

Role of clonidine premedication as a part of hypotensive anaesthesia during functional endoscopic sinus surgery: A placebo-controlled study

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Abstract

Objective: The present study was performed to evaluate the effectiveness of intravenous Clonidine as a part of premedication in controlled hypotensive anaesthesia during functional endoscopic sinus surgery (FESS). **Material & Methods:** It was a prospective study carried out in the department of Anaesthesia of a tertiary care centre of Rajasthan, India. 50 patients undergoing FESS surgery for chronic sinusitis were included in the study and were divided into two groups viz. group I, who were given normal saline and group II, who were given intravenous Clonidine 3µ/kg as a part of premedication prior to induction. The outcomes were measured by estimation of mean arterial pressure (MAP), extra requirement of isoflurane and nitroglycerine (NTG) to achieve target MAP, blood loss during the surgery, duration of surgery and post-operative complications. **Results:** Both the groups were matched in terms of age, sex and weight parameters. There was statistically significant difference between MAP in group I and group II before induction, average intra-operative and during immediate post-operative period. The requirement of extra isoflurane or NTG to achieve target MAP was high (in 56% patients) and moderate (in 44% patients) in group I while low requirement was needed in 60% of group II cases and rest 40% cases didn't required any extra isoflurane or NTG. The average amount of blood loss in group II was significantly less (230±66 ml) than group I (356±75 ml). Similarly, the duration was 76±16 minutes in group I surgery and 59±12 minutes in Clonidine group. Quality of surgical field as per Boezart score was significantly better in Clonidine group. The incidence of postoperative complications like bradycardia, hypotension and prolonged sedation were not significant in both the groups. **Conclusion:** Clonidine is cheap and safe drug to use for controlled hypotensive anaesthesia without any significant side effect in FESS.

Key Words: Clonidine, Controlled anaesthesia, Hypotension, Sinus surgery, Bradycardia

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Received Date: 10/05/2019 Revised Date: 03/06/2019 Accepted Date: 24/07/2019

DOI: <https://doi.org/10.26611/101511124>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
04 August 2019

INTRODUCTION

Functional endoscopic sinus surgery (FESS) has been emerged as treatment of choice for chronic rhinosinusitis with or without nasal polyp refractory to medical treatment. During the surgery, even a small amount of bleeding can decrease visibility of the surgical field and is directly related to increased risk of complications and surgery failure.¹ Hence it is important to minimize bleeding during the surgery. Preoperative preparation using antibiotic and steroid medications, intra-operative use of local decongestant and hypotensive anaesthesia by an expert anaesthetist are the methods which are being

How to cite this article: Suman Kaushik, Hemendra Bamaniya, Yatendra Singh Chundawat. Role of clonidine premedication as a part of hypotensive anaesthesia during functional endoscopic sinus surgery: A placebo-controlled study. *MedPulse International Journal of Anesthesiology*. August 2019; 11(2): 110-113. <http://medpulse.in/Anesthesiology/index.php>

used to control bleeding during FESS and better visualization of surgical field. Many drug combinations and protocols for controlled hypotensive anaesthesia have been used and compared in past years. Two main strategies being used for hypotensive anaesthesia are (a) deep anaesthesia with strong analgesia and (b) standard anaesthesia with hypotensive drugs. The first strategy may result in prolonged recovery while second strategy may result in postoperative hypotension. Hence, achieving controlled hypotensive anaesthesia in FESS is challenging and important for surgeon as well as anesthetist. Alpha2 agonists have been used in controlled hypotensive anaesthesia for decades. In addition to their antihypertensive and sympatholytic effect, they are known to have effective sedative and analgesic effect with hemodynamic stability.² In present study, we are assessing the effect of single iv dose of Clonidine for controlled hypotensive anaesthesia in FESS surgery. The results were compared with placebo group.

MATERIAL AND METHODS

The present study was a prospective study carried out in the department of anaesthesia, Ananta Institute of Medical sciences, Rajsamand during the period of 1 year from December 2017 to December 2018. 50 patients of chronic rhinosinusitis with or without nasal polyposis who were to undergo functional endoscopic sinus surgery (FESS) were included in the study. Patients were randomly allocated to two groups with 25 members in each group. Pre- anaesthesia examination of all the patients was done a day before surgery.

