

To evaluate the effect of intravenous Dexmedetomidine (1µg/kg) as premedication in obtunding the pressor response to laryngoscopy and tracheal intubation compared to intravenous preservative free 2% Lignocaine (1.5 -2mg/kg) .

¹Dr. Seetharamaiah Surabathuni, ²Dr. G.R. Santhilatha,
³Dr. P. Nageswara rao, ⁴Dr. T. Venugopala rao.
^{1,2,3,4}Department of Anaesthesiology, Government General Hospital, Guntur.

Abstract:

Background: General Anaesthesia is used for many surgeries. There is pressor response during laryngoscopy and tracheal intubation. To decrease that response in patients this study is taken.

AIM: To compare the effect of i.v. Dexmedetomidine & i.v. 2% Lignocaine as premedication in obtunding the pressor response to laryngoscopy and tracheal intubation and to evaluate hemodynamic stability.

Methods: 60 patients were randomly allocated to receive I.V. Dexmedetomidine (1mcg/kg) as pre medication & I.V. Lignocaine (1.5mg/kg), 30 patients in each group, Group D (30 patients), Group L (30 patients).

Results: Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Blood Pressure were observed. Systolic, diastolic, mean arterial pressure and heart rate decreased from the baseline value after intubation in Dexmedetomidine group, whereas in the Lignocaine group there was an increase in the first and second minute, it was a significant change and decreased at third, fourth and fifth minute after intubation. All the hemodynamic parameters showed significant difference when comparing between the two groups.

Conclusion: Dexmedetomidine and Lignocaine are effective in blunting the hemodynamic response to intubation, but Dexmedetomidine is superior to Lignocaine in blunting the hemodynamic response to laryngoscopy and endotracheal intubation.

Key Words; General anaesthesia, Dexmedetomidine, Lignocaine, Heart rate, Systolic and Diastolic Blood pressure, Mean Arterial Pressure.

I. Introduction

Laryngoscopy and Endotracheal intubation are the frequently performed procedures in the practice of anaesthesia. These are the most stressful conditions to which the patient is subjected. The standard technique of laryngoscopy and endotracheal intubation involves the stimulation of Larynx, Pharynx, Epipharynx and trachea, which are extensively innervated by Autonomic nervous system, namely the parasympathetic innervation via vagus and glossopharyngeal nerves and sympathetic via superior cervical ganglion.

During laryngoscopy and intubation

1. Increase in Heart rate
2. Increase in Blood pressure
3. Increase in MAP

The more recent techniques are

1. α_2 agonist - a) I.V. Dexmedetomidine
- b). I.V Clonidine.

2.I.V .Nitro glycerine.

3. I.V. Labetolol / Esmolol.

4. I.V. Fentanyl / Alfentanyl / Sufentanyl.

We have undertaken this study to assess the efficacy of intravenous Dexmedetomidine premedication in attenuating the pressor response to laryngoscopy and intubation in a group of Normotensive patients, mild hypertensive patients compared to the control group with intravenous preservative free Lignocaine.

USES : Dexmedetomidine used for adult intubated patients in the ICU. It has beneficial effects of anxiolysis, sedation, analgesia, and sympatholysis with minimal or no respiratory depression.

Lignocaine

- Lignocaine is a voltage gated sodium channel blocker preventing channel activation and interfering with large transient Na influx associated with membrane depolarization.
- IV Lignocaine 1.5mg/kg has been proved to attenuate stress responses during laryngoscopy and intubation when given prior to induction

II. Aim Of The Study

To evaluate the effect of intravenous Dexmedetomidine (1µg/kg) as premedication in obtunding the pressor response to laryngoscopy and tracheal intubation compared to intravenous preservative free 2% Lignocaine (1.5 -2mg/kg) - A prospective, randomized, controlled study.

III. Materials And Methods

Source Of Data

This study was carried out in the Department of anaesthesiology, Government General Hospital, Guntur medical college, Guntur. The study was approved by the local ethical committee. The protocol of the study was reviewed and approved by Dr NTR UNIVERSITY OF HEALTH SCEINCES.

IV. Method Of Collection Of Data

Sample Size

A total number of 60 patients, 30 in each group with inclusion and exclusion criteria were selected for study, patients will be allocated randomly to each group by lottery method.

