

A comparative study of dexmedetomidine versus lignocaine used for laryngoscopy and endotracheal intubation with respect to blood pressure changes at tertiary health care centre

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Abstract

Background: Laryngoscopy and endotracheal intubation increase the plasma concentration of catecholamines due to sympathetic stimulation which can result in tachycardia and hypertension in most of the individuals **Aims and Objectives** : to study of Dexmedetomidine versus lignocaine used for laryngoscopy and endotracheal intubation with respect to Blood pressure changes at tertiary health care centre. **Methodology:** This was prospective randomized single blind control study carried out in the department of Anesthesia of MIMSR medical college, Latur during the two year period i.e. September 2013 to September 2015 in 80 patients. The patients were divided into Group L- patients receiving i.v. 2 % 1.5 ml/kg lignocaine (preservative free) 3 minute before laryngoscopy. Group D- Patients receiving i.v. dexmedetomidine (0.6mcg/kg) 10 minutes before laryngoscopy. The statistical analysis was done by unpaired t-test and calculated by SPSS 19 version. **Result:** In our study we have seen that Baseline parameters like Systolic Blood pressure, Diastolic Blood pressure, Mean Arterial Pressure were comparable to each other (t=0.15,0.88,NS),(t=0.76,0.76,NS), (t=0.96,0.96,NS) respectively. Systolic Blood pressure was at Baseline (15 min before induction) (t=0.15,0.88,NS); Immediately after induction (t=0.85, 0.4, NS); During intubation (0 minute)(t=4.43,p<0.001,S); 1 minute post intubation (t=2.92, p<0.004,S); 2 minute post intubation (t=2.41p<0.02,S); 3 minute post intubation (t=2.39,p<0.02,S), 4 minute post intubation(t=1.41,0.16,NS);5 minute post intubation(t=0.38,p<0.7,NS); 10 minute post intubation (t=0.73,p<0.47,NS)Diastolic Blood pressure was at Baseline (15 min before induction) (t=0.3,p>0.76,NS); Immediately after induction (t=6.21,p<0.001,S); During intubation (0 minute)(t=8.31,p<0.001,S);1 minute post intubation (t=9.97,p<0.001,S); 2 minute post intubation (t=8.86,p<0.001,S); 3 minute post intubation (t=7.32,p<0.001,S). **Conclusion:** It can be concluded from our study that intravenous Dexmedetomidine is more effective in attenuating in blood pressure (Systolic, Diastolic, MAP) response to intubation than lignocaine.

Key Word: Dexmedetomidine, lignocaine, endotracheal intubation

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Received Date: 04/01/2019 Revised Date: 21/02/2019 Accepted Date: 10/03/2019

DOI: <https://doi.org/10.26611/10151022>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:

02 May 2019

INTRODUCTION

Laryngoscopy and endotracheal intubation increase the plasma concentration of catecholamines due to sympathetic stimulation which can result in tachycardia and hypertension in most of the individuals^{1,2}. The longer the duration and greater the force of laryngoscopy, severe is going to be the haemodynamic stress response. The elevation in arterial pressure generally starts before five seconds of laryngoscopy, peaks in 1–2 min and returns to normal levels inside 5 min³. This may not bring on any unfriendly consequences for normal people but rather could be dangerous in patients with cerebrovascular

How to cite this article: Patil Bhagwan Marotirao, Jadhav P K. A comparative study of dexmedetomidine versus lignocaine used for laryngoscopy and endotracheal intubation with respect to blood pressure changes at tertiary health care centre. *MedPulse International Journal of Anesthesiology*. May 2019; 10(2): 74-77. <http://medpulse.in/Anesthesiology/index.php>

