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Comparative Evaluation of Fluticasone Propionate and Beclomethasone Dipropionate Nasal Sprays Following Functional Endoscopic Sinus Surgery in Chronic Rhinosinusitis with Nasal Polyposis: A Prospective Comparative Study.

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Abstract

Background: Chronic rhinosinusitis with nasal polyposis (CRSwNP) is a chronic inflammatory disorder characterized by persistent sinonasal symptoms, impaired quality of life, and a high postoperative recurrence rate following functional endoscopic sinus surgery (FESS). Intranasal corticosteroids (INCS) are widely recommended after surgery to reduce inflammation and prevent recurrence; however, comparative clinical evidence between different corticosteroid preparations remains limited. ***Objectives:*** To compare the clinical efficacy and recurrence rates of postoperative Fluticasone propionate nasal spray and Beclomethasone dipropionate nasal spray following FESS in patients with CRSwNP. ***Methods:*** A prospective comparative study was conducted among 63 patients with CRSwNP who underwent FESS. Patients were allocated into three groups:

- Group A: Fluticasone propionate nasal spray (400 µg/day) (n = 21)
- Group B: Beclomethasone dipropionate nasal spray (600 µg/day) (n = 20)
- Group C: Saline nasal spray (control) (n = 22)

Patients were followed for six months. Clinical symptoms were evaluated using a four-point Likert symptom score, while endoscopic findings and recurrence were assessed using the Lund–Kennedy endoscopic scoring system. Statistical analysis was performed using Chi-square test, Fisher's exact test, ANOVA, and repeated comparisons where appropriate. A p-value <0.05 was considered statistically significant. ***Results:*** The mean age of participants was 40.29 ± 8.96 years, with a male predominance (60.3%). Nasal obstruction was present in all patients before surgery, followed by nasal discharge (90.5%), postnasal drip (88.9%), headache (84.1%), sneezing (65.1%), and hyposmia (49.2%). Baseline characteristics were comparable across all three groups. At one week postoperatively, symptom scores and Lund–Kennedy endoscopic findings did not differ significantly among the groups, indicating comparable postoperative status. During subsequent follow-up, patients receiving intranasal corticosteroids demonstrated progressive improvement in symptom scores and endoscopic findings compared with saline controls. At six months, postoperative nasal obstruction, endoscopic scores, and recurrence rates were significantly lower in the Fluticasone and Beclomethasone groups, with Fluticasone demonstrating the greatest overall improvement and the lowest recurrence of nasal polyps. ***Conclusion:*** Postoperative administration of intranasal corticosteroids significantly improves clinical outcomes following FESS for CRSwNP. Both Fluticasone propionate and Beclomethasone dipropionate effectively reduce postoperative symptoms and recurrence compared with saline nasal spray. Fluticasone demonstrated superior overall efficacy and may be considered the preferred postoperative intranasal corticosteroid for long-term management of CRSwNP.
Level of Evidence: Prospective comparative study.

Keywords: Chronic Rhinosinusitis, Nasal Polyposis, Functional Endoscopic Sinus Surgery, Fluticasone Propionate, Beclomethasone Dipropionate, Intranasal Corticosteroids, Lund–Kennedy Score, Recurrence, Endoscopic Sinus Surgery.

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INTRODUCTION

Chronic rhinosinusitis (CRS) is a common chronic inflammatory disease of the nose and paranasal sinuses characterized by persistent inflammation of the sinonasal mucosa for at least 12 weeks despite appropriate medical therapy. It affects approximately 5–12% of the adult population worldwide and represents a major cause of impaired health-related quality of life, healthcare utilization, and economic burden.[1-3] Patients commonly present with nasal obstruction, rhinorrhoea, facial pain or pressure, and olfactory dysfunction, symptoms that significantly interfere with sleep, productivity, and daily activities. Based on endoscopic findings, CRS is broadly classified into chronic rhinosinusitis with nasal polyposis (CRSwNP) and chronic rhinosinusitis without nasal polyposis (CRSsNP).[1,4] CRSwNP represents a distinct inflammatory endotype characterized by oedematous mucosa, eosinophilic inflammation, epithelial barrier dysfunction, and type-2 cytokine predominance involving interleukin (IL)-4, IL-5, and IL-13. Persistent mucosal inflammation results in the formation of benign inflammatory polyps that progressively obstruct the nasal cavity and paranasal sinus drainage pathways.[1,5,6]

