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A study on the effectiveness of dexmedetomidine and esmolol for induced hypotension in functional endoscopic sinus surgery.

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I. Introduction:

In order to facilitate surgery and lessen the need for bleeding and transfusions, controlled hypotension, also known as induced hypotension, is a technique in which the arterial blood pressure is reduced in a predictable and intentional manner. Controlled hypotension's primary goals are to reduce intraoperative blood loss and enhance surgical field visibility is surgeries like Functional Endoscopic sinus surgery (FESS)(1,2). In order to achieve regulated hypotension, dexmedetomidine, a centrally acting -2 agonist, has been employed. Dexmedetomidine has very advantageous sedative, analgesic, and anaesthetic sparing properties. Esmolol, a selective -1 adrenergic antagonist with ultra-short action, is widely employed to treat induced hypotension(3). Esmolol also provides the additional benefits of reducing the need for postoperative analgesics and sparing opioids. Esmolol usage intraoperatively lowers anaesthetic needs and lowers opioid use postoperatively. Dexmedetomidine and Esmolol are being compared in this study's functional endoscopic sinus surgery section for efficacy and safety(4).

Aims and Objectives:
To assess Dexmedetomidine and Esmolol's effectiveness in inducing hypotension during functional endoscopic sinus surgery.

II. Materials And Methods:

This was a randomized, prospective, single blinded, comparative study. The study was started after receiving Institutional Ethical Committee approval and written informed consent from all the patients. Simple randomized sampling was done by computer generated random numbers. Sixty patients were studied, randomized into two groups of 30 each. Patients were allocated into three groups:
• Group A (n= 30): Patients receiving Dexmedetomidine
• Group B (n= 30 : Patients receiving Esmolol
Inclusion Criteria:
1. Age 20-50 yrs
2. ASA l &ll
3. Written informed consent
4. Posted for FESS surgery
Exclusion Criteria:
1. ASA grade III and IV
2. Known allergy to study drug
3. Recurrent sinus surgery
4. Hypertension
5. Patients with coagulopathies or receiving drugs influencing blood coagulation

Before the induction of anaesthesia, patients in Group A received a loading dose of 1 micro g/kg Dexmedetomidine dissolved in 10 ml of 0.9% saline that was administered over a period of 10 minutes. This was followed by a continuous infusion of 0.4 to 0.8 g/kg/h.
Before the induction of anaesthesia, patients in Group B received a loading dosage of 1 mg/kg of esmolol, which was then continuously given at a rate of 0.4–0.8 mg/kg/h. According to the Holliday Segar formula, patients were given lactated Ringer's solution. To enhance venous drainage, patients were positioned in a 15°

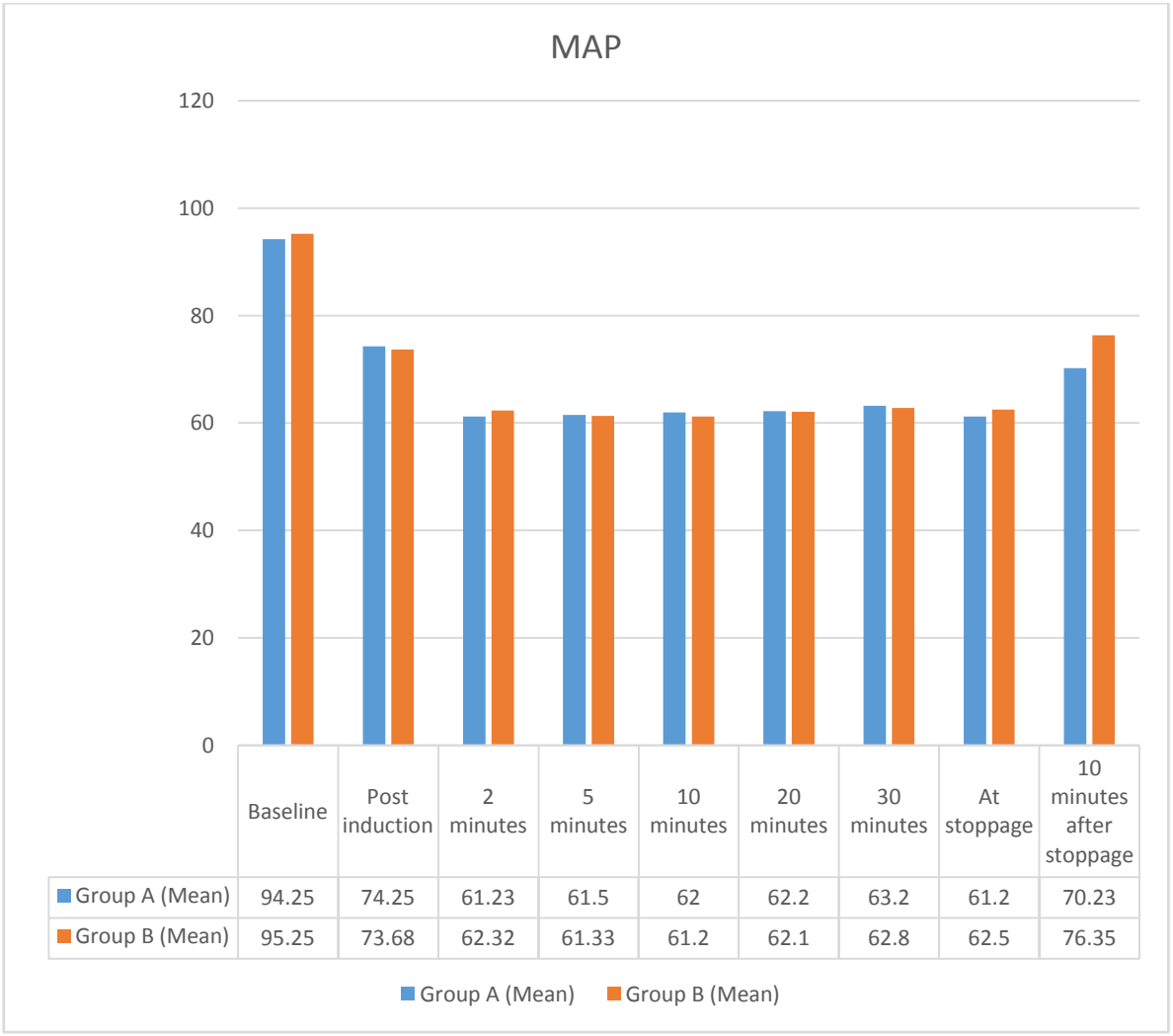
reverse Trendelenburg posture. To reduce blood loss, cottonoids were placed between the polyps and into the nasal cavity in both groups. The cottonoids were soaked with epinephrine at a dosage of 1:200,000.

