Section: Anesthesiology

Original Research Article

A COMPARATIVE STUDY OF DIFFERENT PRE INDUCTION DOSES OF FENTANYL IN REDUCING INTRAOPERATIVE BLEEDING IN PATIENTS UNDERGOING FUNCTIONAL ENDOSCOPIC SINUS SURGERY

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ABSTRACT

Background: One of the most common ENT procedures is Functional endoscopic sinus surgery. It is a minimally invasive surgery done for acute and chronic sinus diseases or paranasal sinuses. It will preserve normal anatomy by removing the obstructing osteometal complex and facilitating the drainage. The aim of the study is to compare the effects of 2mcg/kg and 4mcg/kg of Pre induction Fentanyl during FESS in terms of Level of bloodless surgical field, Intraoperative hemodynamic status, Surgeon satisfaction score and Side effects like postoperative nausea and vomiting

Materials and Methods: A prospective randomized control study was conducted among the patients coming for functional endoscopic sinus surgery in ENT department of Government Medical college and ESI hospital, Coimbatore. Based on the inclusion and exclusion criteria the study participants recruited for the study was 90. (45 in each group). After getting institutional ethical clearance informed consent is obtained from the study participants. Randomly the study participants were grouped in Group A and Group B. Goup A receives Inj. Fentanyl at dosage of 2 mcg/kg and Group B -Inj. Fentanyl at dosage of 4 mcg/kg. The data will be entered in MS Excel and the analysis will be done with SPSS 23. The outcomes of the two groups are measured. p value <0.05 is considered statistically significant.

Results: In our study the most common age group was 51-60years of age 22(48.8%). Male were predominant. ASA II was found more. Severe bleeding was noted in majority of the study participants in Group A. No bleeding was present only in Group B and not in Group A. Fully satisfied and satisfied was observed only in Group B. There observed a significant difference.

Conclusion: The study concluded stating that the patients of Group B had significant stable hemodynamic with good surgical field and improved surgeon satisfaction scale when compared to Group A.

Keywords: Minimal invasive surgery, FESS, osteomeatal, paranasal sinuses.

INTRODUCTION

General anesthesia involves usage of multiple pharmacological agents like opioids, benzodiazepines and antisialogogues as premedication before induction of anesthesia in varying dosage depending on various factors including age of the patient, weight of the patient and comorbidities.

Following which patient is either induced with IV induction agents or inhalational agents along with muscle relaxation for endotracheal intubation and surgical procedure is carried on with maintenance of general anesthesia with inhalational anesthetic agents

and muscle relaxation, once the surgical procedure is complete, anesthetic agents are tapered and stopped, neuromuscular blockade is reversed and patient is safely extubated.

In modern day practice majority of otorhinolaryngological surgical procedures are performed under general anesthesia. Most common procedure that is been extensively practiced in the above specialty is functional endoscopic sinus surgery which is usually performed under general anesthesia using either endotracheal intubation or through supraglottic airway devices. FESS can also be performed under regional technique by giving local infiltration but since there is increased risk of complication associated with surgery, regional anesthetic is barely used.

FESS is an indicated surgical procedure done in paranasal sinuses when medical management does not lead to the recovery of the

Patient.[1] Indications are varied and include conditions such as nasal polyps, chronic sinusitis, epistaxis bleeding, tumor removal, foreign body removal, treatment of sinus mucoceles and more

Proper anesthetic management ensures a good outcome, the important goals include blood free surgical condition, patient immobilization, stable cardio -respiratory conditions and gentle recovery from anesthesia. Impaired visualization due to intraoperative bleeding is a major setback reported in FESS under general anaesthesia.[2]

Due to close relation to major blood vessels and nerves in relation to the orbit, brain, and neuronal tissue , complications are possible especially when the surgical landmarks are obscured by blood or clots. Studies have proven that adding hypotensive agents can reduce bleeding during intraoperative period.

Commonly used agents in general anesthesia to reduce bleeding include halogenated compounds in the form of inhalational agents like isoflurane, beta adrenergic blockers like esmolol or metoprolol, vasodilators like sodium nitroprusside, but using above agents are not without side effects, common side effects encountered are vasodilatation with halogenated compounds,[3] like isoflurane, nitrates are associated with tachyphylaxis,[4] heart blocks and rebound hypertension with beta blockers.[5]

Aim & Objectives of The Study

The aim of the study is to compare the effects of 2mcg/kg and 4mcg/kg of Pre induction Fentanyl during FESS in terms of Level of bloodless surgical field, Intraoperative hemodynamic status, Surgeon satisfaction score and Side effects like postoperative nausea and vomiting.

