

Original Research

To compare dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS

Dinesh Mohan Agarwal

Assistant professor in Anaesthesiology, Mulayam Singh Yadav Medical College & Hospital, Meerut, Uttar Pradesh, India

ABSTRACT:

Background: Functional endoscopic sinus surgery (FESS) is today the most common type of surgery for chronic rhinosinusitis. The present study was conducted to compare dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS. **Materials & Methods:** 64 patients belonging to the American Society of Anesthesiologists' Physical Status (ASA-PS) grades I and II between 18–60 years were divided into 2 groups of 32 each. Group I received dexmedetomidine 1 µg/kg over 10 min followed by infusion at 0.2 to 0.7 µg/kg/hour and group II patients received MgSO₄ 40 mg/kg over 10 min followed by an infusion at 10 to 15 mg/kg/hour. **Results:** Group I had 20 males and 12 females and group II had 18 males and 14 females. Duration anaesthesia was 90.3 minutes in group I and 110.4 minutes in group II, duration of surgery was 75.4 minutes in group I and 92.6 minutes in group II, mean time to achieve target MAP was 10.2 minutes in group I and 23.1 minutes in group II. Bleeding score 2 or less was seen in 25 minutes in group I and 6 minutes in group II, >2 was seen in group I and 7 and 24 in group II, satisfaction score 2 or less was seen minutes in 4 group I and 27 in group II, >2 was seen in 28 group I and 5 group II. The difference was significant (P < 0.05).

Key words: Dexmedetomidine had better patient satisfaction score as compared to magnesium sulphate. Adverse events were seen more with magnesium sulphate.

Received: 15/06/2020

Accepted : 22/07/2020

Corresponding Author: Dinesh Mohan Agarwal, Assistant professor in Anaesthesiology, Mulayam Singh Yadav Medical College & Hospital, Meerut, Uttar Pradesh, India

This article may be cited as: Agarwal DM. To compare dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS. J Adv Med Dent Scie Res 2020;8(8):218-221.

INTRODUCTION

Functional endoscopic sinus surgery (FESS) is today the most common type of surgery for chronic rhinosinusitis.¹ FESS is minimally invasive which means that it is done without an open incision and is much less invasive than older surgery methods. The health and normal function of sinuses and their lining mucus membranes depends primarily on two important factors- ventilation and drainage function of the sinuses.²

Intentional hypotension to limit intraoperative blood loss has dramatically improved surgical dissection during the functional endoscopic sinus surgery (FESS). A bloodless surgical field provides better visibility of the operative field, with reduced risk of injury to adjoining structures. Numerous pharmacological agents have been used effectively for controlled hypotension by reducing the baseline mean arterial pressure (MAP) by 30% or maintaining MAP

at 60–70 mmHg.³ Sodium nitroprusside and nitroglycerine (NTG) precisely control the MAP because of their rapid onset and short duration of action, but disadvantages like resistance to vasodilators, tachyphylaxis and cyanide toxicity pose many challenges.⁴

Dexmedetomidine, a highly selective α₂ adrenoreceptor agonist has sedative, analgesic and anaesthesia sparing effects. It has a dose-dependent decrease in arterial blood pressure, heart rate (HR) and cardiac output because of central sympatholysis. MgSO₄ has also been found to reduce the arterial pressure and HR by inhibiting the release of norepinephrine.⁵ The present study was conducted to compare dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS.

MATERIALS & METHODS

The present study comprised of 64 patients belonging to the American Society of Anesthesiologists' Physical Status (ASA-PS) grades I and II between 18–60 years, who were scheduled to undergo FESS under GA of both genders. All were taken into the study after they agreed to participate.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 32 each. Group

I received dexmedetomidine 1 µg/kg over 10 min followed by infusion at 0.2 to 0.7 µg/kg/hour and group II patients received MgSO₄ 40 mg/kg over 10 min followed by an infusion at 10 to 15 mg/kg/hour. The time to reach the target MAP, the number of patients requiring a minimum and maximum infusion doses of study drugs were noted. Results were studied and determined statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Drug	Dexmedetomidine	MgSO ₄
M:F	20:12	18:14

Table I shows that group I had 20 males and 12 females and group II had 18 males and 14 females.

