ORIGINAL ARTICLE

# THE EFFECT OF PRE-MEDICATION WITH ORAL STEROIDS ON INTRA-OPERATIVE BLEEDING IN PATIENTS WITH CHRONIC RHINOSINUSITIS UNDERGOING FUNCTIONAL ENDOSCOPIC SINUS SURGERY

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**Background:** An inflammation of the nasal and paranasal sinus mucosa that lasts longer than three months is known as chronic rhinosinusitis. When corticosteroids and other medicinal treatments fail to relieve a patient's symptoms, then functional endoscopic sinus surgery (FESS) is a commonly performed procedure to alleviate the symptoms. The aim of the study was to evaluate the impact of oral steroids given prior to surgery on intraoperative bleeding in patients having functional endoscopic sinus surgery for chronic rhinosinusitis. **Methods:** The study was conducted in ENT Department of Shifa Foundation Community Health Centre (SFCHC) and Shifa International Hospital (SIH) Islamabad, in a period of three years from June 2019 to June 2021. A total of 72 patients consisting of 36 patients in study group and 36 in control group, fulfilling the inclusion criteria were included in the study. Per-operative bleeding was assessed by measuring the amount of blood collected in suction bottle at the end of the procedure (the amount of saline used during the procedure was subtracted) and the number of surgical gauzes stained with blood (1 partially stained gauze = 5 ml and 1 completely stained gauze = 10 ml). The surgeon performing the surgery was unaware of the study group of the patient. All the collected data was entered and analyzed with SPSS v. 25. **Results:** The mean age of group A (35.39±13.86 vs. 29.83±15.86, *p*-value > 0.05) was similar to group B. There was male dominance in both group (69.4% vs. 72%) males in group A and group B. Nasal obstruction and nasal discharge was observed in all patients of both groups. Post nasal drip (88.9% vs. 88.9%), headache (97.2% vs. 91.7%) and facial pain (97.2% vs. 94.4%) was present in majority patients of both groups without any significant (*p*-value >0.05) difference. Both the groups were compared on the basis of amount of blood loss per-operatively and it was seen that the mean blood loss in group A was (164.03±42.99 ml) significantly (*p*-value <0.05) lower as compared to (215.83±39.397 ml) in group B. **Conclusion:** This study showed that individuals with nasal polyps receiving preoperative steroids could successfully lower their perioperative morbidity, specifically intraoperative haemorrhage, after undergoing functional endoscopic sinus surgery.

**Keywords:** Rhinosinusitis; Steroids; Blood Loss; Endoscopic Sinus Surgery

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## INTRODUCTION

An inflammation of the nasal and paranasal sinus mucosa that lasts longer than three months is known as chronic rhinosinusitis (CRS).[1] CRS has been classified as CRS with nasal polyps and CRS without nasal polyps. Compared to CRS without nasal polyps, CRS with nasal polyps has more severe symptoms, a greater recurrence rate, and a 50–70% surgical failure rate. The aetiology of CRS is multifaceted and involves viral, bacterial, fungal, and allergic infections as well as environmental pollutants.[2]

The diagnosis of CRS requires the presence of at least two of the following symptoms i.e. nasal obstruction, anterior or posterior nasal discharge or drip, facial pain and loss of sense of smell for a minimum of 12 weeks. To determine the severity of the condition, a CT scan of paranasal sinuses is necessary.[3,4]

Patients who are not responding to medication and those who have anatomic obstruction might consider surgical therapy, such as functional endoscopic sinus surgery (FESS). The treatment of chronic rhinosinusitis has been greatly benefited from endoscopic sinus surgery.[5] Restoring sinus drainage and ventilation while protecting the sinonasal mucosa and its role in mucociliary clearance is the aim of functional endoscopic sinus surgery.[6] Functional endoscopic sinus surgery (FESS) facilitates the clearance of disease from key areas like osteomeatal

complex, restores adequate aeration and drainage of the sinuses, debulks severe polyposis with minimal damage to normal nasal functioning.[7]

