Original Research Paper

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"PRE OPERATIVE LOW DOSE DEXMEDETOMIDINE FOR ATTENUATION OF PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION IN ELECTIVE SURGICAL PATIENTS UNDER GENERAL ANAESTHESIA. A PROSPECTIVE OBSERVATIONAL ANALYTIC STUDY"

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ABSTRACT

Background: Dexmedetomidine is a α2 agonist with sedative, sympatholytic and analgesic properties and hence, it can be a very useful adjuvant in anaesthesia as stress response buster, sedative and analgesic. We aimed primarily to evaluate the effects of low dose dexmedetomidine for attenuation of haemodynamic pressor response to laryngoscopy and endotracheal intubation. The secondary aim was to observe the requirement of induction dose of propofol and occurrence of adverse effects.

Methods: Eighty patients of American Society of Anaesthesiologists(ASA) physical grades Iand II undergoing surgical procedures under general anaesthesia were divided into two groups of 40 patients each. Group I (control group) patients who received 20 ml normal saline IV as infusion over 10 minutes before induction.Group II (dexmeditomidine group) patients who received IV dexmedetomidine 0.5 µg/kg diluted to 20 ml with normal saline as infusion over 10 minutes before induction. Parameters noted were heart rate, systolic ,diastolic and mean BP at baseline and upto 20 minutes of endotracheal intubation, induction dose of propofol. Statistical software: Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software.

Results: In dexmedetomidine group, the haemodynamic pressor response to laryngoscopy and tracheal intubation was significantly attenuated with 0.5 ug/kg dose as compare to control group. Dose of Propofol for induction is significantly reduced in dexmeditomidine group. No significant side effects noted.

Conclusion: It is recommended that the use of low dose Injection Dexmedetomidine 0.5 mcg/kg as premedication is effective for suppression of pressor response to direct laryngoscopy and intubation. It also reduces dose requirement of Propofol.

KEYWORDS : Dexmeditomidine, Pressor Response, Laryngoscopy And Intubation, Propofol

INTRODUCTION

In the modern anaesthesia , airway management has been a challenge. The first direct laryngoscopy was performed in 1895 by Alfred Kirstein. Anaesthesia is associated with haemodynamic changes due to reflex sympathetic discharge caused by epipharyngeal and laryngopharyngeal stimulation. This increase in sympathoadrenal activity may result in hypertension, tachycardia and arrhythmia [1,2]. This increase in blood pressure is transient, variable and unpredictable. Transient hypertension and tachycardia are probably of no consequence in healthy individual but either or both may be hazardous to those with hypertension ,myocardial insufficiency and cerebrovascular disorders .At least in such individuals there is necessity to blunt this response.

Many methods like lignocaine, opioids ,calcium channel blockers , beta blockers ,alpha 2 blockers have been tried to attenuate pressor response. But these have it's own limitations and drawbacks. Dexmedetomidine being selective Alpha 2 agonist causes symphatholysis, sedation, anxiolysis,and analgesia have been tried by many to reduce pressor response.

METHODOLOGY:

Sampling method Consecutive A Prospective ,observational , analytic study at Tertiary government hospital.Sample size: Duration based , out of the patients scheduled for surgery under general anaesthesia during the period sampling.

After obtaining informed consent and ethic committee approval a total of 80 patients were studied which were posted for elective surgeries under general anaesthesia in the age group of 18-50 years and ASA I and II. Patients with Known case of cerebrovascular, neurologic, respiratory or ischemic heart disease, renal and hepatic dysfunction ,uncontrolled hypertension, diabetes mellitus, pheochromocytoma ,Known drug allergy to dexmedetomidine , on β-blockers, antidepressants, anxiolytics, anticonvulsant or antipsychotics , predicted difficult airway , requiring more than 15 secs for intubation ,BMI more than 30 kg/m2 , Pregnancy were excluded

A detailed history and pre anaesthetic evaluation were done on the previous day of the surgery. Routine investigations like haemoglobin, blood grouping, serum electrolytes, blood sugar were done. Written informed consent was taken prior to scheduled operation from the patients .Patients were kept nil oral for 6 hrs before the surgery. Patients were shifted to the operation theatre. Patients receiving normal saline will be named as group I and those receiving dexmedetomidine will be named as group II.

