



## Anaesthesiology

## PROSPECTIVE RANDOMISED COMPARATIVE TRAIL OF DEXMEDETOMIDINE VERSUS VERAPAMIL FOR ATTENUATION OF EXTUBATION RESPONSES

**Dr Prashanth Jajjari\***

MD Anaesthesia, Department Of Anaesthesiology, KMC. \*Corresponding Author

**Dr Sarah Shahnaz**

Postgraduate, Department Of Anaesthesiology, KMC.

**Dr Anitha**

M.D, Assistant Professor, Department Of Anaesthesiology, KMC.

### ABSTRACT

Tracheal extubation is the discontinuing the artificial airway when the necessities like ventilation, protection of the airway, obstruction of the airway and hypoxia were corrected. This study was conceptualized to analyze the outcome of intravenous dexmedetomidine with intravenous verapamil on the hemodynamic and recovery profiles during endotracheal extubation. Study was done with 60 patients. 30 patients in each group dexmedetomidine (D) and verapamil (V). At the end of surgery, after the return of spontaneous efforts, in "Group V" 30 patients verapamil 0.1 mg/kg and in "Group D" 30 patients dexmedetomidine 0.3 mcg/kg were administered as bolus intravenously over one minute. The values for HR, SBP, DBP, and MAP were obtained just before administration of the study drug (baseline value, T<sub>0</sub>), 2 min after the injection of study medications (TM), just after oral suction (TS), immediately after extubation (TE) and 1, 3, 5 and 10 min postextubation (E1, E3, E5, E10) and compared among the two groups.

**CONCLUSION :** Patients on dexmedetomidine had a better control of HR and hemodynamics (SBP, DBP, MAP) as compared to verapamil after study medication was given and at the time of extubation and the period following extubation.

**KEYWORDS :** Verapamil, Dexmedetomidine, Extubation

### INTRODUCTION

Extubation during lighter planes of anesthesia or sedation can stimulate laryngopharyngeal reflexes and is associated with a reflex increase in sympathetic activity leading to hemodynamic changes like rise in heart rate and arterial blood pressure and are usually variable, transitory and unpredictable.

### MATERIALS AND METHODOLOGY:

Patients posted for elective surgeries at Kurnool Medical College with 60 patients (20-50 years, ASA I and II) as sample size. Sixty patients (ASA Grade I, II) scheduled for elective surgeries under general anesthesia were randomly divided into two groups. Pre-anesthetic assessment of the patient was done with a complete history, physical examination, and routine investigations. At the end of surgery, after the return of spontaneous efforts, in "Group V" 30 patients verapamil 0.1 mg/kg and in "Group D" 30 patients dexmedetomidine 0.3 mcg/kg were administered as bolus intravenously over one minute. The values for HR, SBP, DBP, and MAP were obtained just before administration of the study drug (baseline value, T<sub>0</sub>), 2 min after the injection of study medications (TM), just after oral suction (TS), immediately after extubation (TE) and 1, 3, 5 and 10 min postextubation (E1, E3, E5, E10) and compared among the two groups.

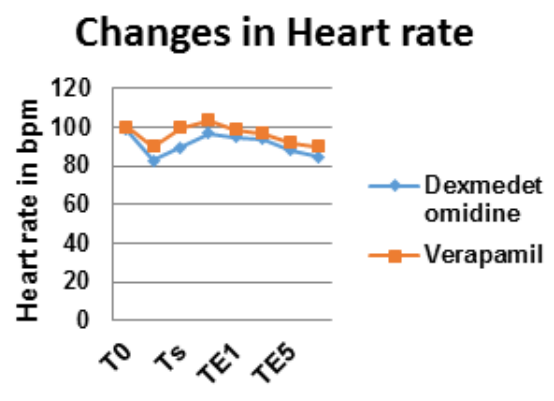
### RESULTS

#### DEMOGRAPHIC PROFILE: AGE DISTRIBUTION

The mean age of the participants in Dexmedetomidine group is 42 ± 8.40 years and that of Verapamil group is 43.8 ± 7.18 years. The two groups didn't show any difference in allocation of the participants with respect to their age. (t-value= 0.892; p>0.05)