diseases, hypertension or myocardial insufficiency⁴. The laryngoscopic response in these patients can increase myocardial oxygen demand and may lead to complications in susceptible individuals^{5,6}. In spite of the availability of numerous drugs to blunt the haemodynamic response, the search for an ideal drug with minimal adverse effect continues. Several strategies have been tried to obtund stress response following laryngoscopy and endotracheal Intubation like local anaesthetics, intravenous opioids, β blockers, α_2 adrenergic agonists, vasodilators, magnesium or by increasing volatile anaesthetic concentrations⁷. No single agent has been established as the most appropriate for this purpose. The disadvantages of these drugs vary from inadequate control of haemodynamics to various adverse effects like severe hypotension, bradycardia, arrhythmias, chest wall rigidity and delayed recovery. So, we have studied Dexmedetomidine versus lignocaine used for laryngoscopy and endotracheal intubation with respect to Blood pressure changes at tertiary health care centre

METHODOLOGY

This was prospective randomized single blind control study carried out in the department of Anesthesia of MIMSR medical college, Latur during the two year period

i.e. September 2013 to September 2015 in 80 patients. American society of Anesthesiologist Classification grade II patients, Age (18 to 65) patients posted for elective non cardiac surgery under general anesthesia were included into the study while patients uncontrolled hypertension, cardiac disease, heart block, allergy to Dexmedetomidine and lignocaine, any emergency cases were excluded from the study. By informed and written consent, pre-anesthetic evaluation including routine investigation, premedication agents were given. Induction agent given were Thiopentone sodium, Muscle relaxant such as Succinylcholine, Vecuronium were given. Maintenance agent, reversal agent –neostigmine, monitoring etc. was with standard protocols. The patients were divided into **Group L-** patients receiving i.v. 2 % 1.5 ml/kg lignocaine (preservative free) 3 minute before laryngoscopy **Group D-** Patients receiving i.v. dexmedetomidine (0.6mcg/kg) 10 minutes before laryngoscopy. The blood pressure was monitored at Baseline (15 min before induction), Immediately after induction, During intubation (0 minute), 1 minute post intubation, 2 minute post intubation, 3 minute post intubation, 4 minute post intubation, 5 minute post intubation, 10 minute post intubation. The statistical analysis was done by unpaired t-test and calculated by SPSS 19 version.

RESULTS

Table 1: Distribution of the patients as per the Baseline parameters

Parameters	Dexmedetomidine group (mean \pm SD)	Lignocaine group (mean \pm SD)	t-value	p-value
Systolic Blood pressure (mm of Hg)	123.4 \pm 6.82	123.15 \pm 8.51	0.15	0.88,NS
Diastolic Blood pressure (mm of Hg)	75.28 \pm 4.78	75.55 \pm 4.78	0.76	0.76,NS
Mean Arterial Pressure (mm of Hg)	91.33 \pm 3.38	91.28 \pm 5.12	0.96	0.96,NS

Baseline parameters like Systolic Blood pressure Diastolic Blood pressure, Mean Arterial Pressure were comparable to each other (t=0.15,0.88, NS),(t=0.76,0.76,NS), (t=0.96,0.96,NS) respectively.

Table 2: Comparison of systolic Blood pressure in both the Groups

Parameters	Dexmedetomidine group (mean \pm SD)	Lignocaine group (mean \pm SD)	t-value	p-value
Baseline (15 min before induction)	123.4 \pm 6.82	123.15 \pm 8.51	0.15	0.88,NS
Immediately after induction	111.48 \pm 6.65	112.75 \pm 6.76	0.85	0.4, NS
During intubation (0 minute)	126.13 \pm 8.59	133.8 \pm 6.74	4.43	<0.001,S
1 minute post intubation	122.28 \pm 7.83	128.15 \pm 9.95	2.92	<0.004,S
2 minute post intubation	119.83 \pm 7.59	124.4 \pm 9.28	2.41	<0.02,S
3 minute post intubation	116.45 \pm 7.50	120.78 \pm 8.64	2.39	<0.02,S
4 minute post intubation	113.73 \pm 7.79	116.38 \pm 8.91	1.41	0.16,NS
5 minute post intubation	111.78 \pm 8.06	112.5 \pm 8.92	0.38	0.7,NS
10 minute post intubation	103.65 \pm 8.40	105 \pm 8.46	0.73	0.47,NS