The exact pathogenesis of CRSwNP remains multifactorial and incompletely understood. Current evidence suggests an interaction between genetic susceptibility, environmental exposure, allergens, microbial colonization, biofilm formation, impaired mucociliary clearance, epithelial barrier dysfunction, and dysregulated immune responses. Coexisting conditions such as asthma, aspirin-exacerbated respiratory disease (AERD), allergic fungal rhinosinusitis, and cystic fibrosis further increase disease severity and recurrence. These mechanisms contribute to chronic mucosal oedema, impaired sinus ventilation, recurrent infection, and progressive polyp formation.[1,4]. The diagnosis of CRSwNP is established using a combination of clinical symptoms, diagnostic nasal endoscopy, and computed tomography (CT) of the paranasal sinuses. The Lund–Mackay CT scoring system[7,8] remains the most widely accepted radiological grading system, whereas postoperative endoscopic assessment is commonly performed using the Lund–Kennedy endoscopic score.[9] Together, these validated scoring systems provide objective assessment of disease severity and treatment outcomes.

Current international guidelines recommend a stepwise approach beginning with medical management.[1,4] Intranasal corticosteroids (INCS), saline nasal irrigation, and short courses of systemic corticosteroids remain the cornerstone of initial therapy. Although these treatments effectively reduce mucosal inflammation and polyp size in many patients, a substantial proportion continue to have persistent symptoms requiring surgical intervention. Functional endoscopic sinus surgery (FESS) has become the standard surgical treatment for medically refractory CRSwNP. Since its introduction by Messerklinger and Stammberger,[10,11] FESS has transformed the management of chronic sinonasal disease by restoring ventilation and drainage of the osteomeatal complex while preserving normal mucosal function. Compared with conventional procedures, FESS offers superior visualization, lower morbidity, better preservation of mucociliary clearance, and significant improvement in quality of life.

Despite successful surgery, postoperative recurrence remains a major therapeutic challenge. Recurrence rates reported in the literature range from 20% to more than 60%,[1,4,12] depending on disease severity, inflammatory phenotype, duration of follow-up, and associated comorbidities. Persistent postoperative inflammation is considered the principal factor responsible for recurrent polyp formation, highlighting the importance of effective postoperative medical therapy. Intranasal corticosteroids are regarded as the cornerstone of postoperative management following FESS. Their anti-inflammatory actions include suppression of eosinophilic infiltration, inhibition of inflammatory cytokine production, reduction of vascular permeability, improvement in mucociliary clearance, and prevention of mucosal oedema and recurrent polyp formation. Numerous randomized clinical trials and meta-analyses have demonstrated that postoperative INCS significantly improve symptom scores, endoscopic appearance, and quality of life while reducing recurrence rates and the need for revision surgery.[1,4,12,13]

Among the available intranasal corticosteroids, Fluticasone propionate and Beclomethasone dipropionate are widely prescribed owing to their established efficacy and safety. Fluticasone propionate possesses high glucocorticoid receptor affinity, prolonged tissue retention, minimal systemic bioavailability, and a favourable safety profile.[14,15] Beclomethasone dipropionate has also demonstrated significant clinical benefit in reducing postoperative inflammation and improving symptom control. However, direct comparative evidence evaluating these two agents in the postoperative setting remains limited, particularly in the Indian population.[16-18]. Several earlier studies have demonstrated the beneficial role of postoperative intranasal corticosteroids in reducing recurrence after endoscopic sinus surgery. Nevertheless, variations in study design, steroid formulation, dosage, duration of therapy, and outcome measures have resulted in inconsistent conclusions regarding the relative efficacy of individual preparations. Furthermore, data from prospective comparative studies conducted in tertiary care centres in India remain scarce.[12,13]

The present prospective comparative study was therefore undertaken to evaluate the postoperative efficacy of Fluticasone propionate nasal spray and Beclomethasone dipropionate nasal spray in patients undergoing FESS for CRSwNP. Clinical symptoms, endoscopic findings, postoperative mucosal healing, and recurrence of nasal polyps were compared over a six-

month follow-up period. By directly comparing two commonly prescribed intranasal corticosteroids with saline nasal spray, this study aims to provide clinically relevant evidence that may guide postoperative management and optimize long-term outcomes in patients with CRSwNP.

AIMS & OBJECTIVES

Aim

To compare the efficacy of postoperative Fluticasone propionate and Beclomethasone dipropionate nasal sprays following functional endoscopic sinus surgery in patients with chronic rhinosinusitis with nasal polyposis.

Objectives

1. To compare postoperative symptom improvement among patients receiving Fluticasone propionate, Beclomethasone dipropionate, and saline nasal spray.
2. To evaluate postoperative endoscopic healing using the Lund–Kennedy endoscopic scoring system.
3. To compare recurrence rates of nasal polyps during six months of follow-up.
4. To evaluate the safety and tolerability of postoperative intranasal corticosteroid therapy.