MATERIALS AND METHODS

Study Design

A prospective randomized control study

Study Population

The study population include 90 adult patients aged between 18 years and 60 years coming for functional endoscopic sinus surgery in ENT department of Government Medical college and ESI hospital, Coimbatore.

Sample Size

- During the study period based on the inclusion and exclusion criteria Total sample size 90 cases.45 cases in each group.
- Group A- 45 cases with Fentanyl 2 mcg/kg,
- Group B- 45 cases with Fentanyl 4 mcg/kg

Duration of Study

One year 2023-2024

Inclusion Criteria

Age 18- 60 years

ASA I/II patients

Elective functional endoscopic sinus surgery posted for Chronic rhino sinusitis, nasal polyposis and septoplasty

Exclusion Criteria

- Age < 18 years or > 60 years
- ASA III/IV patients
- Patients with bleeding diathesis
- Patients with uncontrolled hypertension
- Patients with pre existing hyper reactive airway disease
- Patients with opioid hypersensitivity
- Patients with alcohol abuse, substance abuse

Methodology Outline

After getting institutional ethical clearance informed consent is obtained from the study participants . Preanesthetic assessment was done prior to surgery. Then the patient is shifted to the OT. Monitors are connected. The baseline vitals will be recorded. According to body weight and fasting status IV fluids will be given through IV access. Patients will be receiving Inj.Glycopyrollate 10 mcg/kg iv ad Inj.Midazolam 1mg prior to induction of general anesthesia. Prior to induction of anesthesia, Inj.Fentanyl to the patients randomly assigned to one of the two groups enclosed in sealed envelopes.

To Group A -Inj.Fentanyl at dosage of 2 mcg/kg

To Group B -Inj.Fentanyl at dosage of 4 mcg/kg

Induction was done with Inj. Propofol 2mg/kg, Inj.Atracurium 0.5 mg/kg. Appropriate ETT size was used for intubation. It is connected to the closed circuit. Air entry was checked. Maintenance was done with N20:02 66%:33% & Sevoflurane at 0.8 - 1 MAC & Atracurium 0.1mg/kg. Inj. Fentanyl repeated after an hour at the rate of 0.5 mcg/kg, Inj.Paracetamol infusion at 15 mg/kg given as analgesia, Inj.Ondonsetron 4 mg given as antiemetic. Intra op Monitoring Of HR/NIBP/surgical field condition every 10 minutes till end of surgery.

Intraoperative Nitroglycerine infusion to be started at 0.5mcg/kg/min if MAP Exceeded 75 mm/hg as a safety measure. At the end of the surgery, after nostrils packed residual NM blockade reversal with Neostigmine (50 µg/kg) and glycopyrrolate (10 µg/kg) IV. Extubation was done once the patient awake and obeys commands. After extubation patient observed in recovery room for next 1 hour and hemodynamic status observed and shifted.

Outcome Measures

- The outcome measures that was observed in the above study include
- Surgical field condition (SFC) using Fromm-Boezaart surgical field grading
- Surgeon satisfaction profile (SSP) using numerical scale
- Postoperative nausea and vomiting

Statistical Analysis

The collected data was entered into a master chart in MS Excel. Data analysis were calculated with the help of SPSS 16 software. Using the above software numbers and percentages were used to represent categorical variables, Mean and standard deviation were used for continuous variables. T test was used Test of significance for continuous variables and Chi square was used for Categorical variables. A p value of less than 0.05 is taken to denote significant relationship.

RESULTS

Table 1: Baseline characteristics of the study participants

Variables	Group A	Group B	P value
Age			
<30 years	1(2.2%)	3(6.7%)	
31-40 years	11(24.5%)	7 (15.5%)	0.09
41-50 years	11(24.5%)	13(28.9%)	
51-60 years	22(48.8%)	22(48.9%)	
Gender			
Male	24(53%)	29(64%)	0.14
Female	21(47%)	16(36%)	
ASA			
I	1(2.1%)	0(0%)	0.15
II	44(97.8%)	45(100%)	
Weight	164.8±12	166.3±14	0.58
Height	63.28±9.8	63.22±10.2	0.97

In our study the most common age group was 51-60years of age 22(48.8%) followed by 41-50 years. Male were predominant in our study. ASA II was found more. The baseline characteristics was found to be not significant.

Table 2: Heart beat

Variables	Group A	Group B	P value
10 minutes	77.9±7.45	73.04±5.857	.002*
60 minutes	77.36±7.75	66.89±4.608	<0.001*
90 minutes	77.91±7.84	65.16±3.26	<0.001*

Heart beat was lesser in Group B compared to Group A and it was found to be statistically significant at 10 minutes,60 minutes and 90 minutes.