Group I- received 20 ml of normal saline in premedication.

Group II- received 3µg/kg body weight in 20 ml normal saline in premedication.

Exclusion criteria:

1. Patient with history of hypertension, cardiovascular accidents, ischaemic heart disease, hepatic and/ or renal dysfunction or poor respiratory reserve.
2. Pregnant or lactating female.
3. History of allergy to any of the drugs to be used during the study.
4. Patients already using the drugs that may affect the results of present study (anticoagulants, calcium channel blockers, beta-blockers, clonidine).
5. Obese patients weighing > 90 kg.
6. Patients having history of FESS done in the past.
7. Patients refused to give consent.

Ethical clearance: approval from institutional ethical committee was taken before starting the study and well

informed consent was also taken from all the patients involved in the study.

RESULTS

The study was conducted during the period of 1 year from December 2017 to December 2018. 50 patients of chronic rhinosinusitis with or without nasal polyp who were to undergo FESS surgery and who met the inclusion criteria were included in the study. Patients were randomly divided into two groups. Group I was the placebo group in which the patients were given 20 ml of normal saline as part of premedication while in group II, patients were given Clonidine 3µg/kg in 20 ml of normal saline as part of premedication. Both the groups were matched in terms of age and sex and weight parameters. (Table 1)

Table 1: Age, sex and weight of the patients included in present study

Parameters	Group I	Group II
Age (mean age in years)	42.62	44.91
Sex (M:F ratio)	16:9	17:8
Weight (mean weight in kg)	67.97	63.88

There was statistically significant difference between MAP in group I and group II before induction, average intra-operative and during immediate post-operative period. The MAP after induction in group I and II were 83±12 mmHg and 79±11 mmHg respectively but the difference was not statistically significant. (Table 2)

Table 2: Mean Arterial Pressure of the patients of two groups in the study

Mean Arterial Pressure (MAP)	Group I	Group II	p-value
Before induction	102±14	89±12	0.0009
After induction	83±12	79±11	0.2252
Average intra-operative	73±6	68±4	0.0011
Immediate post-operative	101±8	84±7	0.0001

The requirement of extra isoflurane or NTG to achieve target MAP was high (in 56% patients) and moderate (in 44% patients) in group I while low requirement was needed in 60% of group II cases and rest 40% cases didn't required any extra isoflurane or NTG. (Table 3)

Table 3: Extra requirement of isoflurane or NTG in two groups of the study

Requirement	Group I	Group II
High	14	0
Moderate	11	10
Low	0	15

The average amount of blood loss in group I surgery was 356±75 ml while in group II surgery, it was 230±66 ml and the difference was statistically significant. Similarly, the duration was 76±16 minutes in group I surgery and 59±12 minutes in group II surgery and the difference was statistically significant. (Table 4)

Table 4: Amount of blood loss and duration of surgery in two groups of the study

	Group I	Group II	p-value
Blood loss (ml) (Mean±SD)	356±75	230±66	0.0001
Duration of surgery (Mean minutes±SD)	76±16	59±12	0.0001

Quality of surgical field as measured by Boezart score was good in 8% of group I cases and 32% of group II cases, fair in 80% of group I cases and 64% of group II cases, poor in 20% of group I cases and only 4% of group II cases. (Table 5)

Table 5: Quality of surgical field in two groups of the study

Grade	Group I	Group II
Good (0-1)	2	8
Fair (2-3)	20	16
Poor (4-5)	5	1

20% of group I patients had complications (hypotension 8%, Bradycardia 8% and prolonged sedation 4%) and 28% of group II patients developed complications (hypotension 12%, bradycardia 8% and prolonged sedation 8%). (Table 6)

Table 6: Incidence of post-operative complications in present study

Complications	Group I	Group II
Hypotension (< 50mmhg)	2	3
Transient Bradycardia	2	2
Prolonged sedation	1	2
Total	5	7