MATERIALS AND METHODS

Study Design and Setting

This prospective, randomized, comparative clinical study was conducted in the Department of Otorhinolaryngology of a tertiary care teaching hospital over a two-year period. Patients diagnosed with chronic rhinosinusitis with nasal polyposis (CRSwNP) who underwent Functional Endoscopic Sinus Surgery (FESS) were prospectively enrolled and followed for six months after surgery. The study protocol was approved by the Institutional Ethics Committee before commencement, and written informed consent was obtained from all participants. A total of 63 consecutive adult patients diagnosed with chronic rhinosinusitis (CRS) with bilateral nasal polyposis and fulfilling the eligibility criteria were enrolled in this prospective randomized study. Following Functional Endoscopic Sinus Surgery (FESS), patients were randomly allocated using a computer-generated randomization sequence into one of three postoperative treatment groups: Group A received fluticasone propionate aqueous nasal spray (400 µg/day; n = 21), Group B received beclomethasone dipropionate nasal spray (600 µg/day; n = 20), and Group C received isotonic saline nasal spray as the control group (n = 22).

Patients aged 18 years or older with clinically and endoscopically confirmed chronic rhinosinusitis with bilateral nasal polyposis, persistent symptoms for more than 12 weeks despite adequate medical therapy, and computed tomography (CT) evidence of sinonasal disease requiring FESS were included in the study. All participants were willing to undergo surgery, comply with the scheduled follow-up visits, and provided written informed consent before enrolment. Patients were excluded if they had previous sinonasal surgery, unilateral nasal polyposis, allergic fungal rhinosinusitis, antrochoanal polyp, sinonasal malignancy, cystic fibrosis, primary ciliary dyskinesia, immunodeficiency disorders, granulomatous diseases, pregnancy or lactation, long-term systemic corticosteroid therapy, known hypersensitivity to corticosteroids, or inability to complete the follow-up protocol. Before surgery, all patients underwent a standardized preoperative evaluation consisting of a detailed clinical history, comprehensive otorhinolaryngological examination, diagnostic nasal endoscopy, computed tomography of the paranasal sinuses, and routine pre-anaesthetic investigations. The severity of major sinonasal symptoms, including nasal obstruction, nasal discharge, postnasal drip, headache, sneezing, and hyposmia, was assessed using a four-point Likert scale, where 0 = absent, 1 = mild, 2 = moderate, and 3 = severe.

All patients underwent Functional Endoscopic Sinus Surgery under general anaesthesia by experienced otorhinolaryngologists following standard Messerklinger principles. Depending on the extent of disease, the surgical procedure included uncinectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy, sphenoidotomy where indicated, frontal recess clearance when required, and complete removal of nasal polyps. Every effort was made to preserve healthy sinonasal mucosa to facilitate optimal postoperative healing. Apart from the allocated topical postoperative medication, all patients received identical routine postoperative care. Following removal of the postoperative nasal pack, patients commenced the assigned topical therapy. Group A received fluticasone propionate aqueous nasal spray at a dose of 400 µg/day, administered as two sprays in each nostril twice daily. Group B received beclomethasone dipropionate nasal spray at a dose of 600 µg/day, administered as two sprays in each nostril three times daily. Group C received isotonic saline nasal spray according to the standard postoperative nasal hygiene schedule. No additional topical corticosteroids were prescribed during the study period. Routine postoperative antibiotics, analgesics, and saline irrigation were administered according to institutional protocol.

Patients were followed up at 1 week, 2 weeks, 4 weeks, 2 months, 3 months, and 6 months after surgery. At each follow-up visit, clinical symptom scores, compliance with topical therapy, adverse events, and endoscopic findings were recorded. The primary outcome was recurrence of nasal polyps at six months, assessed by rigid nasal endoscopy using the Lund–Kennedy Endoscopic Score. Secondary outcome measures included improvement in nasal obstruction, nasal discharge,

postnasal drip, headache, sneezing, and hyposmia, as well as endoscopic assessment of mucosal oedema, nasal discharge, crusting, synechiae, and overall Lund–Kennedy score. Rigid nasal endoscopy using a 0° Hopkins telescope was performed at every postoperative visit. Endoscopic evaluation was based on the validated Lund–Kennedy grading system, which assesses the presence of nasal polyps, mucosal oedema, nasal discharge, crusting, and synechiae. Throughout the study, patients were closely monitored for adverse events, including epistaxis, nasal irritation, dryness, burning sensation, local infection, septal ulceration, and drug intolerance. No serious adverse drug reactions requiring discontinuation of therapy were observed.

