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Original Research

Assessment of dexmedetomidine and esmolol for induced hypotension in nasal surgeries

[1]Manish Arya, [2]Tushar Arya

[1]Associate Professor, Department of ENT, Major S D Singh Medical College & Hospital, Farrukhabad, Uttar Pradesh, India;
[2]Professor, Department of Anaesthesiology, Major S D Singh Medical College & Hospital, Farrukhabad, Uttar Pradesh, India

ABSTRACT:
Background: Endoscopic nasal surgery is a minimally invasive procedure that uses an endoscope, a thin tube equipped with a camera and light, to access and treat conditions within the nasal cavity and sinuses.The present study was conducted to compare dexmedetomidine and esmolol for induced hypotension in nasal surgeries. **Materials & Methods:** 56 ASA physical status I or II patients aging 20-60 years scheduled for elective nasal surgery of both genderswere divided into 2 groups of 28 each. Group I patients received dexmedetomidine and group II patients received esmolol. Parameters such as arterial blood pressure (mm of Hg), pulse rate (bpm),blood loss during surgeries, Ramsay sedation scores and time to first analgesic request, Frommes' bleeding scale etc. were recorded. **Results:** The mean arterial blood pressure (mm of Hg) pre-operativewas 86.5 and 84.1 and post- operative was 61.5 and 83.5 in group I and group II respectively. The mean pulse rate (bpm) pre- operatively was 85.1 and 85.4 and post- operatively was 64.3 and 93.2 in group I and group II respectively. The mean blood loss (ml) was 88.5 and 87.4 in group I and group II respectively. The difference was non- significant (P> 0.05). In group I and group II, mean Ramsay sedation scores was 4.3 and 3.2, time to first analgesic request was 47.3 and 26.3 and Frommes' bleeding scale was 2.6 and 2.0. The difference was significant (P< 0.05). **Conclusion:** Both esmolol and dexmedetomidine are safe agents for controlled hypotension and are useful in creating the optimal surgical field for nasal surgeries. When compared to esmolol, dexmedetomidine provides the benefit of both sedation and analgesia.
Keywords: Dexmedetomidine, Endoscopic nasal surgery, Ramsay sedation scores

Corresponding author: Tushar Arya, Professor, Department of Anaesthesiology, Major S D Singh Medical College & Hospital, Farrukhabad, Uttar Pradesh, India

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INTRODUCTION

Endoscopic nasal surgery is a minimally invasive procedure that uses an endoscope, a thin tube equipped with a camera and light, to access and treat conditions within the nasal cavity and sinuses.[1] This approach is commonly used to address various conditions, including chronic sinusitis, nasal polyps, tumors, and other structural abnormalities of the nasal and sinus passages.Common procedures in endoscopic nasal surgery are endoscopic sinus surgery (ESS) used to treat chronic sinusitis that doesn't respond to medication. It removes blockages in the sinuses to restore normal drainage.[2]Polypectomy is removal of nasal polyps, which are non-cancerous growths in the nasal or sinus lining.Endoscopic skull base surgery involves accessing tumors or other abnormalities at the base of the skull through the nasal cavity, reducing the need for more invasive open surgeries.Septoplasty is correction of a deviated nasal septum, often improving breathing or reducing chronic sinus infections.[3]

Comparing endoscopic nasal surgery to traditional methods reveals a number of advantages. The most frequent documented complication following endoscopic intranasal ethmoidectomy was hemorrhage. Reduced intraoperative blood loss is facilitated by induced hypotension.[4] Esmolol is a selective 1 adrenergic antagonist with ultrashort half-life. It acts quickly and doesn't cause rebound hypertension to develop. A strong agonist of the 2 adrenergic receptor is dexmedetomidine. Both the central and peripheral nerve systems are affected. It has analgesic and sedative properties.[5]The present study was conducted to compare dexmedetomidine and esmolol for induced hypotension in nasal surgeries.