Table 3: Systolic Blood pressure

Variables	Group A	Group B	P value
10 minutes	121.27±6.294	121.84±5.88	0.349
60 minutes	115.53±4.393	96.29±6.608	<0.001*
90 minutes	113.78±5.027	93.24±4.657	<0.001*

The systolic blood pressure was less in Group B compared to Group A. Systolic blood pressure was found to be statistically significant at 60 minutes and 90 minutes.

Table 4: Diastolic blood pressure

Variables	Group A	Group B	P value
10 minutes	76.80±6.294	79.82±3.070	<0.001*
60 minutes	73.89±5.162	64.89±4.013	<0.001*
90 minutes	75.69±4.931	62.80±3.116	<0.001*

Diastolic blood pressure was found less in Group B compared to Group A. The difference between the two groups was found to be statistically significant at 10 minutes,60 minutes and 90 minutes.

Table 5: MAP

Variables	Group A	Group B	P value
10 minutes	92±40	94±41	0.81
60 minutes	88±38	75±39	0.11
90 minutes	88±40	73±41	0.08

There is a difference in the Mean arterial pressure between the two groups but it was not statistically significant.

Table 6: Surgical Field condition

Variables	Group A	Group B	P value
10 minutes			
1	**0**	**3**	
2	**17**	**42**	**<0.001***
3	**28**	**0**	
60 minutes			
1	**0**	**13**	
2	**2**	**30**	**<0.001***
3	**43**	**2**	
90 minutes			
1	**0**	**28**	
2	**1**	**16**	**<0.001***
3	**44**	**1**	

Severe bleeding was noted in majority of the study participants in Group A. No bleeding was present only in Group B and not in Group A. The difference between the two groups was found to be statistically significant.

Table 7: Surgical satisfaction profile

Variables	Group A	Group B	P value
1	**0**	**3**	**<0.001***
2	**0**	**39**	
3	**37**	**3**	
4	**8**	**0**	

Fully satisfied and satisfied was observed only in Group B whereas Just satisfied and not satisfied was more in Group A and the difference was found to be statistically significant.

Table 8: Post-operative nausea and vomiting

Variables	Group A	Group B	P value
Present	**3**	**3**	**0.50**
Absent	**42**	**42**	
Total	**45**	**45**	

The postoperative nausea was found to be equal in both the groups and found to be not statistically significant.

DISCUSSION

Intraoperative bleeding in FESS is major setback since it interferes with operating field due to limited space available in nose for operation and also associated with risk of complication due to close proximity to brain and other important anatomical structure in the face. Moreover excessive bleeding interferes in the progression of surgery thereby prolonging surgical duration, prolonged exposure to anesthetic agents increases the risk of delayed recovery from anesthesia thereby necessitating the need for prolonged post operative care which in turn prolongs hospital stay.

In our study the most common age group was 51-60years of age 22(48.8%) Male were predominant. ASA II was found more. There is a significant reduction in heart rate, Systolic blood pressure and Diastolic blood pressure in patients belonging to Group B who received 4 mcg/kg of fentanyl as pre induction dose at all time intervals. Better surgical field condition is observed in Group B patients compared to Group A at all time intervals which denotes that surgeon needed less time for doing surgery since there was significantly less bleeding which warranted active intervention. Surgeon Satisfaction was observed more in Group B group .similar results was also observed in Prabhat chaudary Et al,[6] where the surgical field condition and surgeon satisfaction score was superior in groups which received higher dose of preinduction fentanyl. It also found that use of hypotensive drugs was reduced in groups which received higher dose of fentanyl. Hyung-Seok Yoo Et al,[7] in his study found that there is no significant difference in surgical field grades after 60 minutes following initiation of surgery. The study authors observed that remifentanil had produced reduction heart rate which in turn reduced blood pressure by its sympatholytic effect. Postoperative nausea and vomiting was found equal in both the groups and not found to be statistically significant. Amitabh Dutta Et al[8] observed that fentanyl does not seem to interfere with occurrence of PONV.

CONCLUSION

The study concluded stating that the patients who received 4mcg/kg as pre induction dose had significant stable hemodynamic with good surgical field and improved surgeon satisfaction scale when compared to patients who received 2mcg/kg and the use of nitroglycerin was reduced in patients who received 4 mcg/kg as pre-induction dose of fentanyl before undergoing FESS.

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Limitations: The sample size was small. Study was done in a single center so the results cannot be generalized.

Conflict of Interest: Nil

Sponsorship: Nil

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