Statistical analysis was performed using IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Comparisons among the three treatment groups were carried out using one-way analysis of variance (ANOVA) for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. Repeated assessments of symptom scores across follow-up visits were analysed using appropriate non-parametric methods because the symptom scores were ordinal in nature. Whenever overall statistical significance was observed, post-hoc pairwise comparisons were performed. A two-tailed p-value <0.05 was considered statistically significant. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and Good Clinical Practice guidelines. Approval was obtained from the Institutional Ethics Committee before commencement of the study, and written informed consent was obtained from all participants prior to enrolment. Patient confidentiality was maintained throughout the study.

RESULTS

Study Population

A total of 63 patients with chronic rhinosinusitis with nasal polyposis (CRSwNP) who underwent Functional Endoscopic Sinus Surgery (FESS) were included in the study. All patients completed the scheduled six-month follow-up, and no participant was lost to follow-up. The study cohort comprised 21 patients in the Fluticasone group (Group A), 20 patients in the Beclomethasone group (Group B), and 22 patients in the saline control group (Group C).

Baseline Characteristics

The mean age of the study population was 40.29 ± 8.96 years. The majority of patients belonged to the 31–40-year age group (38.1%), followed by 41–50 years (25.4%) and 51–60 years (20.6%). Age distribution was comparable among the three treatment groups, with no statistically significant difference (P = 0.680). There was a male predominance, with 38 males (60.3%) and 25 females (39.7%), and gender distribution was similar across the three groups.

Table 1. Baseline Demographic Characteristics

Variable	Group A (n=21)	Group B (n=20)	Group C (n=22)	P value
Mean age (years)	39.76 ± 9.50	39.35 ± 8.34	41.64 ± 9.22	0.680
Male, n (%)	12 (57.1)	12 (60.0)	14 (63.6)	0.912
Female, n (%)	9 (42.9)	8 (40.0)	8 (36.4)	

Preoperative Clinical Presentation

At the time of presentation, all patients (100%) reported nasal obstruction, making it the most common presenting symptom. Other frequently observed symptoms included nasal discharge in 90.5% of patients, postnasal drip in 88.9%, headache in 84.1%, sneezing in 65.1%, and hyposmia in 49.2% of the study population. Comparison of baseline clinical characteristics among the three treatment groups demonstrated a similar distribution of symptoms, indicating that the groups were well matched before intervention and that there were no significant differences in preoperative symptom profiles, thereby ensuring baseline homogeneity for subsequent outcome comparisons.

Table 2. Preoperative Symptoms

Symptom	Frequency (%)
Nasal obstruction	100
Nasal discharge	90.5
Postnasal drip	88.9
Headache	84.1
Sneezing	65.1
Hyposmia	49.2

Early Postoperative Outcomes

At the first postoperative week, symptom severity was markedly reduced in all treatment groups compared with baseline. There were no statistically significant differences between the three groups with respect to nasal obstruction, nasal discharge, postnasal drip, headache, sneezing, hyposmia, or Lund–Kennedy endoscopic scores, indicating comparable postoperative status immediately after surgery. Similarly, postoperative oedema, nasal discharge, crusting, and scarring assessed endoscopically did not differ significantly among the groups during the first postoperative week.

Table 3. Comparison of First Postoperative Week Outcomes

Variable	P value
Nasal obstruction	0.096
Nasal discharge	0.227
Postnasal drip	0.200
Headache	0.281
Sneezing	0.551
Hyposmia	0.118
Lund–Kennedy polyp score	1.000
Oedema	0.067
Endoscopic discharge	0.524
Crusting	0.373
Scarring	1.000

These findings confirm that the three groups were clinically comparable immediately after surgery, allowing valid comparison of subsequent treatment effects.

Six-Month Clinical Outcomes

Progressive improvement in postoperative symptoms was observed in all three treatment groups throughout follow-up. However, patients receiving intranasal corticosteroids demonstrated significantly greater improvement than those receiving saline nasal spray. At six months, the Fluticasone group consistently demonstrated the greatest improvement in nasal obstruction, nasal discharge, postnasal drip, headache, and hyposmia, followed by the Beclomethasone group, whereas the saline group showed comparatively less improvement. For nasal obstruction, a statistically significant difference was observed among the three groups at six months ($P = 0.021$), favouring Fluticasone treatment.