Inclusion Criteria

1. ASA grade I and II physical status
2. Patient requiring general anaesthesia and not on elective ventilation.
3. Age between 18-60yrs, belonging to both sexes.
4. Weight 50-100 kgs.

Exclusion Criteria

1. Patients with ASA Grade \geq III.
2. Patient allergic to Dexmedetomidine or Lignocaine
3. Patients age <18 or >60

V. Methodology

All patients were explained in detail about the study and consent as taken. Patients were randomly allocated to receive intravenous Dexmedetomidine infusion 1mcg/kg, 10 minutes before induction of anaesthesia or injection Lignocaine 1.5mg/kg intravenously 10 minutes before intubation. All patients had an intravenous access secured in the pre operative holding area. Randomization was done by picking lots. The Anaesthesiologist who prepared and administered the drug was not involved with the intra and post operative management of the patient.

Monitors connected include electrocardiogram, pulse oximeter and non invasive blood pressure. Baseline systolic blood pressure, diastolic blood pressure, mean arterial blood pressure and heart rate are recorded.

Group D: injection Dexmedetomidine 1mcg/kg diluted to 10 ml in normal saline as an infusion over 10 minutes before induction.

Group L: 1.5mg/kg preservative free Lignocaine diluted to 10ml with normal saline 10 minutes before intubation.

Readings were recorded as follows

Baseline- in the pre operative holding area before securing intravenous access 1 minute, 2 minute, 3 minute, 4 minute, 5 minute after intubation.

Statistical Data

At the end of study all data is compiled and statistically analyzed using

- Diagrammatic representation
- Descriptive data presented as mean \pm SD
- Continuous data are analyzed by sample "t" test.
- Chi-square test to assess the statistical difference between the 2 groups.

VI. Results

The age distribution in GROUP-D & GROUP-L was from 18-60. The maximum age in GROUP-D & GROUP-L was 60 years. The minimum age in GROUP-D -25 yrs & GROUP-L -21yrs. When chi squared the value is 1.625 with two degrees of freedom with P value 0.654 which is considered statistically not significant.

Sex Distribution

Both groups were comparable in terms of sex distribution. Chi squared equals 0.267 with 1 degrees of freedom. The two-tailed P 0.606. The association between rows (groups) and columns (outcomes) is considered to be not statistically significant.

Weight Distribution

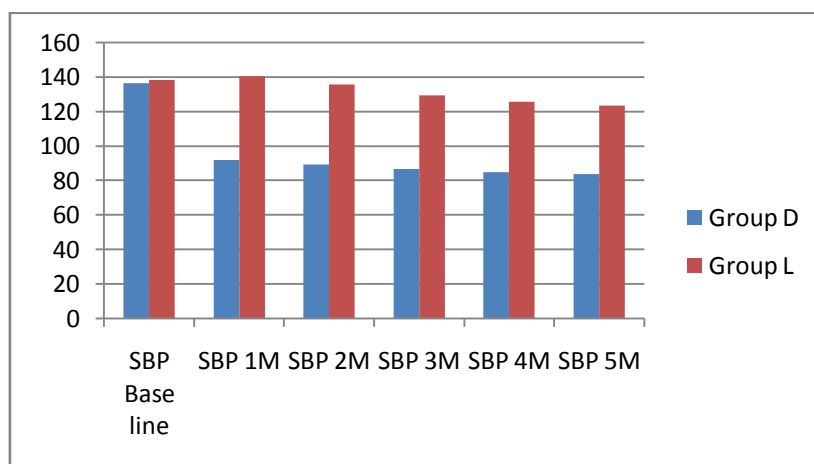
The mean weight of patients in both the groups was comparable. There is no statistical significance between the groups with P value being 0.3281.

Asa Grade

Both the groups are similar with respect to ASA Grade as well as is evident by the statistics below. When chi squared the value is 0.164 with one degree of freedom with P value >0.05 indicating that there is no statistical significance.