#### Distribution By Changes In Heart Rate Between The Groups

At the baseline, difference in mean heart rate between the groups was not significant. After 2 mins of medication, Mean heart rate of the participants in Dexmedetomidine group was 83 ± 2.17 bpm and in Verapamil group was 90.2 ± 2.07 bpm. The difference in mean heart rate between the groups was significant at this point. After oral suction, Mean heart rate of the participants in Dexmedetomidine group was 89.5 ± 2.19 bpm and in Verapamil group was 99.9 ± 2.46 bpm. The difference in mean heart rate between the groups was significant at this point. Immediately after extubation, Mean heart rate of the participants in Dexmedetomidine group was 97 ± 1.65 bpm and in Verapamil group was 103.5 ± 0.97 bpm. The difference in mean heart rate between the groups was significant at this point. When tested with Anova, the changes in heart rate within the groups were significant statistically. Dexmedetomidine group: Anova value=240.8; p<0.001 Verapamil group: Anova value=378.1; p<0.001. Similarly at each point the difference in mean heart rate values between the groups were also significant statistically when tested with unpaired t-test. (p<0.05)



**Figure 1 : Line Diagram Showing The Changes In Heart Rate Between The Groups**

#### Distribution By Changes In Mean Arterial Pressure Between The Groups

At the baseline, mean arterial pressure of the participants in both the groups was not significant at baseline. After 2 mins of medication, mean arterial pressure of the participants in Dexmedetomidine group was 97.2 ± 2.42 mm of Hg and in Verapamil group was 100.1 ± 4.17 mm of Hg. The difference in mean arterial pressure between the groups was significant at this point.

After oral suction, mean arterial pressure between the groups was not significant at this point. Immediately after extubation, mean arterial pressure of the participants between the groups was not significant at this point. One minute after extubation, mean arterial pressure of the participants in between the groups was not significant. When tested with Anova, the changes in mean arterial pressure within the groups were significant statistically.

Dexmedetomidine group: Anova value=99.88; p<0.001. Verapamil group: Anova value=29.62; p<0.001. Similarly at 3 min, 5 min and 10 mins after extubation, the difference in mean arterial pressure values between the groups were also significant statistically when tested with unpaired t-test.

#### Extubation Quality:

80% of the patients in the Dexmedetomidine group could be extubated smoothly with no coughing. Whereas 56.66% patients in Verapamil group showed minimal coughing. In Verapamil group, around 16.67% patients showed moderate coughing.

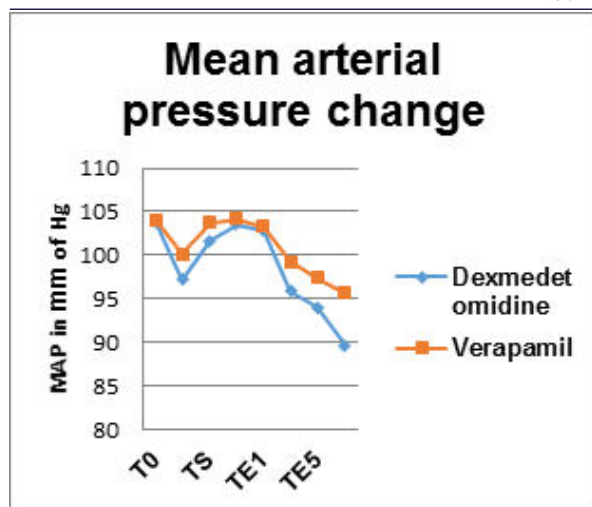


Figure 2: Line Diagram Showing The Changes In Mean Arterial Pressure Between The Groups

