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COMPARISON BETWEEN DIFFERENT DOSES OF DEXMEDETOMIDINE IN PRODUCING CONTROLLED HYPOTENSION IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY

Anaesthesiology

Dr. Keerthana D Post Graduate Trainee, Department of Anaesthesiology, Assam Medical College and Hospital, Dibrugarh, Assam, India.

Dr. Priyadharshini D MBBS

Dr. Karuna Kumar Das M.D., Professor and Head, Department of Anaesthesiology, Assam Medical College and Hospital, Dibrugarh, Assam, India.

ABSTRACT

Background The purpose of the study is to compare the different doses of dexmedetomidine in producing controlled hypotension in FESS. Excessive bleeding in the surgical field is a major concern during FESS under general anaesthesia which can be reduced by using a technique called controlled hypotension. **Method** In our present observational study, 45 patients aged from 18 to 50 years with ASA I and II undergoing elective FESS were enrolled in this study. Before the induction of anaesthesia, the patients were divided into three groups;(n=15 in each group). group A received a dexmedetomidine bolus dose of 1mcg/kg followed by an infusion of 0.7mcg/kg/hr and group B received a dexmedetomidine bolus dose of 1mcg/kg followed by an infusion of 0.5mcg/kg/hr and group C received a dexmedetomidine bolus dose of 1mcg/kg followed by an infusion of 0.3mcg/kg/hr. The mean arterial pressure (MAP) was maintained between 55 and 65 mmHg. The surgical field quality was assessed by using Fromme et al. bleeding score. **Results** The intraoperative MAP in group A was maintained within the target range at all time intervals. In group B, MAP showed fluctuation at different time intervals. Fromme et al. bleeding score showed the lowest values in group A and the highest in group B. The difference between the two groups was statistically significant (p-value <0.05) **Conclusion** Dexmedetomidine as bolus 1mcg/kg IV followed by infusion of 0.7mcg/kg/hr significantly decreased the MAP to the target level and provided a satisfactory surgical field.

KEYWORDS

Dexmedetomidine, Controlled Hypotension, Mean Arterial Pressure.

INTRODUCTION

Functional endoscopic sinus surgery is a minimally invasive procedure and is commonly performed under controlled hypotensive anaesthesia.(1)

Controlled hypotension is defined as a reduction of the systolic blood pressure to 80–90mm Hg, a reduction of mean arterial pressure (MAP) to 50–65mm Hg or a 30% reduction of baseline MAP. (2)

Controlled hypotension is used as a means of limiting intraoperative blood losses or limiting the need of blood transfusions, it is also used to achieve a clear operative field which is needed for successful middle ear microsurgery and FESS.(1)

Several pharmaceuticals have been used successfully to produce controlled hypotension during general anesthesia. One of the methods is by using dexmedetomidine. Dexmedetomidine is the dextro-rotatory S-enantiomer of medetomidine, is a highly selective α2 adreno-receptor agonist with a high affinity to α2 receptor than clonidine and this makes dexmedetomidine primarily sedative and anxiolytic. The predominant clinical effect of dexmedetomidine is principally due to its action in the brain stem and in the spinal cord. α2A adrenergic receptor stimulation in brain and spinal cord most likely produces hypotension, bradycardia, sedation and analgesia. (3)

In this study we compared and determined the efficacy of different dexmedetomidine doses in producing controlled hypotension during functional endoscopic sinus surgery.

METHODOLOGY

- PLACE OF STUDY: Department of anaesthesiology, Assam medical college, Dibrugarh.
- STUDY DESIGN : A comparative observational study.
- DURATION OF THE STUDY : 3 months
- STUDY POPULATION : Patients aged between 18 and 50 Who underwent elective functional endoscopic sinus surgeries
- STUDY SUBJECTS : Sample size of 15patients in each Group (n=45)
- ETHICAL CLEARANCE : Ethical clearance was obtained From Institutional Ethics Committee (human) of Assam medical college and hospital before starting the Research.

Participants

Inclusion Criteria

Age between 18 to 50 years.
ASA Grade I and II
Willing to give informed consent.

Exclusion Criteria

Age less than 18 and more than 50 years
ASA III and IV
Patient's refusal
History of allergies to particular drugs (local anesthetic, antihistamines

Statistical Analysis

The collected data was reviewed in specially designed sheet and analyzed by SPSS version statistics software 23.0Version. Data descriptive statistics frequency analysis was used to describe descriptive data and percentage analysis was used for categorical variables. For continuous variables mean and standard deviation were used. Independent t-test was used for finding the significant difference between bi variate samples in Independent Groups and to find significant difference in categorical data. A probability value of ≤0.05 was considered to be significant.

Intervention

After detailed pre-operative assessment, patient was shifted to the operation theatre and their vital parameters were recorded before induction. Before inducing general anaesthesia the participants were allocated into three groups, where everyone had received bolus dose of dexmedetomidine 1µg/kg iv infusion over 10-20mins and followed by,

- Group A, in which patients after receiving bolus dose of dexmedetomidine 1µg/kg iv, continuous iv infusion of 0.7µg/kg/hr was started.
- Group B, in which patients after receiving bolus dose of dexmedetomidine 1 µg/kg iv, continuous iv infusion of 0.5 µg/kg/hr was started.
- Group C, Patients after receiving bolus dose of dexmedetomidine, continuous iv infusion of 0.3 µg/kg/hr was started.
- Then patients were induced with propofol 1 to 2.5mg/kg and non-depolarizing muscle relaxant atracurium 0.5mg/kg and patients were intubated with appropriate size endotracheal tubes and was secured after confirming the air entry on both sides. Meanwhile the ongoing dexmedetomidine infusion was monitored. Maintained the plane of anaesthesia with non-depolarizing muscle relaxant, inhalation anesthetics like sevoflurane and mixture of medical air and oxygen in the ratio of 3:2. The target MAP is 55–65 mmHg, if not achieved by the infused study drug, nitroglycerin infusion was added in a titrating manner started with 0.1µg/kg/min and

increased gradually till the target MAP is reached.

