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A COMPARATIVE STUDY OF DEXMEDETOMIDINE AND LABETALOL IN ATTENUATION OF HAEMODYNAMIC STRESS RESPONSE TO DIRECT LARYNGOSCOPY AND INTUBATION WITH RESPECT TO HEART RATE AND MEAN ARTERIAL PRESSURE.

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ABSTRACT This study was done to compare the haemodynamic variation using Dexmedetomidine and Labetalol during direct laryngoscopy and intubation. **Methodology:** This study was a prospective observational study on 90 patients divided in 2 groups of 45 each and was carried out in Department of Anesthesiology in a tertiary care hospital after getting approval from ethical committee of institution during period 1-2-2021 to 31-7-2022. **Observation And Results:** In our study we observed that Majority of patients in the study were females and both groups were comparable (p=0.832, NS).Thus, the difference in weight distribution on using unpaired t-test was not statistically significant (p = 0.162). In Dexmedetomidine group mean (±SD) heart rate was lower than Labetalol group, after induction, at intubation, 1,2,3,4,5,10 and 15 minutes after intubation (p<0.001, HS). In Dexmedetomidine group mean(±SD) MAP was lower than Labetalol group, after induction, at intubation, 1,2,3,4,5,10 and 15 minutes after intubation in the study period (p<0.001, HS).

KEYWORDS : Labetalol, Dexmedetomidine.

INTRODUCTION

An increase in heart rate is more likely to produce signs of myocardial ischaemia than hypertension on the ECG in patients with myocardial dysfunction.(1)

It has been clearly proven by various studies that sympathetic overactivity occurs during laryngoscopy and the importance of suppressing the sympathetic overactivity is well emphasized. It has become evident that, alpha-2 adrenoceptor agonists may also be a useful class of drugs in conjunction with anaesthesia.(2) They simultaneously potentiate the effects of general anaesthetic agents, reduce their dose requirements and attenuate sympathoadrenal responses to noxious stimuli encountered during anaesthesia and surgery, thus providing improved haemodynamic, metabolic and hormonal stability.(3)

Dexmedetomidine is a highly selective and potent alpha 2 adrenoceptor agonist. It is a pure alpha-2 adrenoceptor agonist (α1: α2 ratio-1:1600) than clonidine which has only less selective agonist activity (α1: α2 ratio-1:200). Alpha 2 adrenergic agonist have been widely used as an adjunct in the pre operative period for their analgesic, sedative, (4) hypnotic, anxiolytic and sympatholytic (5) properties remain.

The beta blocking agent, Labetalol is combined α1 and β antagonist. In patients with no history of hypertension or significant cardiac disease, Labetalol 0.3 or 0.6mg/kg i.v. can be used to blunting tachycardia and hypertension to laryngoscopy and intubation. (6) .

Keeping all this in mind, we have planned this study to compare intravenous Labetalol and Dexmedetomidine in attenuating haemodynamic stress response (increase in heart rate and an increase in the mean arterial pressure) to direct laryngoscopy and intubation.

METHODOLOGY

This study was a prospective observational study was carried out prospectively in Department of Anesthesiology in a tertiary care hospital after getting approval from ethical committee of institution during period 1-2-2021 to 31-7-2022. The total population was of 90 patients admitted in department of general Surgery, ENT, gynecology and orthopedics with the age in the range of 18 to 50 years, posted for elective surgery under general anesthesia.

Inclusion Criteria

Adult patients of age 18-50 years, ASA grade 1 or 2 and weighing between 40 to 80kg and giving consent for the procedure will be included in our study.

Exclusion Criteria

Patients unwilling, ASA Grade 3 and 4, those with mental incapacity or language barrier, BMI over 35, anatomical variations.

90 Patients were divided into 2 groups alternatively with 45 patients in each group:

- Group D (n=45): Were received Dexmedetomidine 1 µg/kg in 10ml normal Saline i.v. over 10 min, 5min before induction of anaesthesia.
- Group L (n=45) : were received Labetalol 0.5mg/kg in 10ml normal saline i.v. over 10min, 5min before induction of anaesthesia.

Microsoft excel was used for statistics and Students t test was used to compare means between groups.

OBSERVATION AND RESULTS

In our study the two groups were comparable with respect to age and weight.

The mean (±SD) heart rate in Dexmedetomidine group decreased after study drug, after induction, at intubation,1,2,3,4,5,10 and 15 minutes after intubation below the baseline value (p<0.000, S).

The mean (±SD) Heart rate in Labetalol group was decreased after study drug administration and after induction (p<0.000, S). The mean Heart rate in Labetalol group was increased from baseline at intubation till 5 minutes after intubation thereafter mean heart rate was comparable to baseline values at 10 and 15 minutes after intubation (p<0.05, S).

The mean(±SD) MAP in Dexmedetomidine group decreased after study drug, after induction, at intubation ,1,2,3,4,5,10 and 15 minutes after intubation below the baseline value(p<0.000, S).

The Mean(±SD) MAP in Labetalol Group was decreased from baseline, after study drug administration and after induction (p<0.000, S). The Mean(±SD) MAP in Labetalol Group was increased from baseline value at intubation till 5 minutes after intubation (P<0.000, S). Thereafter the mean(±SD) MAP was comparable to baseline value at 10 and 15 minutes after intubation (P>0.05, NS).

DISCUSSION

A total number of 90 patients belonging to age 18-50 years posted for elective surgery were selected and divided into two groups of 45 each after obtaining approval from the institutional ethics committee and valid informed consent.

Group D (n:45): were received Dexmedetomidine 1 µg/kg in 10ml normal saline.
Group L (n:45) : were received Labetalol 0.5mg/kg in 10ml normal saline.