The successful outcome of the procedure depends on a correct anatomical orientation of the key areas e.g. the osteomeatal complex with minimized intraoperative bleeding and oedema. Steroids work by reducing inflammation.[8] Oral steroid treatment is contraindicated in diabetics, patients with glaucoma, uncontrolled hypertensives and in congestive heart failure.[2]

The side-effects of steroid therapy in high dose and for longer period are hypertension, type 2 diabetes mellitus, fatty liver disease, decreases immunity, osteoporosis, skin sepsis, and electrolyte disturbance.[9]

When corticosteroids and other medicinal treatments fail to relieve a patient's symptoms, then functional endoscopic sinus surgery (FESS) is a commonly performed procedure to alleviate the symptoms. The disease has a significant rate of recurrence even with the best surgical care. Because of the inflammatory pathophysiology of CR, therapy with oral and topical corticosteroids is recommended to avoid recurrences. Furthermore, in order to lessen the amount of inflammation and intraoperative bleeding, oral steroids - which have potent anti-inflammatory properties are frequently given in the preoperative phase. Nevertheless, there isn't presently a standard for using these medicines during surgery.[10]

But studies have proven the advantage of the use of steroid prior to the surgery. Fraire ME et al found significantly less bleeding 94.62 ml in patients with CRS receiving systemic steroids and 101.9 ml in the control group.[11] Till date, the data regarding the effects of steroids pre-operatively is available only from the western studies. Not much work has been done in our part of the world. This study will help in developing pre-operating protocols in such patients.

## MATERIAL AND METHODS

This prospective, open labelled, parallel, randomized controlled trial study was conducted in ENT Department of Shifa Foundation Community Health Centre (SFCHC) and Shifa International Hospital (SIH) Islamabad. This study was conducted in a period of three years from June 2019 to June 2021. Randomization list will be generated through online software with Group A (patients taking oral steroids (prednisolone in a dose of 01 mg/kg body weight for 01 week) prior to surgery and group B (patients in controlled group), all the patients having equal chance of being selected in either group.

The study involved 72 patients in total, 36 of whom were in the study group and 36 of whom were in the control group. Using a 5% level of significance, 80% power of test, a pooled standard deviation of 11, and mean blood loss values of 94.62 ml in the study group and 101.9 ml in the control group, the sample size was determined using the WHO sample size calculator.[11]

All the patients of both genders who have been diagnosed with CRS with or without NP, having age between 18–60 years as to avoid any harmful effects of steroids in very young and the elderly patients were included in the study. Patients suffering from any disease in which steroids are contraindicated e.g. diabetes, glaucoma, uncontrolled hypertension and congestive heart failure, patients with bleeding diathesis e.g. deranged liver function tests or clotting profile and platelet disorders as they have a tendency to bleed more than normal, and patients with chronic fungal sinusitis whose CT Paranasal sinuses show heterogeneous opacities or double density sign in sinuses as these patients are mostly immunocompromised were excluded from the study sample. Per-operative bleeding was assessed by measuring the amount of blood collected in suction bottle at the end of the procedure (the amount of saline used during the procedure was subtracted) and the number of surgical gauzes stained with blood (1 partially stained gauze = 5 ml and 1 completely stained gauze =10 ml).[12] The surgeon performing the surgery was unaware of the study group of the patient.

SPSS v. 25 was used to enter and analyze all of the obtained data. Frequency and percentages were used to represent qualitative data, whereas mean±standard deviation was used to represent quantitative variables. The independent sample t-test was utilized to compare quantitative data like age and blood loss between the two groups, while the Chi-Square test was employed to compare qualitative data like headache, facial pain, hyposmia, nasal polyps between both groups. P-values less than 0.05 were regarded as statistically significant.

## RESULTS

In this study a total of 72 patients were included consisting of 36 patients in each group. The mean age of group A and group B (35.39±13.86 vs. 29.83±15.86, *p*-value >0.05) was similar without any significant difference. There was male dominance in both group 69.4% males in group A and 72.2% male in group B. Nasal obstruction and nasal discharge was observed in all patients of both groups. Post nasal drip (88.9% vs. 88.9%), headache (97.2% vs. 91.7%) and facial pain (97.2% vs. 94.4%) was present in majority patients of both groups without any significant (*p*-value >0.05) difference between both groups. Hyposmia was observed higher in group A (50% vs. 16.7%) patients in comparison to group B as elaborated in table 1.

