine	10 mg/spray

Comparison of Mean change in Heart Rate (from the baseline value) in TWO groups

HEART RATE	Group L		Group N		P Value
	Mean	SD	Mean	SD	
PRE OP	80.2	9.54	83.76	10.19	0.1726
PRE MED	80.92	9.68	84.08	9.47	0.1021
INDUCTION	81.84	9.08	84.90	9.60	0.1408
LARYNGOSCOPY AND INTUBATION	91.52	10.16	93.32	11.40	0.7119
1 MIN	111.70	10.01	115.82	11.03	0.0169
2 MIN	110.26	9.05	114.40	9.87	0.0312
3 MIN	108.86	9.22	112.5	9.34	0.0141
4 MIN	106.58	9.16	109.42	9.19	0.1249
5 MIN	102.72	8.96	107.20	9.21	0.1755
6 MIN	100.80	8.47	105.22	9.18	0.1738
7 MIN	99.66	8.48	103.06	9.15	0.4294
8 MIN	97.90	8.14	100.38	9.36	0.7850
9 MIN	95.72	8.14	96.06	8.78	0.8413
10 MIN	93.82	7.51	93.12	8.40	0.6614

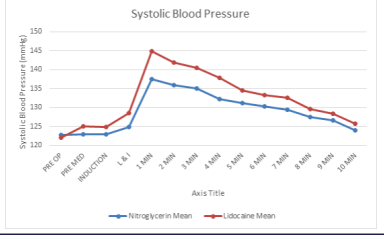
The preinduction values of Heart rate were comparable between two groups with no significant difference. The rise in HR is highly significant in Nitroglycerin group in the first 3 mins after intubation compared to Lidocaine group($p<0.05$).. The Heart Rate however does not return to baseline even 10 mins after intubation.



Comparison of SBP (Systolic Blood Pressure) at various intervals in patients of TWO Groups

Systolic BP	Nitroglycerin		Lidocaine		P Value
	Mean	SD	Mean	SD	
PRE OP	122.72	10.35	122.04	10.10	0.7402
PRE MED	122.90	9.74	125.04	10.31	0.2864
INDUCTION	122.92	9.58	124.86	10.10	0.3257
LARYNGOSCOPY AND INTUBATION	124.82	10.59	128.56	9.85	<0.0001
1 MIN	137.60	10.65	144.96	8.82	<0.0001
2 MIN	136.00	10.25	141.90	7.81	0.0016
3 MIN	135.00	10.30	140.56	7.58	0.0027
4 MIN	132.30	9.90	137.80	7.74	0.0026
5 MIN	131.28	10.75	134.60	7.92	0.0818
6 MIN	130.27	10.45	133.28	7.84	0.1065
7 MIN	129.46	9.97	132.58	7.42	0.0780
8 MIN	127.57	9.72	129.70	7.04	0.2125
9 MIN	126.61	9.83	128.48	7.20	0.2805
10 MIN	124.08	9.37	125.70	7.14	0.3332

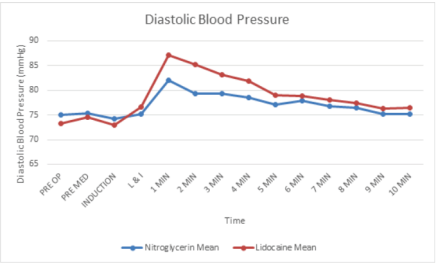
The preinduction values of SBP were comparable between two groups with no significant difference($p>0.05$). The rise in SBP was significantly higher in Lidocaine group from the time of Laryngoscopy till 4 mins after that($p<0.05$). 5 mins after intubation there is no significant difference in SBP between the two groups. The return to baseline values of SBP in both the groups was achieved aound 10 minutes after Intubation.



Comparison of DBP (Diastolic Blood Pressure) at various intervals in patients in TWO Groups

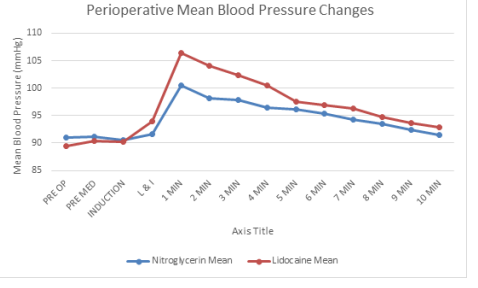
Diastolic BP	Nitroglycerin		Lidocaine		P Value
	Mean	SD	Mean	SD	
PRE OP	75.08	6.71	73.20	6.03	0.1430
PRE MED	75.38	6.63	74.48	5.55	0.1196
INDUCTION	74.30	6.29	73.02	5.42	0.2784
LARYNGOSCOPY AND INTUBATION	75.12	5.92	76.64	5.18	0.1050
1 MIN	82.02	6.19	87.08	5.05	<0.0001
2 MIN	79.30	6.07	85.20	4.76	<0.0001
3 MIN	79.26	6.24	83.16	4.69	0.0005
4 MIN	78.48	5.93	81.80	4.68	0.0025
5 MIN	77.08	5.31	79.04	4.94	0.0184
6 MIN	77.92	4.72	78.78	5.09	0.3832
7 MIN	76.78	4.44	78.04	4.96	0.1839
8 MIN	76.42	4.45	77.34	4.57	0.3103
9 MIN	75.22	4.48	76.30	4.20	0.2166
10 MIN	75.14	4.77	76.48	4.27	0.1421

The preinduction values of DBP were comparable between two groups with no significant difference. DBP increased in both Nitroglycerin and Lidocaine groups after laryngoscopy and intubation but the rate of rise of DBP was significant in Lidocaine group ($p<0.05$) from intubation to 5 mins after that. The return to baseline values for Nitroglycerin group was achieved around 8 mins after intubation and but was not seen even after 10 mins for Lidocaine group.