The two groups were comparable with respect to age and weight.

There was statistically significant difference in Heart rate between the

two groups after induction, after intubation ,1 to 15 minutes after intubation . But, the mean pulse rate was not less than 60 beats per minutes during the study duration. The mean Heart rate was significantly lower after induction, after intubation,1 to 15 minutes after intubation in Dexmedetomidine group than Labetalol group ($p<0.001$).

Nisarg V. Patel Nikita P. Mevada (2023) (7) et al, Mrunalini P, Daxa Hiren Oza et al.,(2021) (8) and Sangeetha, M Saranya (2021) (9) et al. found that the fall in heart rate was more in group D than in group L. Heart rate increased after intubation is more in Placebo group than Group D and Group L ($p=0.001$,S).

In our study, the baseline mean (±SD) Mean Arterial blood pressure (MAP) in Group L was 86.11 (± 5.33) mm Hg.

In the present study, the mean arterial blood Pressure alterations in Group D and Group L were comparable with baseline, after premedication, and after study drug on intergroup comparison. At intubation ,1,2,3,4,5,10 and 15 minutes after intubation the mean arterial blood pressure (±SD) was significantly less in Group D than Group L at these intervals except at induction.

None of the patient required inj. mephentermine for the treatment in any of the group. The systolic blood pressure was never below 94 mm Hg in any patient of either group. Thus, hypotension was not noted in any patient of either group.

Nisarg V. Patel Nikita P. Mevada (2023) (7) et al and Alka Kewalramani (Chhabra), Seema Partani, et al (2016) (10) in their study found significant fall in MAP after giving study drug, at induction, at laryngoscopy and at intubation ,1,3,5,10 and 15 minutes after intubation in group L and group D as compared to group C ($p<0.001$).The values of MAP were not significant statistically between group L and group D($p>0.05$) at intubation, 1, 3, 5 minutes after intubation and statistically significant at 10, 15 minutes after intubation ($p<0.001$).

CONCLUSION

We conclude that we conclude that, on comparison of Dexmedetomidine with Labetalol, Dexmedetomidine 1 µg/Kg given slowly over 10 minutes intravenously 5 minutes before induction of anesthesia, attenuates the hemodynamic stress response to laryngoscopy and intubation in terms of heart rate and mean arterial pressure in a better manner than Labetalol 0.5 mg/Kg without any side effects.

Table 1 Showing Age And Gender And Weight-wise Distribution Of Patients In 2 Groups

Characteristic	Group D	Group L	P value
Age Mean age S.D.	34.91 9.52	32.82 8.98	0.288 (NOT SIGNIFICANT)
Gender Males Females	19 26	20 25	0.832 (NOT SIGNIFICANT)
Weight Mean weight S.D.	60.40 7.14	61.91 5.75	0.272 (NOT SIGNIFICANT)

Test Applied: Chi-square test.

Table 2 Showing Comparison Of Mean (SD) Heart Rate Changes Between Group D And Group L

Heart rate	Group D (n = 45) (Mean ± SD)	Group L (n = 45) (Mean ± SD)	p value
Baseline	86.09 ± 9.80	86.51 ± 6.70	0.812
After premedication	84.11 ± 6.95	85.33 ± 3.92	0.279
After study drug	70.07 ± 7.21	72.89 ± 9.12	0.107
After induction	67.0 ± 6.46	70.11 ± 7.92	0.044(S)
At intubation	67.80 ± 7.30	90.48 ± 5.51	< 0.001(HS)
After intubation 1 min	68.16 ± 6.81	90.20 ± 7.64	< 0.001(HS)
After intubation 2 min	67.49 ± 5.92	89.51 ± 6.53	< 0.001(HS)
After intubation 3 min	66.73 ± 5.63	90.78 ± 6.17	< 0.001(HS)
After intubation 4 min	67.49 ± 4.52	89.24 ± 5.69	< 0.001(HS)
After intubation 5 min	67.44 ± 5.11	89.13 ± 5.21	< 0.001(HS)
After intubation 10 min	72.07 ± 5.09	84.98 ± 5.70	< 0.001(HS)
After intubation 15 min	75.09 ± 4.77	84.95 ± 3.45	< 0.001(HS)

Applied-student Unpaired t-test

Table 3 Showing Comparison Of Mean (SD) Mean Arterial Blood Pressure Changes Between Group D And Group L

Mean Arterial Pressure (MAP)	Group D (n = 45) (Mean ± SD)	Group L (n = 45) (Mean ± SD)	p value
Baseline	84.80 ± 2.94	86.11 ± 5.33	0.152
After premedication	83.95 ± 1.85	84.35 ± 2.99	0.421
After study drug	77.24 ± 5.97	78.16 ± 4.85	0.429
After induction	75.18 ± 5.28	73.11 ± 4.51	0.049(S)
At intubation	79.07 ± 6.50	97.56 ± 5.14	<0.001(S)
After intubation 1 min	81.29 ± 6.25	98.16 ± 4.15	<0.001(S)
After intubation 2 min	79.38 ± 4.52	91.42 ± 4.02	<0.001(S)
After intubation 3 min	78.13 ± 3.42	91.98 ± 3.77	<0.001(S)
After intubation 4 min	76.53 ± 4.17	90.80 + 3.46	<0.001(S)
After intubation 5 min	73.44 ± 3.73	88.82 ± 3.09	<0.001(S)
After intubation 10 min	78.20 ± 4.06	85.56 ± 3.23	<0.001(S)
After intubation 15 min	78.33 ± 6.06	85.60 ± 3.96	<0.001(S)

Applied-student Unpaired t-test

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