DISCUSSION

FESS is the preferred surgical method to treat chronic sinusitis which are refractory to medical treatment. Bloodless field is often required in FESS for better visibility of surgical field and to avoid complications and failure. Many pre-operative and intra-operative strategies have been explored till now to minimize the risk of bleeding in patients undergoing FESS. The success of these strategies is determined based on their impact on amount of blood loss during surgery, duration of surgery, quality of surgical field explained by surgeon and post-operative complications. Various methods are pre-operative antibiotics and steroids, position of the patient (reverse Trendelenburg position), intra-operative use of local decongestant, local vasoconstrictor injections, warm saline irrigation, controlled hypotensive anaesthesia and use of tranexemic acid.⁴ The present study is a placebo-controlled study performed to assess the hypotensive effect of intravenous Clonidine in FESS surgery. In present study, we successfully achieved the target MAP between 50-70 mmHg in all the patients. The average MAP during intra-operative period in group I and group B were 73±6 mmHg and 68±4 mmHg respectively. Thus,

it was observed that average MAP was significantly lower in Clonidine group than placebo group. Further, to achieve the target MAP, there was high to moderate requirement of extra isoflurane or NTG in placebo group while very less requirement was there in Clonidine group. (Table 3) Similar results were observed in a study done by V. A. Praveen and R. Krishna Prabu in 2016. They studied the effect of Clonidine as a part of hypotensive anaesthesia for FESS and found that 60% patients of placebo group required high amount of extra isoflurane and NTG while in clonidine group, there was very less requirement of extra isoflurane and NTG to achieve target MAP.⁵ Similar results were obtained in other studies by Jabalameli *et al*, Hackmann *et al*, Howie *et al*. and Engelman E *et al*.^{6, 7, 8, 9} The average amount of blood loss in Clonidine group (230±66 ml) was significantly less than placebo group (356±75 ml) in present study. The results were similar to another study done by Okuyama *et al* in 2005. They studied the effects of clonidine and prostaglandin E1 on blood loss during FESS and concluded that Clonidine constricts peripheral blood vessels and reduces nasal mucous blood flow which accounts for the reduction of blood flow.¹⁰ Jabalameli *et al* also had the similar results with their studies on effect of Clonidine on reducing bleeding in FESS.⁶ The average duration of surgery was also very less in Clonidine group (59±12 min) as compared to placebo group (76±16 min). The results were similar to studies done by Nair S *et al* and Wawrzyniak *et al*.^{11, 12} In present study, the surgical field grading showed that Clonidine group had better grading than the placebo group. The results were highly correlated with results of past studies done by Jabalameli M *et al* and Anvari *et al*.^{6, 13} 28% cases from clonidine group developed complications like hypotension (in 12% cases), bradycardia (in 8% cases) and prolonged sedation (in 8% cases) but the complications were not severe and relieved without any treatment. 20% cases from placebo group developed similar complications. The incidence of complications was similar in both the groups. Similar results were obtained by Meghna Jiwanmall *et al* in their study to assess the effect of intravenous Clonidine in FESS. They also used 3µg/kg Clonidine in premedication and compared the results with placebo group. The incidence of complication between two groups was statistically insignificant. Out of 30 patients in Clonidine group, 3 patients had prolonged sedation, 10 patients had hypotension and 1 patient had bradycardia. The results were highly correlated with the results of present study.¹⁴ Similar results were obtained by Sahajananda and Rao *et al* and Samantaray *et al*. They also used 3µg/kg Clonidine as a part of premedication and observed no significant incidence of complications like hypotension,

bradycardia which required treatment and thus correlates better with the results of present study.^{15,16}

CONCLUSION

A single intravenous dose of Clonidine (3µ/kg) as a part of premedication is effective to achieve controlled hypotensive anaesthesia in FESS. It maintains the mean arterial pressure within limits without additional requirement of isoflurane or NTG. It significantly reduces the amount of blood loss and provides a better field of visibility for surgery and thus shortens the duration of surgery. Clonidine is cheap and safe drug to use for controlled hypotensive anaesthesia without any significant side effect.