Endoscopic Outcomes

Serial nasal endoscopy demonstrated progressive mucosal healing in all treatment groups. Patients receiving intranasal corticosteroids showed: lower mucosal oedema, reduced nasal discharge, fewer crusts, improved Lund–Kennedy endoscopic scores, compared with saline-treated controls. The Fluticasone group exhibited the most favourable postoperative endoscopic appearance throughout follow-up.

Polyp Recurrence

No patient demonstrated recurrent nasal polyps during the first postoperative week. During subsequent follow-up, recurrence was observed predominantly in the saline group, whereas both corticosteroid-treated groups demonstrated substantially lower recurrence rates. Among the steroid-treated patients, the Fluticasone group showed the lowest recurrence, followed by the Beclomethasone group. These findings indicate that postoperative intranasal corticosteroid therapy effectively suppresses recurrent inflammatory changes following FESS.

Table 4. Summary of Six-Month Outcomes

Outcome	Fluticasone	Beclomethasone	Saline
Symptom improvement	Excellent	Good	Moderate
Endoscopic healing	Best	Good	Fair
Lund–Kennedy score	Lowest	Intermediate	Highest
Polyp recurrence	Lowest	Low	Highest

Safety

Both intranasal corticosteroids were well tolerated. No patient discontinued treatment because of adverse effects. No serious complications including septal perforation, severe epistaxis, systemic corticosteroid-related adverse effects, or significant postoperative infection were observed during follow-up.

Key Findings

The present study demonstrated that the baseline demographic and clinical characteristics were comparable across the three treatment groups, indicating successful randomization and group homogeneity. Functional Endoscopic Sinus Surgery (FESS) resulted in significant early postoperative improvement in sinonasal symptoms in all patients. However, the addition of postoperative intranasal corticosteroid therapy provided superior long-term clinical outcomes compared with isotonic saline nasal spray alone. Among the corticosteroid preparations evaluated, fluticasone propionate produced greater improvement in postoperative symptom scores and endoscopic findings than beclomethasone dipropionate. Furthermore, both intranasal corticosteroids were significantly more effective than saline in reducing the postoperative recurrence of nasal polyps during the six-month follow-up period. Treatment with either corticosteroid was well tolerated, and no significant adverse effects or safety concerns requiring discontinuation of therapy were observed.

DISCUSSION

Chronic rhinosinusitis with nasal polyposis (CRSwNP) is a chronic inflammatory disorder of the sinonasal mucosa characterized by persistent symptoms, impaired quality of life, and a high propensity for postoperative recurrence. Although Functional Endoscopic Sinus Surgery (FESS) effectively restores sinus ventilation and drainage, surgery alone does not modify the underlying inflammatory process. Consequently, postoperative anti-inflammatory therapy remains fundamental for maintaining surgical success and minimizing disease recurrence. Intranasal corticosteroids (INCS) have therefore become the standard of care following FESS because of their proven efficacy, excellent safety profile, and minimal systemic absorption. The present prospective comparative study evaluated the efficacy of two commonly prescribed intranasal corticosteroids—Fluticasone propionate and Beclomethasone dipropionate—in patients undergoing FESS for CRSwNP. Clinical symptom improvement, endoscopic healing, and recurrence rates were assessed over a six-month follow-up period and compared with saline nasal spray.

Demographic Characteristics

The mean age of the study population was approximately 40 years, with the highest proportion of patients in the 31–40-year age group. A male predominance (60.3%) was observed. These findings are consistent with previous Indian and international studies,[1,3] which report that CRSwNP most commonly affects adults during the third to fifth decades of life and is slightly more prevalent in men. The comparable demographic characteristics among the three treatment groups indicate successful randomization and minimize the likelihood of demographic confounding.

Clinical Presentation

Nasal obstruction was the predominant presenting symptom and was observed in all patients, followed by nasal discharge, postnasal drip, headache, sneezing, and hyposmia. This symptom profile closely reflects the clinical features described in the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) and several prospective studies. Nasal obstruction results primarily from mechanical blockage caused by inflammatory polyps, while persistent mucosal inflammation contributes to rhinorrhoea, olfactory dysfunction, and facial discomfort.[1,4]

The high prevalence of hyposmia in nearly half the study population further highlights the impact of CRSwNP on quality of life. Olfactory dysfunction is increasingly recognized as an important patient-reported outcome and is frequently associated with extensive ethmoidal disease and eosinophilic inflammation.[1,5,6]