Group I (control group) patients who received20 ml normal saline IV as infusion over 10 min by using syringe infusion pump.

Group II patients whoreceived IV dexmedetomidine 0.5 µg/kg diluted to 20 ml with normal saline as infusion over 10 min by using syringe infusion pump.

All patients were monitored with electrocardiography, pulse oximetry and blood infusion pressure. Baseline heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial blood pressure (MAP) and oxygen saturation (SpO_2) was measured.

A peripheral intravenous line was secured with 20 Gauge intravenous cannula and ringer lactate solution started as maintenance fluid. Inj glycopyrrolate (4µg/kg) iv was given. Normal saline 20 ml as infusion over 10 min or inj dexmedetomidine 0.5 µg/kg diluted to 20 ml with normal saline as infusion given over 10 min by using syringe pump. The patients were premedicated with Inj Ranitidine 1mg/kg , Inj Ondensatron 0.01mcg/kg, Inj Midazolam(0.02mg/kg) ,Inj Fentanyl.

Patients were pre oxygenated with 100% O2 by mask for 3 min. Just after premedication induction done with inj Propofol IV till the loss of eyelash reflex .Mask ventilation confirmed . Inj Suxamethonium 2 mg/kg was given to fecilitate intubation. Intubation done under direct laryngoscopic vision. Anaesthesia was maintained on O2 +N2O (50:50) + inhalational anaesthetic isoflurane. Long acting muscle relaxant vecuronium(0.1mg/kg) is used.

The primary objective was to assess reduction in pressor response to intubation by measuring heart rate ,blood pressure at basal, after study drug, after premedication, after propofol, after suxamethonium,during laryngoscopy, after intubation ,after 30sec, 1 min,1 1/2 min,2min,3min,4min, 5 min,10 min.15min, and 20min after intubation.

The level of reduction in pressor response was assessed by comparing base line value of heart rate ,blood pressure. Any other adverse effects were also recorded.

Statistical Analysis:[56-59]

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test** was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. **Independent t test** was

used as test of significance to identify the mean difference between two quantitative variables.

Graphical Representation Of Data:
MS Excel and MS word was used to obtain various types of graphs such as bar diagram, Line diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical Software:
MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

All demograghic characteristics including age, weight ,sex were comparable in both groups with no statistical difference between them.

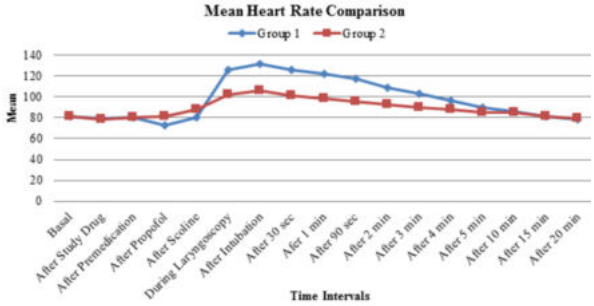

Figure 1 Mean Heart Rate Comparison Between Two Groups At Different Time Intervals

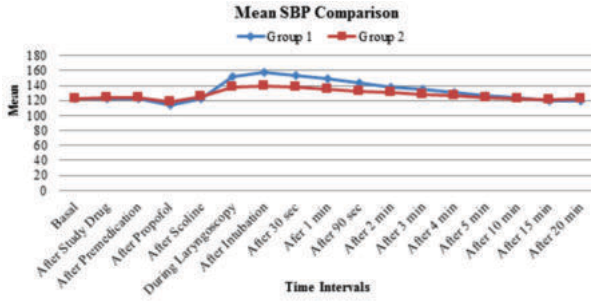

Figure 2: Line Diagram Showing Mean SBP Comparison Between Two Groups At Different Time Intervals