The distribution of physical examination showed that mucopus in nose was present in all patients of both groups. The unilateral nasal polyps were seen in 19.4% patients in group A and 27.8% patients in group B, without any significant (*p*-value >0.05) difference.

The bilateral nasal polyps were also comparable (44.4% vs. 38.9%), *p*-value > 0.05) between both groups A and group B. Turbinate hypertrophy was noted in almost all the 97.2% patients of both groups. The deviated nasal septum (DNS) was observed in 75% patients of group A and 80.6% patients of group B as elaborated in table 2. Both the groups were compared on the basis of amount of blood loss per-operatively and it was seen that the mean blood loss in group A was (164.03±42.99 ml) significantly (*p*-value <0.05) lower as compared to (215.83±39.397 ml) in group B as shown in figure 1.

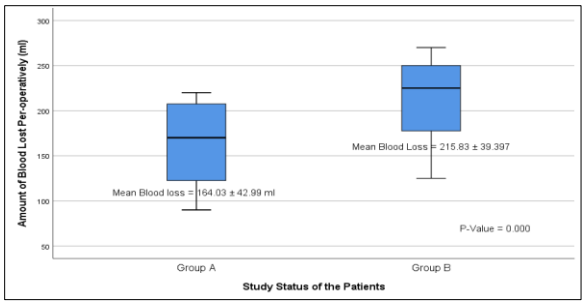


**Figure-1: Comparison of amount of blood loss per-operatively between both groups**

**Table-1: Distribution of demographic characteristics and History of patients**

| Characteristics | Study Status of the Patients | | | | *p*-value |
|---|---|---|---|---|---|
| | Group A | | Group B | | |
| | Frequency | Percentage | Frequency | Percentage | |
| Age of the patients | | | | | |
| Mean±SD | 35.39±13.86 | | 29.83±15.86 | | 0.118 |
| Gender of the Patient | | | | | |
| Male | 25 | 69.4 | 26 | 72.2 | 0.795 |
| Female | 11 | 30.6 | 10 | 27.8 | |
| Nasal Obstruction | | | | | |
| Present | 36 | 100.0 | 36 | 100.0 | -- |
| Absent | 0 | 0.0 | 0 | 0.0 | |
| Nasal Discharge | | | | | |
| Present | 36 | 100.0 | 36 | 100.0 | -- |
| Absent | 0 | 0.0 | 0 | 0.0 | |
| Post Nasal Drip | | | | | |
| Present | 32 | 88.9 | 32 | 88.9 | 1 |
| Absent | 4 | 11.1 | 4 | 11.1 | |
| Headache | | | | | |
| Present | 35 | 97.2 | 33 | 91.7 | 0.303 |
| Absent | 1 | 2.8 | 3 | 8.3 | |
| Facial Pain | | | | | |
| Present | 35 | 97.2 | 34 | 94.4 | 0.555 |
| Absent | 1 | 2.8 | 2 | 5.6 | |
| Hyposmia | | | | | |
| Present | 18 | 50.0 | 6 | 16.7 | 0.003 |
| Absent | 18 | 50.0 | 30 | 83.3 | |
| Total | 36 | 100.0 | 36 | 100.0 | |

