ORIGINAL ARTICLE

The Effect of Preoperative Administration of Oral Steroids Versus Intranasal Steroid Spray on Intraoperative Bleeding of the Surgical Field During Endoscopic Sinus Surgery (ESS)

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Abstract

Background: ***Nasal polyposis, a chronic inflammatory condition of the sinonasal mucosa, often requires Functional Endoscopic Sinus Surgery (FESS) when refractory to medical management. Preoperative corticosteroids have been proposed to improve surgical outcomes by reducing mucosal inflammation and intraoperative bleeding.***

Objective: ***To investigate and evaluate the effectiveness of intranasal steroid spray against oral steroid in reducing hemorrhage during Functional Endoscopic Sinus Surgery for nasal polyposis.***

Patients and Methods: ***This comparative prospective interventional research has been carried out on 60 cases diagnosed with nasal polyposis presenting to outpatient clinics of the Otorhinolaryngology Department at the Al-Azhar University hospitals (Al-Hussein & Bab El Shaeria) from July 2023 to April 2025. Patients were randomized into two groups: Group A received intranasal fluticasone spray (400 µg/day), while Group B received oral prednisolone (1 milligram per kilogram per day), both for seven days prior to surgery.***

Results: ***Group B (oral steroids) showed significantly lower blood loss (p=0.01) compared to Group A. Although both groups had comparable demographic data and symptom profiles, bronchial symptoms were significantly greater in Group A (p-value equal 0.008). Surgical field quality scores illustrated a statistically insignificant variance between the groups (p-value equal 0.88), but Group B demonstrated a trend toward better surgical conditions with fewer cases of moderate-to-severe bleeding.***

Conclusion: ***Oral corticosteroids are more effective in reducing intraoperative bleeding and improving the surgical field during FESS, supporting their use for enhanced surgical results in cases with nasal polyposis.***

Keywords: Nasal polyposis; FESS; Corticosteroids; Intraoperative Bleeding

1. Introduction

Nasal polyps are nonmalignant hyperplastic and inflammatory outgrowths of sinonasal mucosa. It is the predominant manifestation in cases of chronic rhinosinusitis (CRS). Following the management of the polyps, it is imperative to initiate local and systemic medication to control the underlying allergic cause; otherwise, recurrence may occur quickly.[1]

Nasal polyps mostly arise from eosinophilia driven by T-helper 2 (Th2) cells and Immunoglobulin-E (IgE) inflammation, characterized by increased interleukin-5 (IL-5), frequently related to environmental and/or seasonal allergy stimuli.[2]

The causes of nasal polyps may be diverse. As we age, there is a series of functional and anatomical alterations happening in the human body that result in stasis of thick mucus and impaired clearance of biologic offenders (fungi, bacteria, viruses) and irritants, making cases more likely for developing polyps. The alterations encompass reduced ciliary beat frequency resulting in disturbed mucociliary clearance, atrophy of sinonasal mucosa accompanied by lowered mucus production, and reduced vascularity.[3]

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When CRSwNP is resistant to appropriate medical management, FESS is planned.[4]

The objective of endoscopic sinus surgery (ESS) is to excise inflammatory tissue, provide ventilation and drainage, restore mucosal function, and enhance the accessibility of topical treatments.[5] Corticosteroids are synthetic analogs of the natural steroid hormones released via the adrenal cortex, encompassing mineralocorticoids and glucocorticoids. The synthetic hormones exhibit differing levels of mineralocorticoid and glucocorticoid characteristics. Glucocorticoids primarily regulate metabolism and have anti-inflammatory, vasoconstrictive, and immunosuppressive properties. Mineralocorticoids control water and electrolytes balance via influencing the transport of ions in the renal tubule epithelial cells.[6]

They possess both nongenomic and genomic mechanisms of action. The genomic mechanism of action is facilitated by the glucocorticoid receptor, resulting in predominant immunosuppressive and anti-inflammatory effects.[7] The glucocorticoid receptor is situated intracellularly in the cytoplasm and, upon binding, swiftly translocates to the nucleus, where it influences transcription of genes and inhibits the expression of genes and translation in inflammatory leukocytes and structural cells like epithelium.[8]

This action results in a decline of chemokines, cell adhesion molecules, proinflammatory cytokines, and other enzymes implicated in the inflammatory response.[6]