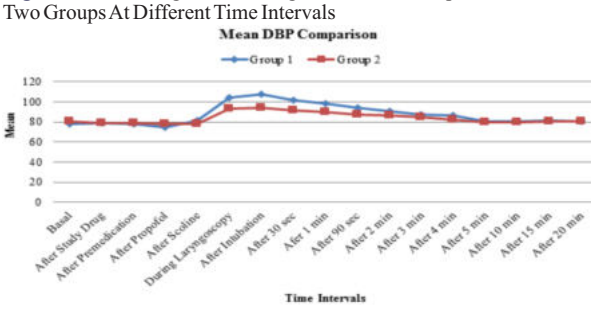

Figure 3: Line Diagram Showing Mean DBP Comparison Between Two Groups At Different Time Intervals

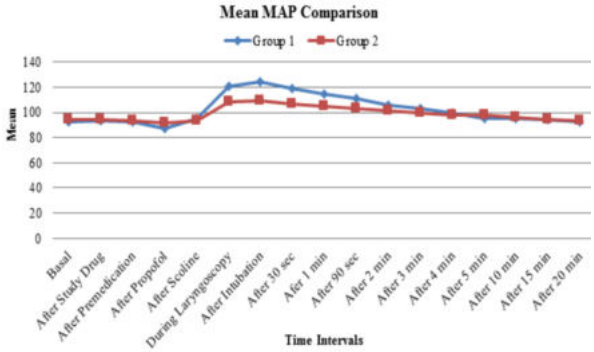

Figure 4: Line Diagram Showing Mean MAP Comparison Between Two Groups At Different Time Intervals

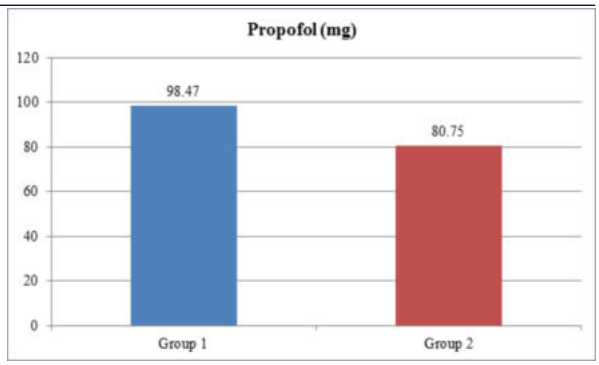

Figure 5: Bar Diagram Showing Propofol Used Comparison Between Two Groups

DISCUSSION

Direct laryngoscopy and endotracheal intubation following induction of anaesthesia is associated with haemodynamic changes due to reflex sympathetic discharge . This increase in sympathoadrenal activity may result in hypertension, tachycardia and arrhythmia [1-2]. This increase in blood pressure is transient, variable and unpredictable. Transient hypertension and tachycardia are probably of no consequence in healthy individual but either or both may be hazardous to those with hypertension ,myocardial insufficiency and cerebrovascular disorders .At least in such individual there is necessity to blunt this response.

Many methods like lignocaine,opioids ,calcium channel blockers , beta blockers ,alpha 2 blockers have been tried to attenuate pressor response[3,4,5]. But these have it's own limitations and drawbacks. Dexmedetomidine being selective Alpha 2 agonist causes symphatholysis, sedation, anxiolysis,and analgesia have been tried by many to reduce pressor response.[6,7]

This study was designed to observe the usefulness dexmedetomidine in reduction of sympathetic discharge to laryngoscopy and intubation.Patient's heart rate ,blood pressure were monitored after study drug, after premedication, after propofol, after suxamethonium, during laryngoscopy, after intubation ,after 30sec, 1 min,1 1/2 min,2min,3min,4min, 5 min,10 min.15min, and 20min after intubation and compared with basal value.