**Table-2: Distribution of Physical Examination of Both Groups**

| Characteristics | Study Status of the Patients | | | | *p*-value |
|---|---|---|---|---|---|
| | Group A | | Group B | | |
| | Frequency | Percentage | Frequency | Percentage | |
| Mucopus in nose | | | | | |
| Present | 36 | 100.0 | 36 | 100.0 | -- |
| Absent | 0 | 0.0 | 0 | 0.0 | |
| Unilateral Nasal Polyps | | | | | |
| Present | 7 | 19.4 | 10 | 27.8 | 0.405 |
| Absent | 29 | 80.6 | 26 | 72.2 | |
| Bilateral Nasal Polyps | | | | | |
| Present | 16 | 44.4 | 14 | 38.9 | 0.633 |
| Absent | 20 | 55.6 | 22 | 61.1 | |
| Turbinate Hypertrophy | | | | | |
| Present | 35 | 97.2 | 35 | 97.2 | 1 |
| Absent | 1 | 2.8 | 1 | 2.8 | |
| Deviated nasal septum (DNS) | | | | | |
| Present | 27 | 75.0 | 29 | 80.6 | 0.417 |
| Absent | 9 | 25.0 | 6 | 16.7 | |

## DISCUSSION

A clear surgical field throughout the process is one of the most crucial things that determines how well functional endoscopic sinus surgery (FESS) goes. The anatomical features of the sinonasal region mean that bleeding, at any rate, may be sufficient to reduce vision field and raise the possibility of consequences like orbital or base of the skull damage. Furthermore, bleeding lengthens the surgical procedure because it necessitates several stops for packing and suctioning. Specifically, higher intraoperative bleeding is expected in patients of chronic rhinosinusitis with polyps because of increased inflammation and vascularity in these situations.[13]

Steroids are thought to work by inhibiting leukocyte migration, fibrin deposition, capillary dilatation, oedema development, and tissue damage. Intravenous dexamethasone is widely known for its prolonged antiemetic action due to its central depression. Corticosteroid therapy complications are associated with long-term use. The hazards associated with steroid therapy lasting less than seven days are minimal.[14]

Khosla *et al.'s* meta-analysis examined intraoperative blood loss comparisons between preoperative steroid-administered and placebo groups. This study found that preoperative steroids reduced surgical blood loss.[15]

While some studies reported that not using steroids prior to surgery made the procedure technically challenging, a meta-analysis conducted by Pundir et al. revealed significant benefits from the use of pre-operative oral steroids on duration of surgery, amount of blood loss and better optics.[16]

In this present study, both the groups were compared on the basis of amount of blood loss per-operatively and it was seen that the mean blood loss in group A was (164.03±42.99 ml) significantly ($p$-value <0.05) lower as compared to (215.83±39.397 ml) in group B. These results are in parallel to the results shown in previous literature like in a similar study done by Pathak in which, when intraoperative bleeding was assessed using the Boezaart-Vandermerwe Grading System, it was discovered that the non-steroid group had considerably ($p$=0.01) more moderate to heavy bleeding than the steroid group. Along with subjective metrics like postnasal discharge and difficulties in smelling, other parameters including postoperative scarring and crusting were also found to have favourable results in the steroid group.[17]

Pre-, intra-, and post-operative benefits of corticosteroids have been demonstrated. The process by which they attach to cytoplasmic glucocorticoid receptor cells starts their multifaceted impact. It aids in tissue remodelling in addition to a notable reduction in symptoms. By inhibiting the manufacture of cytokines by basophils and eosinophils, they reduce inflammatory mediators in the sinus and nasal mucosa and prevent the formation of transudates and tissue oedema. Steroids intensify the effects of endogenous adrenaline and noradrenaline in producing vaso-constriction and raise the smooth muscle's spastic reactivity.[18] Limitations of the study was that side effects of oral steroid use although have very less chances of occurrence with this short-term use, could not be monitored properly.

## CONCLUSION

This study shown that administering steroids to patients with nasal polyps before to surgery could effectively reduce intraoperative bleeding. In patients undergoing functional endoscopic sinus surgery, prednisolone administered five days before to surgery greatly reduces perioperative and postoperative morbidity, specifically haemorrhage, making the process easier. However, more research is necessary to determine the treatment, duration and dosage standard, as well as to incorporate more trials.

## AUTHORS' CONTRIBUTION

SI: Drafting of work and revising it critically for important intellectual content and final approval. AJ: Substantial contribution to the conception and design of the work. MAU: Analysis and interpretation of data. FA: Analysis and interpretation of data. MS: Substantial contribution to the conception and design of the work. SN: Substantial contribution to the conception and design of the work

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