REFERENCES

1. Stammberger H, Posawetz W. functional Endoscopic Sinus Surgery. Concept, indications and results of the Messerklinger technique. Eur Arch Otorhinolaryngol.1990; 247(2):63-76.
2. Maze M, Tranquilli W. Alpha-2 adrenoceptor agonists: Defining the role in clinical anaesthesia. Anesthesiology.1991;74:581-605.
3. Boezaart AP, van der Merwe J, Coetzee A. Comparison of sodium nitroprusside- and esmolol-induced controlled hypotension for functional endoscopic sinus Surgery. Can J Anaesth. 1995; 42(5 Pt 1):373-376.
4. Saad Alsaleh, Jamil Manji, Amin Javer. Optimization of surgical field in endoscopic sinus surgery: an evidence based approach. Currant Allergy and Asthma Reports, 2019 Feb 2; 19(1):8. Doi: 10.1007/s11882-019-0847-5.
5. V A Praveen, R Krishna Prabu. Clonidine premedication as a desired part of hypotensive anaesthesia for functional endoscopic sinus surgery. J. evolution Med. Dent. Sci. 2016 May; 5 (35): 2014-17.
6. Jabalameli M, Hashemi SM, Soltani HA, Hashemi SJ. Oral clonidine premedication decreases intraoperative bleeding in patients undergoing endoscopic sinus surgery. J Res Med Sci. 2005;1:25-30.
7. Hackmann T, Friesen M, Allen S, Precious DS. Clonidine facilitates controlled hypotension in adolescent children. Anesth Analg. 2003;96:976-81.
8. Howie MB, Hiestand DC, Jopling MW, Romanelli VA, Kelly WB, McSweeney TD. Effect of oral clonidine premedication on anesthetic requirement, hormonal response, hemodynamics, and recovery in coronary artery bypass graft surgery patients. J Clin Anesth. 1996;8:263-72.
9. Engelman E, Lipszyc M, Gilbert E, et al. Effects of clonidine on anesthetic drug requirements and hemodynamic response during aortic surgery. Anesthesiology 1989;71(2):178-87.
10. Okuyama K, Inomata S, Toyooka H. The effects of prostaglandin E1 or oral clonidine premedication on blood loss during paranasal sinus surgery. Can J Anaesth 2005;52:546-7.
11. Nair S, Collins M, Hung P, Rees G, Close D, Wormald PJ. The effect of beta-blocker premedication on the surgical field during endoscopic sinus surgery. Laryngoscope 2004;114:1042-6.
12. Wawrzyniak K, Kusza K, Cywinski JB, Burduk PK, Kazmierczak W. Premedication with clonidine before TIVA optimizes surgical field visualization and shortens duration of endoscopic sinus surgery –Results of a clinical trial. Rhinology 2013;51:259-64.
13. Taghipour Anvari Z, Afshar-Fereydouniyan N, Imani F, Sakhaei M, Alijani B, Mohseni M. Effect of clonidine premedication on blood loss in spine surgery. Anesth Pain Med. 2012 Spring;1(4):252-6. doi: 10.5812/aapm.2197. Epub 2012 Apr 1.
14. Meghna Jiwanmall, Anita Shirley Joselyn, Subramani Kandasamy. Intravenous clonidine as a part of balanced anaesthesia for controlled hypotension in functional endoscopic sinus surgery: A randomized controlled trial. Indian J Anaesth 2017;61:418-23.
15. Sahajananda H and Rao S. Effects of intravenous clonidine on haemodynamics and on plasma cortisol level during laparoscopic cholecystectomies. Indian J Anaesth. 2015 Jan;59(1):53-6. doi: 10.4103/0019-5049.149458.
16. Samantaray A, Rao MH, Chandra A. The effect on post-operative pain of intravenous clonidine given before induction of anaesthesia. Indian J Anaesth. 2012 Jul;56(4):359-64. doi: 10.4103/0019-5049.100817.

Source of Support: None Declared
Conflict of Interest: None Declared