Comparison of Mean ± S.D. of MAP (Mean Arterial Pressure) at various intervals in patients in TWO Groups

MBP	Nitroglycerin		Lidocaine		P Value
	Mean	SD	Mean	SD	
PRE OP	90.96	7.35	89.48	6.82	0.2992
PRE MED	91.22	7.19	90.33	6.45	0.5162
INDUCTION	90.5	6.84	90.3	6.22	0.8787
LARYNGOSCOPY AND INTUBATION	91.68	6.44	93.94	5.72	0.2784
1 MIN	100.54	6.36	106.37	5.30	<0.0001
2 MIN	98.2	6.20	104.1	4.67	<0.0001
3 MIN	97.84	6.22	102.29	4.53	0.0001
4 MIN	96.42	5.84	100.46	4.51	0.0002
5 MIN	96.14	5.56	97.56	4.64	0.1687
6 MIN	95.37	5.21	96.94	4.59	0.1131
7 MIN	94.34	5.08	96.22	4.53	0.0537
8 MIN	93.47	4.75	94.79	4.77	0.1687
9 MIN	92.35	4.86	93.69	3.78	0.1270
10 MIN	91.45	4.78	92.88	3.96	0.1065



CONCLUSIONS

The mean baseline variables (heart rate, systolic blood pressure mean blood pressure and diastolic blood pressure) were similar in both the groups so desired study and control population was achieved with

appropriate randomization.After giving premedication and at the time of induction systolic blood pressure , diastolic blood pressure, heart rate and mean blood pressure were comparable. There was a significant increase in the heart rate in NTG group in the immediate post intubation period that is because of its direct action of reflex tachycardia caused by peripheral vasodilatation. Lignocaine Spray as compared to nitroglycerine Spray is thus more effective in attenuating the Heart Rate. As compared to Lignocaine Spray, nitroglycerine Spray significantly attenuates the blood pressure changes to laryngoscopy & intubation.

REFERENCES

1. Elkayam, Uri and Wilbert S Aronow: Glyceryl trinitrate (Nitroglycerine) ointment and isosorbide dinitrate: review of their pharmacological properties and therapeutic use. Drugs 1982; 23: 165.
2. Fassoulaki A, Kaniaris P. Intranasal administration of nitroglycerine attenuates the pressor response to laryngoscopy and intubation of the trachea. Br J Anaesth. 1983 Jan;55(1):49-52.
3. Hamaya Y, Dohi S. Differences in cardiovascular response to airway stimulation at different sites and blockade of the responses by lidocaine. Anesthesiology. 2000 Jul;93(1):95-103.
4. Hwang JJ, Ko YP, Jen RK, Hsu YW, Cheng CR, Wei TT, Yeh CY. The use of intranasal nitroglycerin to prevent pressor responses during intubation in general anesthesia--a comparison of various doses. Acta Anaesthesiol Sin. 1995 Dec;33(4):205-10.
5. Indira Kumari, Udita Naithani, Vinod Kumar Dadheech, D. S. Pradeep, Khemraj Meena, and Devendra Verma. Attenuation of pressor response following intubation: Efficacy of nitroglycerine lingual spray. J Anaesthesiol Clin Pharmacol. 2016 Jan-Mar; 32(1): 69–73.
6. Kautto UM, Heinonen J. Attenuation of circulatory response to laryngoscopy and tracheal intubation: a comparison of two methods of topical anaesthesia. Acta Anaesthesiol Scand. 1982 Dec;26(6):599-602. Download PDF
7. King BD, Harris LC, Greifenstein FE, Elder JD and Dripps RD: Reflex circulatory responses to direct laryngoscopy and tracheal intubation performed during general anesthesia. Anesthesiology 1951; 12:556-66.
8. Martin DE, Rosenberg H, Aukburg SJ, Bartkowski RR, Edwards MW Jr, Greenhow DE, Klineberg PL. Low-dose fentanyl blunts circulatory responses to tracheal intubation. Anesth Analg. 1982 Aug;61(8):680-4.
9. Mikawa K , Hasegawa M , Suzuki T , Maekawa N , Kaetsu H , Goto R , Yaku H , Obara H Attenuation of hypertensive response to tracheal intubation with nitroglycerin. Journal of Clinical Anesthesia [1992, 4(5):367-371]
10. Minogue SC, Ralph J, Lampa MJ. Laryngotracheal topicalization with lidocaine before intubation decreases the incidence of coughing on emergence from general anesthesia. Anesth Analg. 2004 Oct;99(4):1253-7,
11. Mostafa SM. Comparison of effect of topical lignocaine on the pressor response to DL & intubation. Anaesthesiology 1999;16:7-10.
12. Paul G. Barash, Bruce F. Cullen, Robert K. Stoelting, Michael K. Cahalan, M. Christine stock: Clinical Anesthesia. Edition 6, 2010:444-527.
13. Reid LC and Brace DE: Irritation of the respiratory tract and its reflex effect upon the heart. Surg Gynaec & obst 1940;70: 157-62.
14. Robert K. Stoelting. Blood Pressure and Heart Rate Changes During Short-Duration Laryngoscopy for Tracheal Intubation: Influence of Viscous or Intravenous Lidocaine. Anaesthesiology, 1977;47:381.