MATERIALS & METHODS

The present study was conducted on 56 ASA physical status I or II patients aging 20-60 years scheduled for elective nasal surgeryof both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 28 each. Group I patients received loading dose of 1 µg/kg dexmedetomidine diluted in 0.9% saline infused over 20 minutes before induction of anaesthesia, followed by continuous infusion in the range of 0.2- 0.6 µg/kg/hr and group II patients received esmolol as a loading dose of 1 mg/kg over 1 minute followed by continuous infusion in the range of 0.4-0.8 mg/kg/hr. Parameters such as arterial blood pressure (mm of Hg), pulse rate (bpm),blood loss during surgeries, Ramsay sedation scores and time to first analgesic request, Frommes' bleeding scale etc. were recorded. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table IAssessment of parameters

Parameters	Variables	Group I	Group II	P value
Arterial blood pressure (mm of Hg)	Pre- operative	86.5	84.1	0.87
	Post- operative	61.5	83.5	
Pulse rate (bpm)	Pre- operative	85.1	85.4	0.91
	Post- operative	64.3	93.2	
blood loss (ml)		88.5	87.4	0.95

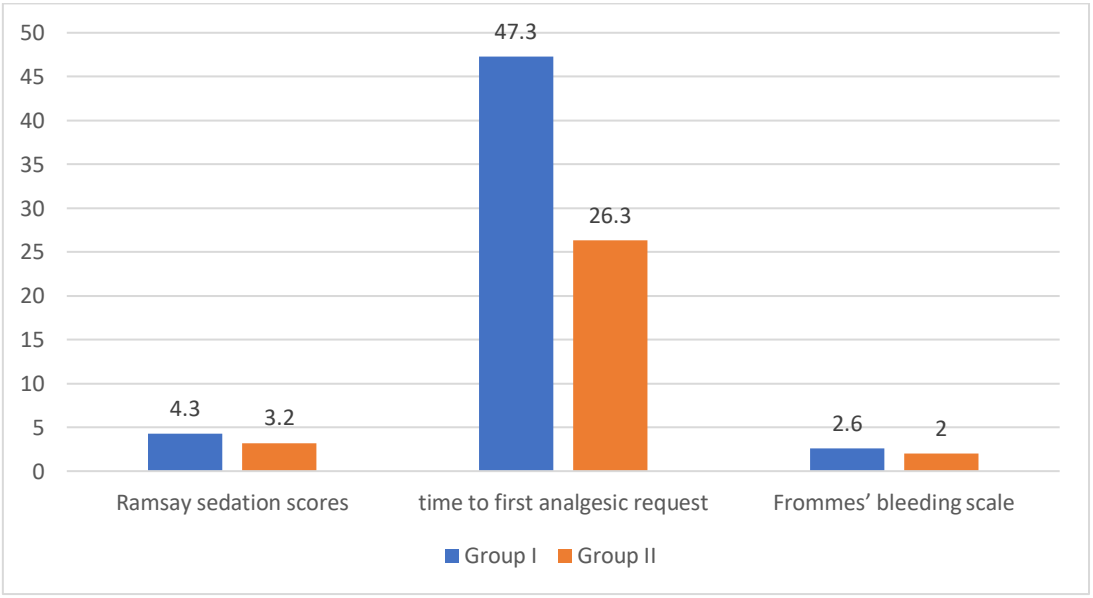
Table I shows that mean arterial blood pressure (mm of Hg) pre- operative was 86.5 and 84.1 and post-operative was 61.5 and 83.5 in group I and group II respectively. The mean pulse rate (bpm) pre- operatively was 85.1 and 85.4 and post- operatively was 64.3 and 93.2in group I and group II respectively. The mean blood loss (ml)was 88.5 and 87.4in group I and group II respectively. The difference was non- significant (P> 0.05).

Table II Assessment of Ramsay sedation scores and time to first analgesic request, Frommes' bleeding scale

Parameters	Group I	Group II	P value
Ramsay sedation scores	4.3	3.2	0.05
time to first analgesic request	47.3	26.3	0.01
Frommes' bleeding scale	2.6	2.0	0.05

Table II, graph I shows that in group I and group II, mean Ramsay sedation scores was 4.3 and 3.2, time to first analgesic request was 47.3 and 26.3 and Frommes' bleeding scale was 2.6 and 2.0. The difference was significant (P< 0.05).

Graph I Assessment of Ramsay sedation scores and time to first analgesic request, Frommes' bleeding scale



DISCUSSION

Benefits of endoscopic nasal surgery is reduced trauma compared to traditional open surgery.Enhanced visualization leads to more accurate interventions.Patients often experience quicker healing and return to daily activities.[6]Reduced pain

and swelling post-surgery.Incisions are made inside the nostrils, leaving no visible marks.While generally safe, potential risks include intraoperative or postoperative bleeding may occur.[7] As with any surgery, there is a risk of infection. It can lead to recurrent obstruction. There can be temporary or, rarely, permanent alterations. There may be damage to surrounding structures such as the eye or skull base, though rare with experienced surgeons.[8]The present study was conducted to compare dexmedetomidine and esmolol for induced hypotension in nasal surgeries.