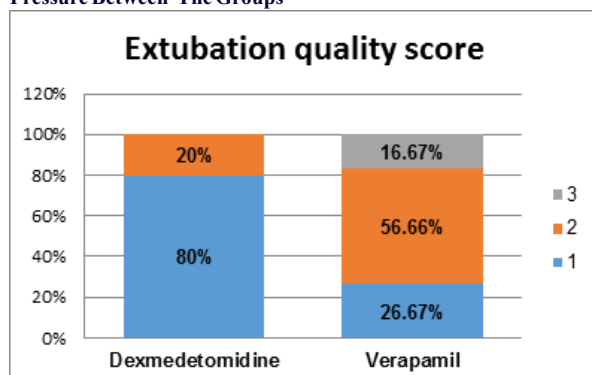


Figure 3: Compound bar diagram showing the Extubation quality score between the groups

## DISCUSSION

Tracheal extubation is associated with acute, transient, significant and undesirable hemodynamic and airway responses that may persist into the recovery period. we have attempted to evaluate and compare the efficacy of intravenous verapamil (phenylalkylamine group of calcium channel blocker) and dexmedetomidine ( $\alpha_2$ -adrenoceptor agonist) on attenuation of the airway and hemodynamic responses following tracheal extubation in patients undergoing elective surgery under general anesthesia.

## HEART RATE:

From the results of our study, in group D heart rate has been decreased after two minutes of study medication. Comparison between the two groups Dexmedetomidine and Verapamil demonstrated that there was no statistically significant difference between the mean HR values of the two groups at baseline but the significant difference has been noticed between two groups after two minutes of medication, after suction and immediately after extubation. After 1min, 3 min, 5 min and 10 mins of extubation, the mean heart rate of the participants in each group was decreasing, but the decrease was more in Dexmedetomidine group than Verapamil group. This is in correlation to the study by **Tuhin Mistry et al** which showed HR recorded was below the baseline values in the Dexmedetomidine group at all measurement times was but HR increased in Group V immediately after suction and extubation which concurred with our study results.

Our study results were also in accordance with the results of **Shruthi AH at al**, and **ShikhaGoyal et al**, who observed that Dexmedetomidine 0.5  $\mu\text{g}/\text{kg}$  given before extubation was able to suppress the HR response to extubation.

## MEAN ARTERIAL PRESSURE

From the results of our study, In group D mean MAP has been decreased after two minutes of study medication when compared to the verapamil group. Comparison between the two groups by taking results and data into consideration, dexmedetomidine and verapamil

demonstrated that there was no statistically significant difference between the MAP values of the two groups at baseline. After 2 mins of medication, a MAP of the participants in the two groups was significant at this point. In the study done by **Tuhin Mistry et al**, they found that the MAP values were below the baseline values in the Dexmedetomidine group than verapamil group at all measurement times which was in accordance with our results. In our study, there was a lesser rise in the MAP during suction ( $T_s$ ) and extubation ( $T_e$ ) in Group D compared to Group V which could be due to dexmedetomidine-induced sedation, analgesia and decreased catecholamine levels, inhibition of central sympathetic outflow and enhanced vagal activity. In the present study results were also in accordance with the results of **Shruthi AH et al**, who observed that Dexmedetomidine 0.5  $\mu\text{g}/\text{kg}$  given before extubation was able to suppress the pressor response to extubation.

## EXTUBATION QUALITY SCORE:

Most of the patients in the Dexmedetomidine group could be extubated smoothly with no coughing, whereas about half of the patients in Verapamil group showed minimal coughing at the time of extubation. None in Dexmedetomidine group showed moderate coughing. This observation is in agreement with **Kothari et al**, whose study showed that Dexmedetomidine produced a high degree of sedation and thus there was no incidence of coughing or breath holding.

## CONCLUSION :

The conclusion from our study showed Patients on dexmedetomidine had a better control of HR and hemodynamics as compared to verapamil after study medication was given and at the time of extubation and the period following extubation. The Quality of Extubation was observed to be better with the dexmedetomidine as compared with that of verapamil.

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