III. Results:

The mean age of Group A was 31.2 ∓ 6.6 years and the mean age of Group B was 28.56 ∓ 4.6 years. The mean weight of group A was 60.2 ∓ 8.6 kgs and the mean weight of group B was 58.6 ∓ 7.5 kgs. The mean duration of surgery in group A and B were 42.2 ∓ 4.5 and 43.62 ∓ 4.3 minutes.

Intra operative mean arterial pressure:

Time	Group A (Mean)	Group B (Mean)	*P*- value	Significance
Baseline	94.25	95.25	0.8	Not significant
Post induction	74.25	73.68	0.68	Not significant
2 minutes	61.23	62.32	0.25	Not significant
5 minutes	61.50	61.33	0.15	Not significant
10 minutes	62.0	61.2	0.36	Not significant
20 minutes	62.2	62.1	0.45	Not significant
30 minutes	63.2	62.8	0.84	Not significant
At stoppage	61.2	62.5	0.65	Not significant
10 minutes after stoppage	70.23	76.35	<0.0001	Significant



Immediately following extubation, the Sedation Score was comparable between the two groups. In the postoperative phase, the Dexmedetomidine group's sedation scores were substantially greater than the Esmolol group's at 20 minutes (2.87 0.57 vs. 2.20 0.41; p value 0.0001) and at 40 minutes (2.7 0.51 vs. 2.07 0.25; p value 0.001).

When compared to the Esmolol group, the Dexmedetomidine group's time to the first analgesic request was substantially longer (53.23 5.84 vs. 30.67 6.48; p value 0.0001).

IV. Discussion:

Several studies have shown that managed hypotension helps functional endoscopic sinus surgeries go more quickly and with better results by improving operative field visibility.

Hypotension during surgery has been induced using a variety of medications. They include calcium channel blockers, beta-blockers, vasodilators, and anesthetic medications like propofol, opioids, and inhalational agents.

Many research comparing these drugs' hemodynamic stability, patient toleration, surgical field quality, etc. were done. Many research have been done to determine how effective dexmedetomidine is as a hypotensive medication. Dexmedetomidine also possesses analgesic, sedative, and anaesthetic sparing actions, which are extra benefits. Current research has focused on Esmolol's use as a hypotensive agent as well as its analgesic and anaesthetic sparing effects. In our research, the effectiveness of dexmedetomidine as a hypotensive drug is contrasted with that of esmolol.

In our investigation, we found that both groups' heart rates and blood pressure significantly decreased after induction. The intraoperative mean arterial pressure was successfully kept between the desired range of 55 and 65 mm of Hg by both medications. Sevoflurane or any other extra medications weren't required to keep the MAP within the acceptable range. These results coincided with those of the research of Erbesler et al(5).

Dexmedetomidine and esmolol were compared in a research by Reddy et al. to lessen the hemodynamic reaction to laryngoscopy and tracheal intubation. During laryngoscopy and intubation, the mean arterial pressure was considerably higher in patients receiving placebo (P 0.0001) and esmolol (P 0.0001) compared to baseline and Group D (P = 0.6294). At the time of intubation, Group D saw just a little increase in HR (P = 0.08481) and rate pressure product (P = 0.0666), both of which were statistically significant for up to 15 minutes(6).

V. Conclusion:

When doing functional endoscopic sinus surgery, both dexmedetomidine and esmolol are effective in creating the best possibleanaesthesia circumstances. There is a benefit of extended post-operative pain relief with dexmedetomidine. Esmolol, as opposed to Dexmedetomidine, offers the benefit of a quicker recovery.

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