Comparison Of Sbp Between The Two Groups

	GROUP	N	MEAN	Std. DEVIATION	P VALUE
SBP.B	GROUP D	30	136.27	14.246	0.6247
	GROUP L	30	138.13	15.040	
SBP.1M	GROUP D	30	91.83	5.173	0.0001
	GROUP L	30	140.27	18.308	
SBP.2M	GROUP D	30	89.13	4.64	0.0001
	GROUP L	30	135.38	17.41	
SBP.3M	GROUP D	30	86.53	5.184	0.0001
	GROUP L	30	129.23	17.368	
SBP.4M	GROUP D	30	84.83	4.09	0.0001
	GROUP L	30	125.7	16.54	
SBP.5M	GROUP D	30	83.70	4.244	0.0001
	GROUP L	30	123.47	17.909	

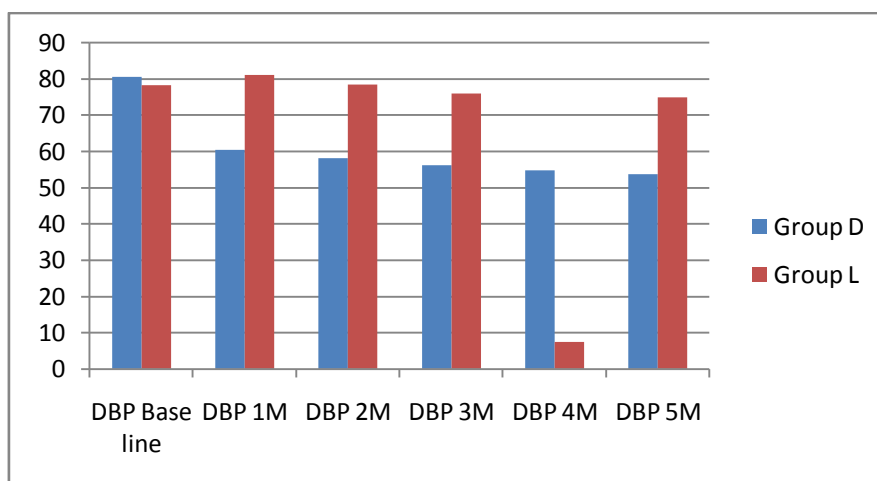


The mean Systolic blood pressure in **Group-D** at Base line 136.27 mmHg, 1st min 91.83 mmHg, 2nd min 89.13 mmHg, 3rd min 86.53 mmHg, 4th min 84.83 mmHg, 5th min 83.70 mmHg.

The mean Systolic blood pressure in **Group-L** at Base line 136.13 mmHg, 1st min 140.27 mmHg, 2nd min 135.38 mmHg, 3rd min 129.23 mmHg, 4th min 125.7 mmHg, 5th min 123.47 mmHg

Comparison Of Dbp

	GROUP	N	MEAN	Std. DEVIATION	P VALUE
DBP.B	GROUP D	30	80.40	7.942	0.3141
	GROUP L	30	78.23	8.597	
DBP.1M	GROUP D	30	60.30	8.860	0.0001
	GROUP L	30	81.07	4.891	
DBP.2M	GROUP D	30	58.13	7.62	0.0001
	GROUP L	30	78.30	5.91	
DBP.3M	GROUP D	30	56.13	7.300	0.0001
	GROUP L	30	75.90	8.389	
DBP.4M	GROUP D	30	54.73	6.36	0.0001
	GROUP L	30	75.43	7.36	
DBP.5M	GROUP D	30	53.60	6.117	0.0001
	GROUP L	30	74.90	7.251	

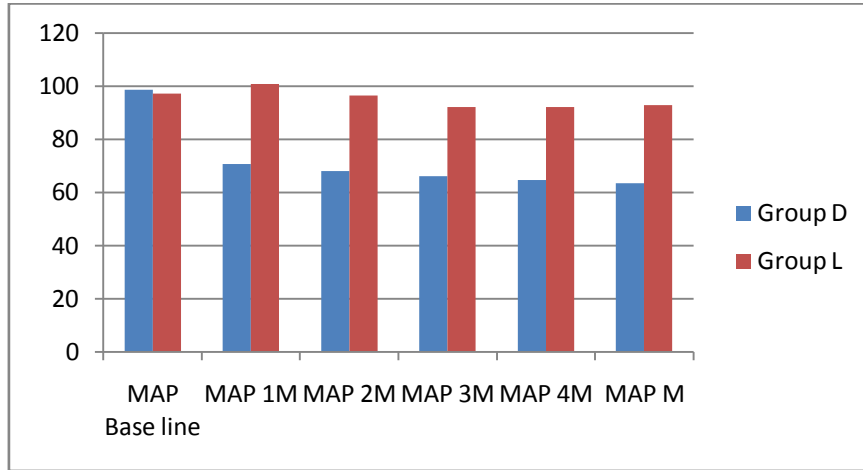


The mean Diastolic blood Pressure in **Group-D** Base line 80.40 mmHg, 1st min 60.30 mmHg, 2nd min 58.13 mmHg, 3rd min 56.13 mmHg, 4th min 54.73 mmHg, 5th min 53.60 mmHg.