Early Postoperative Outcomes

At the first postoperative week, all three treatment groups demonstrated substantial improvement in symptoms following surgery, with no statistically significant differences in symptom scores or endoscopic findings. This observation is expected because early postoperative recovery is primarily influenced by surgical removal of obstructing polyps and restoration of sinus drainage rather than the pharmacological effects of topical corticosteroids, which generally require several weeks to exert maximal anti-inflammatory activity.[14,15]

The comparable first-week findings also confirm that postoperative healing immediately after surgery was similar in all groups, thereby strengthening the internal validity of subsequent comparisons.[1,4,15]

Effect of Intranasal Corticosteroids on Symptom Control

During follow-up, patients treated with intranasal corticosteroids demonstrated progressive and sustained improvement in postoperative symptoms compared with saline controls. Fluticasone consistently produced the greatest reduction in nasal obstruction, nasal discharge, postnasal drip, headache, and hyposmia, while Beclomethasone also showed significant benefit over saline.

These findings are biologically plausible because corticosteroids suppress eosinophilic inflammation, reduce vascular permeability, inhibit cytokine production, and improve mucociliary clearance. By controlling persistent postoperative inflammation, they facilitate mucosal healing and reduce the risk of recurrent oedema and polyp formation.

The superior clinical performance of Fluticasone observed in the present study may be explained by its high glucocorticoid receptor affinity, prolonged tissue retention, and extremely low systemic bioavailability. These pharmacological characteristics provide prolonged local anti-inflammatory activity while minimizing systemic adverse effects.

Endoscopic Healing

Serial endoscopic evaluation demonstrated progressive improvement in mucosal oedema, nasal discharge, crusting, and overall Lund–Kennedy scores in all patients.[9,12] However, improvement was greatest among patients receiving Fluticasone, followed by those receiving Beclomethasone. Objective endoscopic assessment is particularly valuable because it reflects the actual inflammatory status of the sinonasal mucosa rather than subjective symptom perception alone. Better postoperative endoscopic healing suggests more effective suppression of persistent inflammation and predicts lower long-term recurrence. The findings of the present study therefore support routine postoperative nasal endoscopy during follow-up, as recommended by current international guidelines.[1,12]

Prevention of Polyp Recurrence

The principal objective of postoperative corticosteroid therapy is prevention of recurrent nasal polyposis. In the present study, recurrence occurred least frequently in patients receiving Fluticasone, followed by those receiving Beclomethasone, whereas recurrence was greatest among patients treated with saline alone. These findings agree with the concept that surgery removes existing disease but does not eliminate the chronic inflammatory process responsible for future polyp formation.[1,4,12,13] Continuous topical corticosteroid therapy suppresses ongoing inflammation, thereby delaying or preventing recurrence. Several randomized controlled trials have similarly demonstrated reduced postoperative recurrence with topical corticosteroids. Long-term studies have shown that maintenance intranasal corticosteroid therapy significantly decreases the need for revision surgery and prolongs symptom-free survival following FESS.[12,13]

Comparison with Previous Studies

The results of the present study are consistent with those of Penttilä et al.[14] who demonstrated significant improvement in nasal symptoms and reduction in polyp size with Fluticasone propionate in patients with bilateral nasal polyposis. Similarly, Dijkstra et al.,[19] reported that long-term Fluticasone therapy after endoscopic sinus surgery significantly improved symptom scores and reduced postoperative recurrence over one year of follow-up. Rowe-Jones et al.[16] observed sustained improvements in quality of life, nasal airflow, and mucociliary clearance among patients receiving prolonged postoperative Fluticasone therapy, findings that closely parallel those observed in the present study. The beneficial effects of Beclomethasone demonstrated in this study are also supported by earlier investigations by Virolainen, Drettner, Karlsson, Dingsor, and Hartwig, all of whom reported improved postoperative symptom control and lower recurrence compared with placebo. More recently, Fandiño et al. demonstrated that postoperative intranasal corticosteroids significantly improve symptom scores, endoscopic appearance, and recurrence rates during the first postoperative year. The present findings further support these observations within an Indian tertiary-care population.

Comparison with EPOS 2020 Guidelines[1]

The findings of the present study are consistent with the recommendations of the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS 2020), which identifies intranasal corticosteroids as the cornerstone of maintenance therapy following Functional Endoscopic Sinus Surgery. EPOS recommends long-term postoperative topical corticosteroid therapy because it effectively suppresses persistent type-2 inflammation, promotes mucosal healing, reduces postoperative oedema, improves olfactory function, and significantly decreases the likelihood of recurrent nasal polyps. The superior outcomes observed among patients receiving Fluticasone propionate in the present study support these recommendations and reinforce the importance of initiating topical corticosteroids early in the postoperative period.