The non-genomic mechanism happens more quickly and is facilitated by interactions with the membrane-bound glucocorticoid receptor or an intracellular glucocorticoid receptor. Immediately upon receptor activation, a series of actions is initiated, involving the inhibition of phospholipase A2, essential for the synthesis of inflammatory cytokines, hindering the production of arachidonic acid, and modulating apoptosis in thymocytes. Adverse effects are more prevalent with elevated doses and with prolonged usage; however, they aren't exclusive to these settings.[8]

The prevalent adverse effects of corticosteroids encompass fractures and osteoporosis, Cushingoid features, suppression of the hypothalamic-pituitary-adrenal (HPA) axis, hyperglycemia and diabetes, myopathy, cataracts and glaucoma, immunosuppression, cardiovascular illness, psychiatric disturbances, as well as dermatologic and gastrointestinal adverse effects.[6]

Inhaled corticosteroids (ICS) are synthetic analogues derived from the main steroid molecule. Inhaled corticosteroids are halogenated compounds that enhance their efficacy. The mechanism of inhaled corticosteroid therapy is comparable to that of systemic agents.[9]

The objective of the research was to examine and evaluate the influence of intranasal steroid spray and oral steroids on reducing intraoperative hemorrhage during functional endoscopic sinus surgery for nasal polyposis.

2. Patients and methods

This comparative prospective interventional research was performed on 60 cases diagnosed with nasal polyposis presenting to outpatient clinics of the Otorhinolaryngology Department at the Al-Azhar University hospitals (Al-Hussein & Bab El Shaeria) from July 2023 to April 2025

Sampling technique: Purposive sampling

Inclusion criteria: 60 patients of both sexes with bilateral nasal polyposis, between the ages of 18 and 60 years, fit for surgery, and Patients have pansinusitis

Exclusion criteria: Cases who have utilized any form of steroids in the preceding three months, those with hypertension, diabetes mellitus, bronchial asthma, peptic ulcer, cystic fibrosis, Cushing's syndrome, obesity, and other steroid-related complications, as well as cases with severe, unstable concurrent diseases, have been excluded from the research. Additionally, cases on drugs such as cyclosporine that impact the mucosa of the nose, those who had a nasal operation within the last six weeks, individuals with recurrent nasal polyposis after surgery, pregnant women, those unfit for the operation, and non-compliant cases have also been excluded.

Methods

Patient Evaluation: Demographic data, date of surgery, type of surgery, complications, and CT measurements of the nose and paranasal sinuses were analyzed. Cases that met the inclusion criteria were sequentially randomized into two groups following comprehensive history taking, clinical examination involving ENT evaluation, and relevant blood and radiological tests (CT scan). Group A was administered intranasal steroid spray (Fluticasone, four hundred micrograms per day), whereas Group B got oral steroid (Prednisolone, one milligram per kilogram per day), both for a duration of seven days. Cases were given a symptom journal to document symptoms prior to and during therapy. Both groups had Functional Endoscopic Sinus Surgery under general anesthesia, maintaining a mean arterial blood pressure of between seventy and eighty millimeters of mercury. The steroid protocol was given for seven days preceding the operation. The volume of bleeding and the quality of the surgical field have

been evaluated throughout the surgery to examine the influence of preoperative steroids on intraoperative hemorrhage. The volume of blood loss has been assessed by calculating the discrepancy between the total volume in the suction jar and the irrigation volume. The quality of the surgical field has been assessed utilizing a 0–10 scale at the end of the surgery, taking into account the severity of hemorrhage, the complexity of the process, and the frequency of interruptions for suctioning and packing.

Surgical technique:

The case was positioned on the operating table, oriented towards the television monitor. The head of the bed is raised to position the case in reverse Trendelenburg. The endotracheal tube is secured at the left corner of the case's mouth. We protect the cse's eyes using a topical antibiotic ointment (Tobrin). We prepare for shipment. Both nasal cavities were originally treated with cotton soaked in oxymetazoline for decongestion. The case is subsequently draped. A comprehensive nasal endoscopy is conducted with a 0 or 30-degree scope. Subsequently, we placed oxymetazoline-soaked cotton pledgets in the middle meatus. We often start operations on the side exhibiting a greater prevalence of illness or the side that is more exposed in cases of septal deviation. Uncinectomy: The middle turbinate is carefully medialized utilizing a Freer elevator to expose the uncinate process. A backbiter is utilized to sever the uncinate process inferiorly to prevent damage to the medial orbital wall. Blakesley forceps are utilized to grab and remove the free edge of the uncinate process. The remaining portion of the uncinate process is removed utilizing biting tools or a powered debrider till the maxillary ostium is seen. We measure the amount of fluid taken by shivering, and for washing, we measure the amount of fluid sucked and calculate the amount of blood loss from them.

