Original Research Paper

Volume - 13 | Issue - 03 | March - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Anaesthesiology

EFFECT OF NEBULISED DEXMEDETOMIDINE IN BLUNTING HAEMODYNAMIC RESPONSE TO INTUBATION- A RANDOMIZED DOUBLE BLIND CONTROLLED STUDY

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ABSTRACT **BACKGROUND:** Dexmedetomidine, an alpha-2 agonist, has been used for attenuation of he- modynamic response to laryngoscopy but not through the nebulized route. We evaluated the effects of preoperative dexmedetomidine nebulization on the hemodynamic response to laryngoscopy and intubation. **AIM:** To evaluate the effects of nebulised dexmedetomidine as a premedication in Blunting the haemodynamic response to laryngoscopy and tracheal intubation. **MATERIALS AND METHODS:** After written informed consent and ethics committee approval, 50 patientsBelonging to ASA status I or II were randomly allocated to two groups.Patients not Giving consent,predicted airway difficulty and uncontrolled hypertension were Excluded. All the patients were monitored by ASA standard monitors.They were Randomized into two groups- C and D Group C received 5 ml of normal saline and Group D received 5 ml of dexmedetomidine at a dose of 1 µg/kg as nebulisation 10 mins prior to induction.Then the patients were premedicated and induced with Propofol and intubated after giving a non depolarizing muscle relaxant. Vital monitoring like HR,SBP,DBP,MAP,SPO2,was noted at baseline, post nebulization ,post intubation at 1,5,10 minutes. **RESULTS:** Demographic details and surgery characteristics were comparable between the Groups.Heart rate between the two groups were comparable.The MAP,SBP and DBP values after intubation were lower in group D, which was statistically Significant($P<0.05$).The mean dose of propofol for induction was also lower in Group D. **CONCLUSION:** To conclude,nebulised dexmedetomidine effectively blunts the pressor response To laryngoscopy and intubation with no serious adverse effects.

KEYWORDS : Dexmedetomidine,laryngoscopy,intubation, Propofol,premedication,nebulisation.

INTRODUCTION

Direct laryngoscopy and tracheal intubation following induction of anesthesia are associated with hemodynamic changes due to increased sympathoadrenal activity, which may result in hypertension and tachycardia . Although transient, this exaggerated response may precipitate hypertensive crises, myocardial ischemia, arrhythmias, or in- creases in intracranial pressure in susceptible individuals.

Various drugs-including local anesthetics, beta-blockers, calcium channel blockers, and narcotic analgesics-have been tried to blunt the laryngoscopy and intubation response, with varied success.Dexmedetomidine is a potent and highly selective alpha-2 receptor agonist with sympatholytic, sedative, amnestic, and analgesic properties The efficacy of dexmedetomidine in decreasing the hemodynamic response to laryngoscopy and intu- bation has been studied through intravenous, intranasal, and intramuscular routes. However, intravenous administration may cause bradycardia and hypotension, and intra- nasal administration may be associated with irritation .

Nebulized dexmedetomidine, administered in doses of 1 and 2 µg/kg has been found to be an effective premedication in pediat- ric patients . Nebulized dexmedetomidine may offer an at- tractive alternative to both intravenous as well as intranasal routes of administration because drug deposition following nebulization takes place over nasal, buccal, as well as respiratory mucosa.

AIM OF THE STUDY

To evaluate the effects of nebulised dexmedetomidine as a premedication in Blunting the haemodynamic response to laryngoscopy and tracheal intubation.

MATERIALS AND METHODS

A Hospital based randomized controlled trial conducted in a tertiary care hospital over a period of 6 months from May 2021 to September 2021,after getting the Institutional Ethics Committee approval and all the patients gave informed and written consent to participate in the study.

Group C :
Group c received 5 ml of normal saline.

Group D :
Group D received 5ml of Dexmedetomidine at a dose of 1 microgram per kg as nebulisation 10 min prior to induction .

Inclusion criteria:
Patients belonging to American Society of Anesthesiologists (ASA) Physical Status 1 or 2 with normal airway belongings to both genders undergoing elective surgery under general anesthesia with endotracheal intubation.

Exclusion criteria:
Patients with predicted difficult airway
Seizure disorder
Uncontrolled hypertension
Poor Cardiovascular reserve
Renal failure
Pregnancy

PROCEDURE

After shifting the patient to ot ,ASA monitors attached and secured 18 G iv cannula .They were Randomized into 2 groups- Group C received 5 ml of normal saline & Group D received 5ml of Dexmedetomidine at a dose of 1ug / kg as nebulisation 10 min prior to induction .Then patients were premeditated with inj.glycopyrrolate 0.02 mg/ kg ,inj. Fentanyl 2ug /kg ,& induced with inj. Propofol(1-2 mg/kg) , intubated with inj. Atracurium 0.5 mg/ kg.Patients HR,SBP,DBP,MAP,SPO2, Parameters were noted at baseline,pre nebulisation ,post nebulisation at 1,5 & 10 mins.After the procedure the patient reversed with inj. Glycopyrrolate & neostigmine and shifted to PACU.all of them received 1 gm inj. Paracetamol intraoperatively.

STATISTICAL ANALYSIS:

- Data entered in MS excel and analyzed by using SPSS software.
- Qualitative data was represented as frequencies or percentages and quantitative data was represented as means and standard deviation. Chisquare test was used to know the statistical significance between qualitative variables.
- Unpaired t test was used to know the statistical significance between quantitative variables.
- P value <0.05 was considered as statistically significant.