Many studies have been conducted on dexmedetomidine in reduction of pressor response[7,8,9] and their results will be discussed briefly and compared with present study.. Mean HR at after Propofol and from during laryngoscopy to after 5 min of intubation was significantly high in Group 1 (control group) compared to Group 2 (Dexmedetomidine group). After 10 – 20 min after intubation both groups were comparable. Mean SBP between two groups at after Propofol and from during laryngoscopy to after 5 min of intubation. At these intervals mean SBP was significantly high in Group 1(control group) compared to Group 2 (Dexmedetomidine group). In this study there was significant difference in mean DBP between two groups at all the intervals except at baseline, after study drug, after premedication, after 5min ,10-20 min. At these intervals mean DBP was high in Group 1(control group) compared to Group 2(Dexmedetomidine group). MAP between two groups at all the intervals except at baseline, after study drug, after premedication, after Scoline, and from 10 min to 20 min. At these intervals mean MAP was high in Group 1(Control group) compared to Group 2 (Dexmedetomidine group.

The requirement of Propofol in Group 1 [control group], mean Propofol required was 98.47 ± 9.66 mg and in Group 2 [dexmedetomidine group] was 80.75 ± 11.17 mg. There was significant difference in mean Propofol between two groups.Results are matching study by[8]

Dose Of Dexmedetomidine

In my study we used 0.5 mcg/kg dose and found that there was statistically significant reduction of raise in HR,SBP,DBP and MAP from premedication, induction,succanyl choline, laryngoscopy, intubation till 5 min after intubation. Also causes significant reduction of induction agent.

Sukhminder Jit Singh Bajwa (2012) found that reduction in heart rate ,SBP, DBP,MAP highly significant on statistical comparison

(P<0.001). The laryngoscopy , intubation , after 1, 3 and 5 min of intubation was associated with a significant rise of MAP in control group as compared with group (P<0.001)[10]

In 2012 Sajith Sulaiman observed that attenuation of in heart rate ,SBP, DBP MBP in Dexmedetomidine group values at study drug,1,3,and 5 minutes after intubation statistically significant compared with control group { p 0.001} which was comparable with my study.[11]

Similar results were obtained by R. Saraf in 2013 [12] heart rate ,SBP, DBP MBP in Dexmedetomidine group.

A study conducted by Fayaz Ahmad Munshi in 2015[13] and study conducted by Dr A.Venkateswara rao in 2015 noted that the difference in heart rate ,SBP, DBP, MBP between normal saline and Dexmedetomidine group remain statistically significant at all times of assessment before[premedication] and after induction and at the intervals if 1, 3,5 minutes from the onset of laryngoscopy and intubation (P<0.01) which was similar to present study.[14]But dose used by Fayaz Munshi of 1 ug/kg resulted in episodes of bradycardia needing treatment with atropine.

In 2018 Suman Gupta noted group S(control group) highly significant rise was found in DBP during laryngoscopy and intubation which became significant at 1 min after intubation. [15]Thereafter, at 15 min after pneumoperitoneum and after extubation again highly significant rise in DBP was observed compared with Dexmedetomidine group. Similar results noted with heart rate,SBP and MAP.

ALESSANDRO CASSAI et al (2021) studied a metaanalysis on effect of dexmeditomidine on hemodynamic response to tracheal intubation .Results showed that dexmeditomidine before induction leads to lowering of blood pressure and heart rate. It also attenuates noxious hemodynamic response to laryngoscopy and intubation. Clinically relevant bradycardia may occur with dexmeditomidine premedication. A lower dexmeditomedine dose may attenuate bradycardia risk. Results reinforce our study results and recommendation for use of lower dose.[16]

CONCLUSION

it is recommended that the use of low dose Injection Dexmedetomidine 0.5 mcg/kg as premedication is effective for suppression of pressor response to direct laryngoscopy and intubation.It also reduces dose requirement of propofol.

Our study had a few limitations.
1) The study was done in a single centre. So, the results cannot be extrapolated to the entire population, for which a larger sample size would be required.
2) We studied only low risk patients (ASA I-II) with normal airways.
3) Study not observed patients awareness or sedtion due to dexmedetomidine after extubation.

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