Comparison with ICAR-RS 2021[4]

The International Consensus Statement on Allergy and Rhinology: Rhinosinusitis (ICAR-RS 2021) strongly recommends postoperative intranasal corticosteroids for all patients undergoing FESS for CRSwNP. The consensus statement concludes that corticosteroids reduce symptom burden, improve endoscopic appearance, and decrease revision surgery. The present findings closely parallel these recommendations, with both corticosteroid groups outperforming saline controls throughout follow-up.

Comparison with Recent Meta-analysis[13]

A recent systematic review and meta-analysis evaluating postoperative corticosteroid therapy concluded that topical corticosteroids significantly improved postoperative Lund–Kennedy scores, reduced mucosal oedema, and lowered

recurrence rates without increasing adverse events. The current study demonstrates similar findings in an Indian population and extends previous evidence by directly comparing Fluticasone and Beclomethasone.

Pharmacological Explanation [14,15]

Fluticasone possesses approximately twice the glucocorticoid receptor affinity of Beclomethasone together with extremely low systemic bioavailability (<1%). These pharmacokinetic properties permit prolonged local anti-inflammatory activity while minimizing systemic exposure. This pharmacological advantage likely explains the superior symptom control and lower recurrence observed in the present study.

Indian Scenario

Evidence comparing different postoperative intranasal corticosteroids from India remains limited. Most published Indian studies evaluate postoperative steroid therapy against placebo or saline rather than directly comparing available corticosteroid formulations. Consequently, the present study contributes valuable comparative evidence applicable to routine ENT practice in resource-constrained settings.

Future Research

Future research should focus on large multicentre randomized controlled trials with longer follow-up periods of at least two years to better evaluate the long-term efficacy of postoperative intranasal corticosteroid therapy and the recurrence of nasal polyposis following Functional Endoscopic Sinus Surgery. Incorporating validated patient-reported outcome measures, such as the Sinonasal Outcome Test-22 (SNOT-22), together with objective smell identification tests, would provide a more comprehensive assessment of treatment outcomes. Further studies should also investigate inflammatory biomarkers, including serum immunoglobulin E (IgE), tissue eosinophil counts, and cytokine profiles such as interleukin (IL)-5 and IL-13, to better understand disease endotypes and predict therapeutic response. In addition, comparative studies evaluating intranasal corticosteroids against emerging biologic therapies, along with formal cost-effectiveness analyses, would help define the most effective and economically sustainable postoperative management strategies for patients with chronic rhinosinusitis with nasal polyposis.

Clinical Significance

Several clinically important observations emerge from the present study. First, both intranasal corticosteroids produced significantly better long-term outcomes than saline nasal spray alone, confirming that postoperative corticosteroid therapy should be considered standard management following FESS. Second, Fluticasone demonstrated consistently superior symptom control and endoscopic healing compared with Beclomethasone. Although both agents were effective, the pharmacokinetic advantages of Fluticasone—including greater receptor affinity and lower systemic absorption—may translate into improved clinical efficacy. Third, no serious adverse events were encountered during the study, reaffirming the excellent safety profile of modern intranasal corticosteroids. This is particularly important because CRSwNP often requires prolonged maintenance therapy extending over several months or years.[1,4,12]

Strengths of the Study

The present study has several important methodological strengths. It was designed as a prospective comparative study, enabling systematic evaluation of postoperative outcomes following Functional Endoscopic Sinus Surgery (FESS). All surgical procedures were performed using a uniform surgical technique at a single tertiary-care centre, thereby minimizing variability related to surgical expertise and perioperative management. A standardized postoperative follow-up schedule ensured consistent assessment of all participants over the study period. Both subjective clinical symptoms and objective endoscopic findings were evaluated simultaneously, providing a comprehensive assessment of treatment efficacy. The study also directly compared two of the most commonly prescribed intranasal corticosteroids, fluticasone propionate and beclomethasone dipropionate, thereby offering clinically relevant evidence to guide postoperative management. Furthermore, all enrolled patients completed the study without loss to follow-up, eliminating attrition bias and strengthening the validity of the findings. The outcomes assessed are directly applicable to routine otolaryngology practice, enhancing the clinical relevance of the study.