The mean Diastolic blood Pressure in **Group-L** Base line 78.23 mmHg, 1st min 81.07 mmHg, 2nd min 78.30 mmHg, 3rd min 75.90 mmHg, 4th min 75.43mmHg, 5th min 74.90 mmHg.

Comparison Of Mean Arterial Pressure

	GROUP	N	MEAN	Std. DEVIATION	P VALUE
MAP.B	GROUP D	30	98.67	7.526	0.5132
	GROUP L	30	97.10	10.685	
MAP.1M	GROUP D	30	70.57	6.882	0.0001
	GROUP L	30	100.63	8.438	
MAP.2M	GROUP D	30	68.03	6.08	0.0001
	GROUP L	30	96.30	7.87	
MAP.3M	GROUP D	30	65.97	5.798	0.0001
	GROUP L	30	92.03	9.554	
MAP.4M	GROUP D	30	64.53	4.80	0.0001
	GROUP L	30	92.10	8.57	
MAP.5M	GROUP D	30	63.33	4.490	0.0001
	GROUP L	30	92.77	9.662	



The mean arterial Pressure (MAP) in **Group-D** at Base line 98.67 mmHg, 1st min 70.57 mmHg, 2nd min 68.03 mmHg, 3rd min 65.97 mmHg, 4th min 64.53mmHg, 5th min 63.33 mmHg.

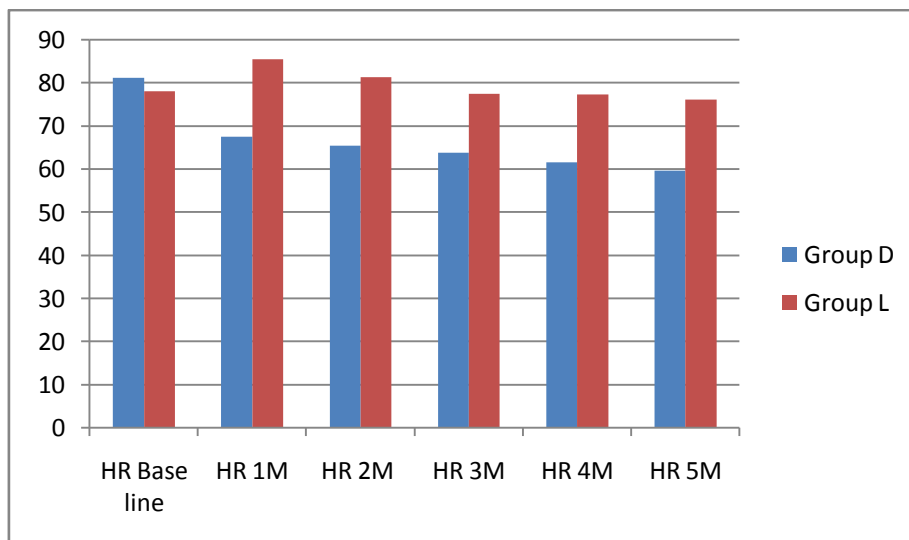
The mean arterial Pressure (MAP) in **Group-L** Base line 97.10 mmHg, 1st min 100.63 mmHg, 2nd min 96.30 mmHg, 3rd min 92.03 mmHg, 4th min 92.10 mmHg, 5th min 92.77 mmHg.

Comparison Of Heart Rate

	GROUP	N	MEAN	Std. DEVIATION	P VALUE
HR.B	GROUP D	30	81.17	14.370	0.3275
	GROUP L	30	77.97	10.417	
HR.1M	GROUP D	30	67.40	9.605	0.0001
	GROUP L	30	85.43	11.082	
HR.2M	GROUP D	30	65.33	8.34	0.0001
	GROUP L	30	81.31	10.47	
HR.3M	GROUP D	30	63.70	7.953	0.0001
	GROUP L	30	77.37	10.568	
HR.4M	GROUP D	30	61.47	7.54	0.0001
	GROUP L	30	77.54	10.08	
HR.5M	GROUP D	30	59.63	7.294	0.0001
	GROUP L	30	76.07	10.432	

The mean Heart Rate in **Group-D** Base line 81.17 beats / min, First 1st min 67.40 beats/min, 2nd min 65.33 beats/min, 3rd min 63.70 beats/min, 4th min 61.47 beats/min, 5th min 59.63 beats/min.