RESULTS

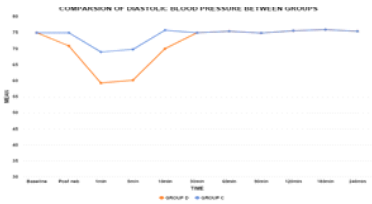

FIGURE1. Comparison of mean systolic blood pressure between 2 groups

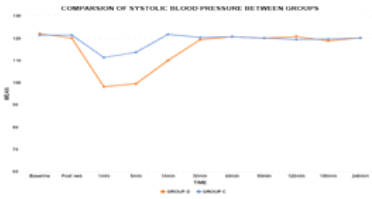

FIGURE 2:

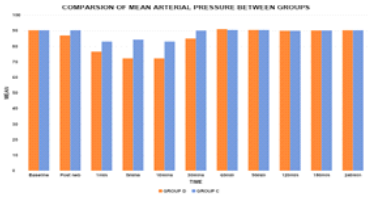

FIGURE 3: comparison of mean arterial pressure between two groups

- The MAP,SBP,DBP values after nebulisation and immediately after intubation were comparable and significant between both the groups.
- The MAP values after intubation were lower in group D, which was statistically significant with p value <0.001 at 1,5,10min post intubation.
- The SBP values at 1, 5 and 10 min after intubation were lower in group D in a statistically significant manner with p values of <0.01.
- The DBP values following laryngoscopy and intubation at 1, 5 and 10 min were lower in group D, which was statistically significant with p values of <0.001

DISCUSSION

α2 adrenergic receptor agonists have sedative, analgesic, perioperative sympatholytic, anesthetic-sparing, and hemodynamic-stabilization properties. Dexmedetomidine, a highly selective α2agonist with a relatively high ratio of α2/ α1-activity (1620:1),possesses all these properties but lacks respiratory depression making it a useful and safe adjunct in diverse clinical applications. Dexmedetomidine is known to attenuate hypertensive responses associated with intubation, surgical stimulation and laryngoscopy by decrease in serum norepinephrine concentration that leads to a dose-dependent decrease in BP and HR without side effects such as respiratory depression. Dexmedetomidine through nebulised route which is a noninvasive method for attenuation of intubation stress response by making use of its rapid onset and good bioavailability through the large surface area of the mucosa. It avoids transient nasal irritation, cough, vocal cord irritation or laryngospasm over intranasal administration and also adverse effects of bradycardia and hypotension by its intravenous route. In our study we compared nebulized dexmedetomidine with the control group and found that nebulized dexmedetomidine reduces the hemodynamic response to laryngoscopy and intubation. There was a statistically significant decrease in MAP at 1,5 and 10 min after intubation in group D and also a statistically significant intra-group decline in MAP as compared to the baseline. Dexmedetomidine through nebulised route which is a noninvasive method for attenuation of intubation stress response by making use of its rapid onset and good bioavailability through the large surface area of the mucosa. It avoids transient nasal irritation, cough, vocal cord irritation or laryngospasm over intranasal administration and also adverse effects of bradycardia and hypotension by its intravenous route .

In our study we compared nebulized dexmedetomidine with the control group and found that nebulized dexmedetomidine reduced the hemodynamic response to laryngoscopy and intubation.There was a statistically significant decrease in MAP at 1,5 and 10 min after intubation in group D and also a statistically significant intra-group decline in MAP as compared to the baseline.

In a study by H S Abdel-Ghaffar et al Preschool children premedicated with nebulised dexmedetomidine had more satisfactory sedation, shorter recovery time, and less postoperative agitation than those who received nebulised ketamine or midazolam.

In a study by Lakshmi Mahajan et al,the attenuation of the pressor responses to laryngoscopy and endotracheal intubation with intravenous dexmedetomidine versus magnesium sulfate under bispectral index-controlled anesthesia found that by maintaining a suitable anesthetic depth using BIS index of 40–50 as a guide, the pressor response to laryngoscopy and intubation can be adequately obtunded.

In a study by M Natarajan Surendar et al compared Dexmedetomidine, Midazolam and Ketamine and all the three drugs evaluated in the study can be used safely and effectively through IN route in uncooperative pediatric dental patients for producing moderate sedation and the overall success rate is more for dexmedetomidine group.

In a study by Parul Uppal Malhotra et al, compared Oral midazolam–ketamine combination and intranasal dexmedetomidine and concluded both can be used safely and effectively in uncooperative pediatric dental patients for producing conscious sedation.

In a study by Neha Sharma et al, Dexmedetomidine when used as infusion in the loading dose of 0.5 μg/kg or 1.0 μg/kg reduces the induction dose of propofol but also in providing good intubating conditions and blunting the hemodynamic response to intubation and lower dose has less incidence of adverse effects like hypotension and bradycardia.

Nebulised dexmedetomidine given before induction was contemplated as it has a very short distribution half-life of 6 min and elimination half-time of 2 h without the adverse haemodynamic effects of IV dexmedetomidine and added advantage of avoiding bronchospasm over lignocaine and 1 μ/kg is clinically effective by both intranasal and IV routes .

CONCLUSION

Nebulised dexmedetomidine at a dose of 1 ug / kg ,10 minutes prior to induction,effectively blunts the pressor response to laryngoscopy and intubation with no serious adverse effects.

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