3. Results

According to demographic data between studied groups, there was a statistically insignificant variance as regard age and gender.

Table 1. Distribution of general characteristics among examined groups:

	GROUP A (NUMBER=30)	GROUP B (NUMBER=30)	TEST	P-VALUE
AGE MEAN ± SD	35.24±7.3	34.82±7.18	t = 0.2247	0.82
GENDER				
MALE	16 (53.3%)	18 (60%)	X^2=0.271	0.6
FEMALE	14 (46.7%)	12 (40%)		

P value above 0.05: Not significant, P value under 0.05 is statistically significant, p-value under 0.001 is highly significant., SD: standard deviation, t: T test, X^2: chi square test.

According to Symptoms between studied groups, a statistically insignificant distinction has been found as regard nasal symptoms, ocular symptoms, throat symptoms, others symptoms, whereas a statistically significant distinction has been found as regard bronchial symptoms.

Table 2. Distribution of symptoms among examined groups:

	GROUP A (NUMBER=30)	GROUP B (NUMBER=30)	TEST	P-VALUE
NASAL	30(100%)	30(100%)	0	1
OCULAR	19(63.3%)	16(53.3%)	0.617	0.43
THROAT	20(66.7%)	15(50%)	1.714	0.19
BRONCHIAL	23(76.7%)	13(43.3%)	6.944	0.008
OTHERS	10(33.3%)	8(26.7%)	0.231	0.63

According to nasal endoscopic grades between studied groups, there was statistically significant difference as regard Grade 1, Grade 2 and Grade 3.

Table 3. Distribution of nasal endoscopic grades between exsamined groups.

	GROUP A (NUMBER=30)	GROUP B (NUMBER =30)	TEST	P-VALUE
GRADE 1	1 (3.3%)	0 (0%)	X^2=	0.04
GRADE 2	10 (33.3%)	3 (10%)	6.161	
GRADE 3	19 (63.3%)	27 (90%)		

According to blood loss between studied groups, a statistically significant distinction has been found among examined groups.

Table 4. Distribution of blood loss among examined groups

	GROUP A (NUMBER =30)	GROUP B (NUMBER =30)	TEST	P-VALUE
BLOOD LOSS (ML)				
< 50	10(33.3%)	1(3.3)	10.36	0.01
50-100	12(40%)	20(66.7%)		
100-150	8(26.7%)	8(26.7%)		
150-200	0	1(3.3)		

According to quality of surgical field score throughout the operation, a statistically insignificant distinction has been found among examined groups.

Table 5. Distribution of quality of surgical field score throughout the operation among examined groups:

	GROUP A (NUMBER=30)	GROUP B (NUMBER=30)	TEST	P-VALUE
0-1 (NO HEMORRHAGE; EXCELLENT TO OUTSTANDING SURGICAL CONDITIONS)	0 (0%)	0 (0%)	X^2= 1.777	0.88
2-3 (SLIGHT HEMORRHAGE; FAIRY EASY OPERATION; NO STOP FOR HEMOSTASIS &/OR SUCTION)	1 (3.3%)	1 (3.3%)		
4-5 (SLIGHT HEMORRHAGE; OPERATION MILDLY DIFFICULT; 1 STOP FOR HEMOSTASIS &/OR SUCTIONING)	6 (20%)	9 (30%)		
6-7 (MODERATE HEMORRHAGE; OPERATION MODERATELY DIFFICULT; IRREGULAR STOP FOR HEMOSTASIS &/OR	14 (46.7%)	15 (50%)		

SUCTIONING)		
8-9 (MODERATE TO SEVERE HEMORRHAGE; OPERATION VERY DIFFICULT; NUMEROUS STOPS FOR HEMOSTASIS &/OR SUCTIONING)	9 (30%)	5 (16.7%)
10 (OPERATION TERMINATED BECAUSE OF SEVERE HEMORRHAGE IN SURGICAL FIELD)	0 (0%)	0 (0%)

4. Discussion

With regard to general characteristics among examined groups, mean age for Group A is 35.24 years (SD = 7.3) compared to 34.82 years (SD = 7.18) for Group B, Group A consists of 53.3% males and 46.7% females, while Group B comprises 60% males and 40% females. a statistically insignificant variance has been observed as regard age as well as gender.