Table II Comparison of parameters

Groups	Group I	Group II	P value
Duration anaesthesia (min)	90.3	110.4	0.05
Duration of surgery (min)	75.4	92.6	0.02
Mean time to achieve target MAP (min)	10.2	23.1	0.01
Bleeding score 2 or less	25	6	0.01
>2	7	24	
Satisfaction score 2 or less	4	27	0.01
>2	28	5	

Table II shows that duration of anaesthesia was 90.3 minutes in group I and 110.4 minutes in group II, duration of surgery was 75.4 minutes in group I and 92.6 minutes in group II, mean time to achieve target MAP was 10.2 minutes in group I and 23.1 minutes in group II. Bleeding score 2 or less was seen in 25 minutes in group I and 6 minutes in group II, >2 was seen in group I and 7 and 24 in group II, satisfaction score 2 or less was seen minutes in 4 group I and 27 in group II, >2 was seen in 28 group I and 5 group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters

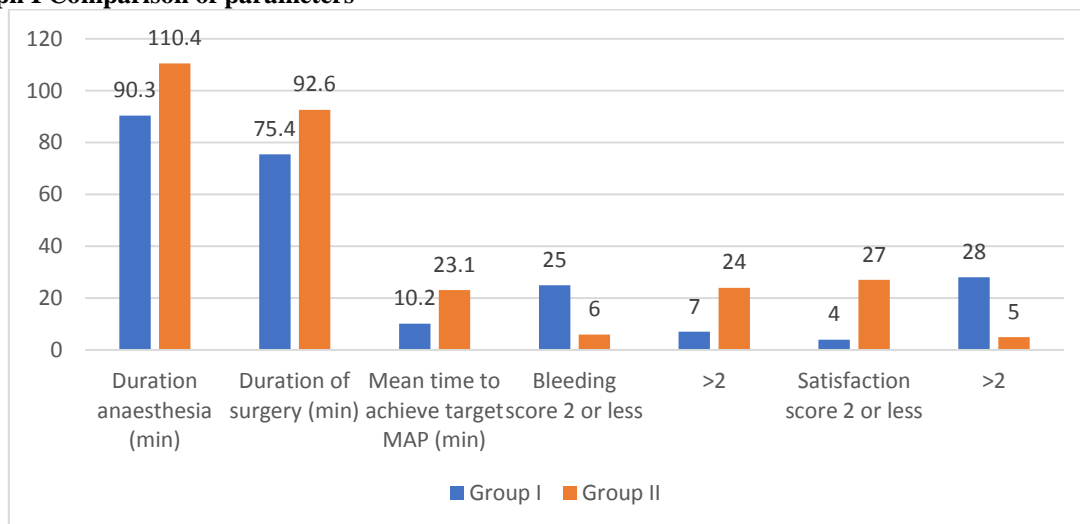


Table III Adverse effects in both the groups

Adverse effects	Group I	Group II	P value
Nausea	2	4	0.01
Vomiting	1	2	0.01
Shivering	3	5	0.03

Table III shows that common adverse effects recorded was nausea 2 in group I and 4 in group II, vomiting 1 in group I and 2 in group II and shivering 3 in group I and 5 in group II. The difference was significant (P< 0.05).

DISCUSSION

Functional Endoscopic Sinus Surgery (FESS) aims at correcting the underlying pathology and maintaining physiological function and anatomical structures of the nose and paranasal sinuses as much as possible.⁶ In experienced hands reported complications of FESS are surprisingly few.⁷ The most common complications are orbital ecchymoses, hemorrhage and synechiae. The most catastrophic very rare complication of FESS is blindness resulting from damage to optic nerve. Another major complication is CSF leak Functional endoscopic sinus surgery (FESS) has now become well-established for the treatment of chronic rhinosinusitis refractory to medical treatment.⁸ Both the drugs have been studied previously, and they had a proven efficacy as a hypotensive agent, but the ideal hypotensive agent should have a shorter onset time. A study conducted by Bassiouny et al. showed that maxillary sinus mucosa in chronic sinusitis return towards normal with the improvement of ventilation and drainage of maxillary sinus following FESS.⁹ The present study was conducted to compare dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS.

In present study, group I had 20 males and 12 females and group II had 18 males and 14 females. Chhabra et al¹⁰ compared the efficacy of dexmedetomidine and magnesium sulphate (MgSO₄) for controlled hypotension in FESS. Sixty-eight patients undergoing FESS were randomised to receive either dexmedetomidine 1 µg/kg over 10 min followed by infusion at 0.2 to 0.7 µg/kg/h (Group D) or MgSO₄ 40 mg/kg over 10 min followed by an infusion at 10 to 15 mg/kg/h (Group M). Anaesthesia and infusion rates for study drugs were maintained with sevoflurane to keep MAP between 60–70 mmHg throughout the surgery. The time to reach the target MAP, the number of patients requiring a minimum and maximum infusion doses of study drugs were noted. The mean time to achieve target mean arterial pressure (MAP) was less in group D (10.59 ± 2.04) as compared with (21.32 ± 4.65 min) group M (*P* < 0.001). The target MAP was achieved between 5–15 min in 73.52% patients (Group D) with an infusion dose of 0.2–0.4 µg/kg/h of dexmedetomidine without the use of sevoflurane, while 82.35% patients in group M required 4% sevoflurane along with >12–15 mg/kg/hr infusion of MgSO₄ to achieve target MAP in 10–20 min.