Systolic Blood pressure was at Baseline (15 min before induction) (t=0.15,0.88,NS); Immediately after induction (t=0.85, 0.4, NS); During intubation (0 minute)(t=4.43,p<0.001,S); 1 minute post intubation (t=2.92, p<0.004,S); 2 minute post intubation (t=2.41p<0.02,S); 3 minute post intubation (t=2.39,p<0.02,S), 4 minute post intubation(t=1.41,0.16,NS);5 minute post intubation(t=0.38,p<0.7,NS); 10 minute post intubation (t=0.73,p<0.47,NS)

Table 4: Comparison of diastolic Blood pressure in both the Groups

Parameters	Dexmedetomidine group (mean ±SD)	Lignocaine group (mean±SD)	t-value	p-value
Baseline (15 min before induction)	75.28± 4.78	75.55±4.78	0.3	0.76,NS
Immediately after induction	64.93±3.76	69.75±3.08	6.21	<0.001,S
During intubation (0 minute)	79.85±4.45	87.78±3.92	8.31	<0.001,S
1 minute post intubation	75.6±4.86	85.95±4.19	9.97	<0.001,S
2 minute post intubation	73.88±4.86	82.83±4.16	8.86	<0.001,S
3 minute post intubation	70.20±4.43	78.9±4.09	7.32	<0.001,S
4 minute post intubation	69.05±4.21	75.28±4.22	5.34	<0.001,S
5 minute post intubation	69.05±4.05	72.58±4.29	3.76	<0.001,S
10 minute post intubation	65.15±4.03	67.2±4.15	2.23	0.03,S

Diastolic Blood pressure was at Baseline (15 min before induction) ($t=0.3, p>0.76, NS$); Immediately after induction ($t=6.21, p<0.001, S$); During intubation (0 minute) ($t=8.31, p<0.001, S$); 1 minute post intubation ($t=9.97, p<0.001, S$); 2 minute post intubation ($t=8.86, p<0.001, S$); 3 minute post intubation ($t=7.32, p<0.001, S$); 4 minute post intubation ($t=5.34, p<0.001, S$); 5 minute post intubation ($t=3.76, p<0.001, S$); 10 minute post intubation ($t=2.23, p<0.03, S$)

Table 5: Comparison of Mean Arterial Blood pressure in both the Groups

Parameters	Dexmedetomidine group (mean ±SD)	Lignocaine group (mean±SD)	t-value	p-value
Baseline (15 min before induction)	91.33± 3.38	91.28±5.12	0.05	0.96,NS
Immediately after induction	80.40±4.06	83.75±4.47	3.49	<0.001,S
During intubation (0 minute)	95.25±5.02	103±3.60	7.91	<0.001,S
1 minute post intubation	91.18±5.12	100.18±6.03	7.10	<0.001,S
2 minute post intubation	89.1±5.07	96.7±5.25	6.51	<0.001,S
3 minute post intubation	86.65±4.76	92.93±5.17	5.60	<0.001,S
<0.001,S 4 minute post intubation	84.73±4.88	88.98±5.36	3.69	<0.001,S
5 minute post intubation	83.23±4.88	85.85±5.38	2.28	0.02,S
10 minute post intubation	78.08±4.86	79.85±4.66	1.66	0.1, NS

The MAP at Baseline (15 min before induction) was ($t=0.05, p<0.96, NS$); Immediately after induction ($t=3.49, p<0.001, S$); During intubation (0 minute) ($t=7.91, p<0.001, S$); 1 minute post intubation ($t=7.10, p<0.001, S$); 2 minute post intubation ($t=6.51, p<0.001, S$); 3 minute post intubation ($t=5.60, p<0.001, S$); 4 minute post intubation ($t=3.69, p<0.001, S$); 5 minute post intubation ($t=2.28, p<0.02, S$); 10 minute post intubation ($t=1.66, p<0.1, NS$)