In accordance with Jagannath et al.,[10] who aimed to investigate and compare the influence of intranasal steroid spray during the operation and oral steroids on bleeding through the operation during functional endoscopic sinus surgery for nasal polyposis, their research involved 60 cases diagnosed with nasal polyposis, who were sequentially allocated into two groups. Group A was administered intranasal steroid spray, whereas Group B received oral steroids, both for a duration of seven days. Patients from both groups had Functional ESS under general anesthesia. They indicated that a statistically insignificant variance was observed in terms of sex and age.

According to the Symptoms between the studied groups, both groups equally prioritized nasal surgeries (100%). Group A exhibited higher rates of ocular (63.3% vs. 53.3%) and throat surgeries (66.7% vs. 50%) when compared with group B and bronchial surgery rates (76.7% in Group A vs. 43.3% in Group B). There was a statistically insignificant distinction regarding nasal symptoms, ocular symptoms, throat symptoms, and other symptoms, whereas a statistically significant variance was observed regarding bronchial symptoms.

Rino et al.,[11] aimed to examine the efficacy of a combination treatment using prednisolone taken by mouth and fluticasone propionate nasal spray in the treatment of nasal polyps. Corticosteroids have been demonstrated to be advantageous preoperatively, intraoperatively, and postoperatively. Their multifactorial influence is triggered by their binding to the cytoplasmic glucocorticoid receptor. In addition to a substantial reduction in symptoms, it also aids in tissue remodeling. They prevent the production of transudate and tissue swelling while diminishing inflammatory mediators in the nasal and sinus mucosa by inhibiting the synthesis of cytokines in basophils and eosinophils.

In contrast to Joe et al.,[12] established the effectiveness of intranasal steroid sprays in a randomized, double-blind, placebo-controlled study. In their research, 157 cases with bilateral nasal polyposis were randomly assigned to receive either a nasal steroid spray or a placebo. Cases administered steroids exhibited statistically and clinically significant enhancement in nasal symptoms and size of polyp in comparison with those who received a placebo.

According to the nasal endoscopic grades between the studied groups, the current research illustrated that a statistically insignificant alteration has been observed with regard to Grade 1, Grade 2, and Grade 3.

Consistent with Aboud et al.,[13] who investigated alterations in endoscopy scores among cases with nasal polyposis (NP), their research involved cases who were initially administered a single dose of oral prednisolone at twenty-five milligrams for two weeks, followed by macrolide at 250 milligrams every day for the 1st three months, and extended intranasal steroids. They showed that there was a statistically significant difference regarding grades 1, 2, and 3.

According to quality of surgical field score throughout operation, each group had one case classified under slight bleeding (scores 2-3), representing 3.3% the moderate bleeding category (scores 6-7) was predominant, comprising 14 cases (46.7%) in Group A and 15 cases (50%) in Group B. Group B exhibited a higher incidence of mild surgical difficulty (scores 4-5) at 30% compared to 20% in Group A. In Group A, 9 cases (30%) experienced moderate to severe bleeding, and Group B reported 5 cases (16.7%); a statistically insignificant distinction has been found among the examined groups.

In accordance with Atighechi et al.,[14] found that a statistically insignificant distincation has been found among examined groups with regard to quality of surgical field score during surgery with p value = 0.09.

Moreover, according to Albu et al.[15] the study aimed to determine if the continuous preoperative application of a topical corticosteroid (mometasone furoate [MF]) may enhance the quality of the operating field and reduce hemorrhage throughout endoscopic sinus surgery. The application of intranasal steroid spray prior to the operation resulted in enhanced surgical field quality and reduced loss of blood during the operation.

4. Conclusion

Intramedullary fixation of mid-shaft clavicular Our investigation indicated that steroids prior to the operation are really advantageous. Oral

steroids have been demonstrated to be superior to intranasal steroid spray in alleviating pain, minimizing hemorrhage during the operation, and enhancing the quality of the surgical field.

Disclosure

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