Limitations

Despite these strengths, the study has several limitations that should be considered while interpreting the results. Being a single-centre study, the findings may not be fully generalizable to other populations or healthcare settings. The relatively moderate sample size may have limited the statistical power to detect smaller differences between treatment groups. In addition, the follow-up period was limited to six months, which may be insufficient to evaluate the long-term recurrence of nasal polyposis after surgery. The study did not include validated patient-reported quality-of-life measures such as the Sinonasal Outcome Test-22 (SNOT-22), which could have provided additional insight into functional recovery. Objective assessment of inflammatory biomarkers, including serum immunoglobulin E levels, tissue eosinophilia, and cytokine profiles, was also not performed, limiting evaluation of disease endotypes and treatment response. Postoperative computed

tomography was not routinely performed, preventing radiological assessment of disease resolution or recurrence. Furthermore, the absence of blinding may have introduced observer bias during postoperative clinical and endoscopic evaluations. Therefore, future multicentre randomized controlled trials involving larger sample sizes, longer follow-up periods, standardized quality-of-life assessment tools, biomarker analysis, and blinded outcome evaluation are warranted to validate and expand upon the findings of the present study.

Clinical Implications

The findings of this study support the routine use of postoperative intranasal corticosteroids following FESS for CRSwNP. Both Fluticasone propionate and Beclomethasone dipropionate improve symptom control, enhance mucosal healing, and reduce recurrence compared with saline alone. Based on the observed clinical outcomes, Fluticasone may be considered the preferred first-line postoperative intranasal corticosteroid, particularly in patients at high risk for recurrence.

Summary of the Discussion

This prospective comparative study demonstrates that postoperative intranasal corticosteroid therapy is an essential component of long-term management after FESS in CRSwNP. While both Fluticasone propionate and Beclomethasone dipropionate significantly improve postoperative recovery and reduce recurrence, Fluticasone consistently provided superior clinical and endoscopic outcomes without additional safety concerns. These findings are consistent with current international recommendations and reinforce the role of topical corticosteroids in optimizing surgical outcomes and reducing disease recurrence.

CONCLUSION

The present prospective comparative study demonstrates that postoperative intranasal corticosteroid therapy significantly enhances clinical recovery following Functional Endoscopic Sinus Surgery (FESS) in patients with chronic rhinosinusitis with nasal polyposis (CRSwNP). Although all patients experienced symptomatic improvement after surgery, those receiving topical corticosteroids showed superior long-term outcomes compared with saline nasal spray alone. Both Fluticasone propionate and Beclomethasone dipropionate effectively reduced postoperative symptoms, improved endoscopic mucosal healing, and decreased recurrence of nasal polyps during six months of follow-up. However, Fluticasone propionate consistently produced greater improvement in symptom scores, more favourable Lund–Kennedy endoscopic findings, and the lowest recurrence rate, suggesting superior anti-inflammatory efficacy. The excellent safety profile observed with both medications further supports their routine postoperative use. Based on these findings, Fluticasone propionate may be considered the preferred first-line postoperative intranasal corticosteroid following FESS for CRSwNP. Long-term multicentre randomized controlled trials incorporating patient-reported quality-of-life measures, inflammatory biomarkers, and extended follow-up are recommended to further establish the comparative effectiveness of different topical corticosteroid preparations.

Clinical Relevance

The findings of the present study emphasize that intranasal corticosteroids remain an indispensable component of postoperative management following Functional Endoscopic Sinus Surgery (FESS) for chronic rhinosinusitis with nasal polyps (CRSwNP). Early initiation of topical corticosteroid therapy after surgery facilitates mucosal healing, suppresses postoperative inflammation, and contributes to improved symptom control. Among the two corticosteroids evaluated, fluticasone propionate demonstrated superior efficacy compared with beclomethasone dipropionate, resulting in greater improvement in both clinical symptoms and endoscopic findings during follow-up. Furthermore, regular postoperative endoscopic surveillance combined with maintenance intranasal corticosteroid therapy may help reduce the long-term recurrence of nasal polyps, decrease disease progression, and potentially minimize the need for revision surgery. These findings provide clinically relevant evidence to support evidence-based optimization of postoperative care in patients with CRSwNP and are readily applicable to routine otolaryngology practice.

What This Study Adds

This study directly compares two of the most commonly prescribed postoperative intranasal corticosteroids in an Indian population undergoing FESS for CRSwNP. While previous studies have largely evaluated individual agents against placebo, the present study demonstrates the comparative advantage of Fluticasone propionate over Beclomethasone dipropionate with respect to symptom improvement, endoscopic healing, and recurrence prevention, thereby providing clinically relevant evidence for postoperative therapeutic decision-making.

Ethics Approval

The study protocol was reviewed and approved by the Institutional Ethics Committee before commencement of patient recruitment. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and Good Clinical Practice guidelines.

Consent to Participate

Written informed consent was obtained from all participants before enrolment in the study.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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