DISCUSSION

laryngoscopy and endotracheal intubations are considered as the most critical events during general anesthesia as they provoke transient but marked sympatho adrenal response manifesting as hypertension and tachycardia^{11,12,13}. The response is variable and significant. Laryngoscopy and intubation violate the patients protective air way reflexes and leads to physiological changes including hypertension tachycardia and arrhythmias raises intracranial and intraocular pressure. During endotracheal intubations marked circulatory effects like reflex hypertension (rise up to 40-50%) and tachycardia (rise p to 20%) is encountered¹⁴ These cardiovascular responses may have serious consequences including dysarrhythmias myocardial infarction sudden LVF, pulmonary edema cerebrovascular hemorrhage and at time even cardiac arrest.¹⁵ Intravenous (IV) lignocaine is one of the oldest, cheapest and most easily available drug used for attenuation of hemodynamic response to laryngoscopy and intubation^{7,8} Dexmedetomidine is a new alpha-2 adrenergic agonist having 8-times more affinity for alpha-2 adrenoceptors as

compared with clonidine. Pretreatment with dexmedetomidine attenuates hemodynamic response to laryngoscopy and intubation.^{9, 10} In our study we have seen that Baseline parameters like Systolic Blood pressure, Diastolic Blood pressure, Mean Arterial Pressure were comparable to each other ($t=0.15, 0.88, NS$), ($t=0.76, 0.76, NS$), ($t=0.96, 0.96, NS$) respectively. Systolic Blood pressure was at Baseline (15 min before induction) ($t=0.15, 0.88, NS$); Immediately after induction ($t=0.85, 0.4, NS$); During intubation (0 minute) ($t=4.43, p<0.001, S$); 1 minute post intubation ($t=2.92, p<0.004, S$); 2 minute post intubation ($t=2.41, p<0.02, S$); 3 minute post intubation ($t=2.39, p<0.02, S$), 4 minute post intubation ($t=1.41, 0.16, NS$); 5 minute post intubation ($t=0.38, p<0.7, NS$); 10 minute post intubation ($t=0.73, p<0.47, NS$) Diastolic Blood pressure was at Baseline (15 min before induction) ($t=0.3, p>0.76, NS$); Immediately after induction ($t=6.21, p<0.001, S$); During intubation (0 minute) ($t=8.31, p<0.001, S$); 1 minute post intubation ($t=9.97, p<0.001, S$); 2 minute post intubation

($t=8.86, p<0.001, S$); 3 minute post intubation ($t=7.32, p<0.001, S$); 4 minute post intubation ($t=5.34, p<0.001, S$); 5 minute post intubation ($t=3.76, p<0.001, S$); 10 minute post intubation ($t=2.23, p<0.03, S$). The MAP at Baseline (15 min before induction) was ($t=0.05, p<0.96, NS$); Immediately after induction ($t=3.49, p<0.001, S$); During intubation (0 minute) ($t=7.91, p<0.001, S$); 1 minute post intubation ($t=7.10, p<0.001, S$); 2 minute post intubation ($t=6.51, p<0.001, S$); 3 minute post intubation ($t=5.60, p<0.001, S$); 4 minute post intubation ($t=3.69, p<0.001, S$); 5 minute post intubation ($t=2.28, p<0.02, S$); 10 minute post intubation ($t=1.66, p<0.1, NS$). Raval DL *et al* (2014) compared two doses of dexmedetomidine and observed statistically highly significant ($p<0.01$) increase in mean arterial blood pressure (MAP) in higher dose group and tracheal intubation and 1 minute after intubation, 2 minute after intubation and 5 minute after intubation, mean SBP, DBP, and MAP were comparable in both the groups ($p>0.05$).

CONCLUSION

It can be concluded from our study that intravenous Dexmedetomidine is more effective in attenuating in blood pressure (Systolic, Diastolic, MAP) response to intubation than lignocaine.

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Source of Support: None Declared
Conflict of Interest: None Declared