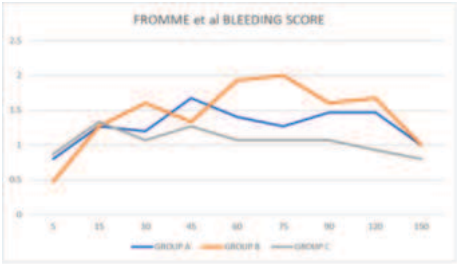
- During the intra-op and post op period patient pulse rate (PR), systolic blood pressure (SAP), diastolic blood pressure (DBP) and mean arterial blood pressure (MAP), oxygen saturation (SPO2) was monitored and recorded. The surgical field quality was assessed periodically using Fromme et al. bleeding score adapted by Boezaart et al and recorded. After extubation patient's sedation was assessed and they were shifted to recovery room to monitor the vitals, recovery from sedation, bleeding from surgical site and adverse effects due to drugs and to the procedure.

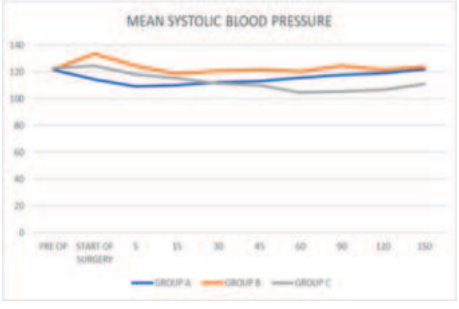
Fromme Et Al Bleeding Score

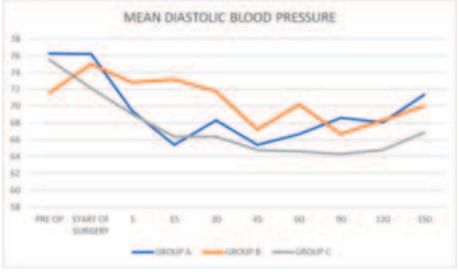
The surgical field quality can be assessed by using Fromme et al. bleeding score adapted by Boezaart et al. Assessment of blood loss obtained from quantity of blood clots collected in the suction canister and visual assessment of surgical field using a 6 point grading system mentioned below.

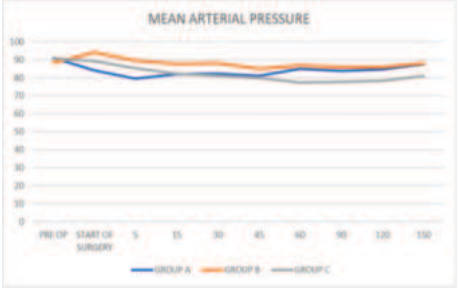
- Grade 0 = no bleeding
- Grade 1 = slight bleeding so blood evacuation not necessary
- Grade 2 = slight bleeding so sometimes blood has to be evacuated
- Grade 3 = low bleeding so blood has to be often evacuated and operative field is visible for some seconds after evacuation
- Grade 4 = average bleeding so blood has to be often evacuated, and operative field is visible only right after evacuation and
- Grade 5 = high bleeding so constant blood evacuation is needed, sometimes bleeding exceeds evacuation and surgery is hardly possible.

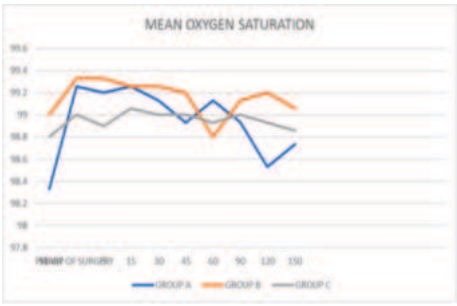
RESULTS AND OBSERVATIONS

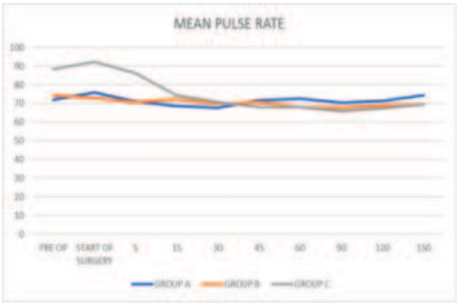












DISCUSSION

- **Fromme et al bleeding score** was significantly reduced in group A (score 0 to 2) and in group B (score 0 to 2) when compared to group C (score 1 to 3).
- All demographic characteristics are comparable between the groups.
- Target MAP was well maintained in group A (66± 11) and Group B (62 ± 33) when compared to group C (72±15).
- The mean pulse rate in group A is (64±12), in Group B is (59±13) and in group C is (76 ± 14).
- The incidences of hypotension and bradycardia were very high in group B which required aggressive intervention.
- Group A provided an optimal surgical field with less adverse events when compared to other two groups.

CONCLUSION

- Dexmedetomidine provides better surgical operative condition during FESS.
- Bolus dose of dexmedetomidine 1µg/kg iv followed by continuous iv infusion of 0.2µg/kg/hr provides an optimal surgical field with less side effects.
- Bolus dose of dexmedetomidine 1µg/kg iv followed by continuous iv infusion of 0.4µg/kg/hr provides better operative conditions at the expense of higher incidence of adverse hemodynamic events.

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