We found that duration anaesthesia was 90.3 minutes in group I and 110.4 minutes in group II, duration of surgery was 75.4 minutes in group I and 92.6 minutes in group II, mean time to achieve target MAP was 10.2 minutes in group I and 23.1 minutes in group II. Bleeding score 2 or less was seen in 25 minutes in group I and 6 minutes in group II, >2 was seen in group I and 7 and 24 in group II, satisfaction score 2 or less was seen minutes in 4 group I and 27 in group II, >2 was seen in 28 group I and 5 group II.

Fragen et al¹¹ conducted a study to determine the effect of two target dexmedetomidine infusions (0.3 ng/ml and 0.6 ng/ml) on the minimal alveolar concentration (MAC) of sevoflurane in elderly patients undergoing elective surgery and found administration of dexmedetomidine was associated with a 17% decrease in sevoflurane requirements for the maintenance of anaesthesia. While Bayram et al¹² compared dexmedetomidine and MgSO₄ in controlled hypotension during FESS and found that the requirement of fentanyl and NTG was more in group D as compared with group M.

CONCLUSION

Authors found that with dexmedetomidine patients satisfaction score was more as compared to magnesium sulphate. Adverse events were seen more with magnesium sulphate.

REFERENCES

- Gross R D, Shridan M F, Burgess L P. Endoscopic sinus surgery Complications in Residency. *Laryngoscope* 1997; 107: 1080-1085.
- Md. Monjurul Alam, Belayat Hossain Siddiquee, Kamrul Hassan Tarafder, Nasima Akhter. Functional Endoscopic Sinus Surgery (FESS)- our experience at Bangabandhu Sheikh Mujib Medical University (BSMMU). *Bangladesh J of Otolaryngology*, 2003;9(1/2): 11-14.
- Rahman M Z, Shaheen M, Saha K. FESS - A Review of Personal Series of 207 Cases. *J Dhaka Med. Coll.* April 2003; 12(1) 56-59.
- Soliman R, Fouad E. The effects of dexmedetomidine and magnesium sulphate in adult patients undergoing endoscopic transnasaltranssphenoidal resection of pituitary adenoma: A double-blind randomised study. *Indian J Anaesth.* 2017;61:410–17.
- Abdelmottalb NA. Magnesium sulphate versus dexmedetomidine in hypotensive technique in patients underwent functional endoscopic sinus surgery. *AAMJ.* 2014;12:119–36.
- Aboushanab OH, El-Shaarawy AM, Omar AM, Abdelwahab HH. A comparative study between magnesium sulphate and dexmedetomidine for deliberate hypotension during middle ear surgery. *Egypt J Anaesth.* 2011;27:227–32.
- Bajwa SJ, Kaur J, Kulshrestha A, Haldar R, Sethi R, Singh A. Nitroglycerine, esmolol and dexmedetomidine for induced hypotension during functional endoscopic sinus surgery: A comparative evaluation. *J Anaesthesiol Clin Pharmacol.* 2016;3:192–7.
- Degoute CS. Controlled hypotension. *Drugs.* 2007;67:1053–76.
- Coursin DB, Coursin DB, Maccioli GA. Dexmedetomidine. *Curr Opin Crit Care.* 2001;7:221–6.
- Chhabra A, Saini P, Sharma K, Chaudhary N, Singh A, Gupta S. Controlled hypotension for FESS: A randomised double-blinded comparison of magnesium sulphate and dexmedetomidine. *Indian journal of anaesthesia.* 2020 Jan;64(1):24.
- Fragen RJ, Fitzgerald PC. Effect of dexmedetomidine on the minimum alveolar concentration (MAC) of sevoflurane in adults age 55 to 70 years. *J Clin Anesth.* 1999;11:466–70.

12. Bayram A, Ulgey A, Güneş I, Ketenci I, Capar A, Esmaoğ lu A, et al. Comparison between magnesium sulfate and dexmedetomidine in controlled hypotension during functional endoscopic sinus surgery. *Rev Bras Anesthesiol.* 2015;65:61–7.