We found that the mean arterial blood pressure (mm of Hg) pre- operative was 86.5 and 84.1 and post-operative was 61.5 and 83.5 in group I and group II respectively. The mean pulse rate (bpm) pre-operatively was 85.1 and 85.4 and post- operatively was 64.3 and 93.2 in group I and group II respectively. Vyas et al[9] compared the effectof IV infusion of Dexmedetomidine and Esmolol for induced hypotension during nasal surgeries under general anaesthesia. 60 patients for nasal surgeries under ASA I/II were allocated in 2 groups. All the patients were premedicated, induced and maintained inusual manner. Group D: received Inj. Dexmedetomidine1 µg/kg as a loading dose over 20 minutes followed by an infusion of 0.2-0.6 µg/kg/hr IV. Group E: received Inj. Esmolol 1mg/kg as a loading dose over 1 minute followed by an infusion of0.4-0.8 mg/kg/hr IV. Intra operative heart rate, mean arterial pressure, surgical field,post-operative sedation and analgesia were evaluated. There was no significant difference of MAP and heart rate in both groups intraoperatively, but there was significant difference at the end of surgery.There was no significant difference in the amount of blood loss in both groups. Mean postoperative sedation score was significantly higherin D than in E group. The duration of first analgesic request was significantly longer in D than E group. No side effects were observed.

We observed that the mean blood loss (ml)was 88.5 and 87.4 in group I and group II respectively. In group I and group II, mean Ramsay sedation scores was 4.3 and 3.2, time to first analgesic request was 47.3 and 26.3 and Frommes' bleeding scale was 2.6 and 2.0.Durmus et al[10]evaluated the efficacy of dexmedetomidine, an alpha(2)-adrenoceptor agonist, on intraoperative bleeding, anaesthetic drug requirement and postoperative pain.Forty patients scheduled for elective tympanoplasty and septorhinoplasty operations under general anaesthesia were included in the study. The patients were randomly assigned to receive either a dexmedetomidine 1 microg kg(-1) bolus 10 min before induction of anaesthesia plus 0.5 microg kg(-1) h(-1) infusions during maintenance or placebo. Mean arterial pressure was maintained between 60 and 80 mmHg. Perioperative mean arterial pressure, heart rate, time to extubation and time to awakening were recorded. Bleeding during surgery was assessed by the surgeon, blinded to the study drugs, both intraoperatively and postoperatively as a final personal opinion about the whole surgical process.The heart rate and mean arterial pressure were significantly lower during induction, operation and extubation in the dexmedetomidine group ($P < 0.05$). Blood losses were lower in the dexmedetomidine group ($P < 0.05$). Propofol dose required for induction, and fentanyl and isoflurane consumption were significantly reduced in the dexmedetomidine group ($P < 0.05$). The total amounts of nitroglycerin and meperidine used were higher in the control group ($P < 0.05$).Ayoglu H et al[11]determined the effect of dexmedetomidine on intraoperative bleeding during septoplasty and tympanoplasty operations.80 ASA physical status I and II patients, aged 18 to 65 years, 40 of whom were scheduled for septoplasty and 40 to undergo tympanoplasty operations.Patients undergoing septoplasty (S) and tympanoplasty (T) operations were randomly divided into 4 groups. Dexmedetomidine (D) was administered to Group SD and Group TD first as a bolus dose of one microg kg(-1), then intraoperative maintenance was supplied with dexmedetomidine 0.7 microg kg(-1) hour(-1). Groups S and T (controls) were given identical amounts of saline. If systolic blood pressure measurements are greater than 20% preoperative values, then fentanyl one microg kg(-1) was given.Group SD had less bleeding and lower bleeding scores ($P < 0.05$). In addition, this group received less intraoperative fentanyl ($P < 0.05$). The only significant difference between Groups TD and T was the amount of intraoperative fentanyl given (35.4 +/- 58.8 vs 110.0 +/- 81.0 microg) ($P < 0.05$).

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that both esmolol and dexmedetomidine are safe agents for controlled hypotension and are useful in creating the optimal surgical field for nasal surgeries. When compared to esmolol, dexmedetomidine provides the benefit of both sedation and analgesia.

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