The mean Heart Rate in **Group L** Base line 77.97 beats / min, First 1st min 85.43 beats/min, 2nd min 81.31 beats/min, 3rd min 77.37 beats/min, 4th min 77.28 beats/min, 5th min 76.07 beats/min



VII. Discussion

Laryngoscopy and endotracheal intubation are considered as the most critical events during general anesthesia. They provoke a transient, but marked sympathetic and sympathoadrenal response. In our study we compared intravenous Lignocaine, a drug which has been successfully used to blunt the hemodynamic response to intubation with Dexmedetomidine a newer agent with additional properties such as sedation, anxiolysis and sympatholysis for attenuating the hemodynamic response to laryngoscopy and tracheal intubation.

All the baseline values Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure and Heart rate are comparable between the two groups. There is statistically no significant difference in the baseline values between the two groups.

In Group D (Dexmedetomidine group) the systolic, diastolic, mean arterial pressure and heart rate decreased significantly from baseline at first, second, third, fourth and fifth minute post intubation. The change in systolic, diastolic, mean arterial pressure and heart rate from base line in group D is statistically significant and is comparable with the findings of Ferdimenda et al¹¹ in their study. In our study, Dexmedetomidine effectively attenuates the intubation response.

Scheinin et al¹ studied the effect of Dexmedetomidine on intubation response. They had similar findings correlating to our observation. They have also stated that the thiopentone dose required for induction is lesser in the dexmedetomidine group. We did not measure the dose required for induction. We have measured the clinical effect, whereas they have measured the biochemical effect.

Yildiz et al² in their study found that blood pressure and heart rate increased post intubation but not significantly from the baseline value. They also found that the arterial blood pressure and heart rate in post operative period is significantly lower in the Dexmedetomidine group.

Divya jain et al³ studied the effect of Dexmedetomidine in attenuating extubation response. They also found similar findings correlating to our observation.

Pekka et al⁴ studied the effect of Dexmedetomidine on perioperative hemodynamic in vascular surgical patients. The change in hemodynamics is less affected in Dexmedetomidine group. Coming to **Group L (Lignocaine group)**, the systolic, diastolic, mean arterial pressure and heart rate increased from baseline at first and second minute and then decreased at third, fourth and fifth minute post intubation. This increase in systolic, diastolic, mean arterial pressure and heart rate at the first and second minute was statistically significant. The decrease in systolic, diastolic, mean arterial pressure and heart rate at third, fourth and fifth minute was statistically significant.

Thus in group L, the systolic, diastolic, mean arterial pressure and heart rate increased from the baseline value at first and second minute after intubation but it is not significant. Bruder et al in a review article wrote that in clinical practice, lignocaine is particularly effective in preventing the pressure response to tracheal intubation, whatever is the route of administration, but not the increase in heart rate which is similar to our observation.

Wilson et al⁵ showed that irrespective of timing of administration of injection of lignocaine at second, third or fourth minute before tracheal intubation, there was a significant increase in heart rate in all the groups. When comparing the hemodynamic parameters between the Dexmedetomidine Group (Group D) and Lignocaine Group (Group L), systolic, diastolic, mean arterial pressure and heart rate decreased from the baseline value after intubation in Dexmedetomidine group, whereas in the Lignocaine group there was an increase in the first and second minute, it was a significant change and decreased at third, fourth and fifth minute after intubation. All the hemodynamic parameters showed significant difference when comparing between the two groups.

VIII. Limitations Of The Study

1. Sedation score not monitored.
2. Anesthetic drug dose was standardized and did not measure intra operative anaesthetic and analgesic requirements.
3. Extubation response and post operative sedation and hemodynamic variations are not studied.

IX. Conclusion

Dexmedetomidine and Lignocaine are effective in blunting the hemodynamic response to intubation, but Dexmedetomidine is superior to Lignocaine in blunting the hemodynamic response to laryngoscopy and endotracheal intubation.

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