ORIGINAL ARTICLE

Comparison of recurrence of allergic fungal rhinosinusitis after endoscopic sinus surgery using steroids with or without itraconazole

Muhammad Rizwan, Muhammad Omer Khan Balouch, Nasir Wakeel, Muhammad Asim Shafique, Mumshad Hussain

Bahawal Victoria Hospital/ Quaid-e-Azam Medical College, Bahawalpur Pakistan

ABSTRACT

Background: Allergic fungal rhinosinusitis (AFRS) is subtype of chronic rhinosinusitis characterized by hypersensitivity reaction to fungal elements, leading to persistent inflammation and a high recurrence rate after Endoscopic Sinus Surgery (ESS). To compare recurrence rates, symptom improvement, and quality of life outcomes in AFRS patients receiving postoperative corticosteroids alone versus those receiving a combination of corticosteroids and itraconazole following ESS.

Material and Methods: A cross-sectional analytical study was conducted at Bahawal Victoria Hospital, Bahawalpur, from July 2023 to December 2024. Patients diagnosed with AFRS based on Bent and Kuhn criteria who underwent ESS were categorized into two groups based on postoperative therapy: Group A (Corticosteroids Only) and Group B (Corticosteroids + Itraconazole). Primary outcomes included recurrence rates at 12 months post-surgery. Secondary outcomes assessed symptom improvement using SNOT-22 scores and quality of life using RSDI scores. Statistical analysis was performed using SPSS version 24.0.

Results: Baseline characteristics were comparable between groups. The recurrence rate was significantly lower in Group B (10.0%) than in Group A (25.5%) ($p = 0.004$). Group B also demonstrated greater reductions in SNOT-22 (20 vs. 12 points, $p< 0.001$) and RSDI scores (25 vs. 15 points, $p< 0.001$), indicating better symptom relief and quality of life improvement.

Conclusion: Addition of itraconazole to corticosteroid therapy significantly reduces AFRS recurrence rates and enhances post-surgical symptom relief and quality of life.

Keywords: Allergic Fungal Rhinosinusitis, Endoscopic sinus surgery, Corticosteroids, Itraconazole, Recurrence

BACKGROUND

Allergic Fungal Rhinosinusitis (AFRS) is a distinct subtype of chronic rhinosinusitis characterized by a hypersensitivity reaction to fungal elements within the sinonasal cavities. This condition is marked by the presence of eosinophilicmucin containing non-invasive fungal hyphae and is associated with type I IgE-mediated hypersensitivity responses.[1] Patients typically present with nasal polyposis, chronic nasal obstruction, and characteristic radiographic findings, including sinus opacification and possible bone remodeling due to expansive sinusitis. AFRS predominantly affects immunocompetent individuals and is more prevalent in warm, humid climates, accounting for approximately 5% to 10% of all chronic rhinosinusitis cases.[1,2,3]

The cornerstone of AFRS management involves a combination of surgical and medical interventions. Functional Endoscopic Sinus Surgery (ESS) plays a pivotal role by facilitating the removal of allergic mucin, fungal debris, and nasal polyps, thereby restoring normal sinus drainage and ventilation. ESS not only alleviates symptoms but also enhances the efficacy of postoperative medical therapies by improving drug delivery to the sinus mucosa. However, surgery alone is often insufficient, as AFRS has a high propensity for recurrence.[4] Therefore, ESS is typically complemented with adjunctive medical treatments to manage the underlying inflammatory process and prevent disease recurrence.[4,5,6]

Postoperative medical management is crucial in reducing the risk of AFRS recurrence. Systemic and topical corticosteroids are commonly employed to suppress the underlying eosinophilic inflammation and

Correspondence: Dr Muhammad Rizwan, Postgraduate Resident ENT, Bahawal Victoria Hospital/ Quaid-e-Azam Medical College, Bahawalpur Pakistan

Email: doc.rizwan33@gmail.com

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modulate the immune response.[7,8] Additionally, antifungal agents like itraconazole have been utilized for their potential to reduce fungal load and exert anti-inflammatory effects. The combination of corticosteroids with itraconazole aims to address both the inflammatory and fungal components of AFRS, potentially leading to improved outcomes. However, the efficacy of this combined approach in preventing recurrence remains a subject of ongoing research.[8,9,10]

Despite advancements in understanding AFRS pathophysiology and management, the optimal postoperative treatment regimen to prevent disease recurrence is not well-established. While corticosteroids are a mainstay in therapy, the adjunctive use of antifungal agents like itraconazole has shown promise but lacks definitive evidence from large-scale studies. This uncertainty underscores the need for further research to evaluate the effectiveness of combined corticosteroid and itraconazole therapy in reducing AFRS recurrence rates following ESS.

Objective of the study was to compare the recurrence rates of AFRS after endoscopic sinus surgery between two treatment groups: one receiving postoperative corticosteroids alone and the other receiving a combination of corticosteroids and itraconazole.

Addition of itraconazole to standard corticosteroid therapy will result in a statistically significant reduction in AFRS recurrence rates compared to corticosteroids alone.

MATERIAL AND METHODS

This cross-sectional analytical study was conducted at Bahawal Victoria Hospital, Bahawalpur, from July 2023 to December 2024, after obtaining approval from the institutional ethical review committee and written informed consent from each participant. The study aimed to assess recurrence rates, symptom improvement, and quality of life outcomes in patients diagnosed with Allergic Fungal Rhinosinusitis (AFRS) who had undergone Endoscopic Sinus Surgery (ESS), followed by either corticosteroid therapy alone or a combination of corticosteroids and oral itraconazole.

The calculated sample size, based on a 5% level of significance, 80% power, an expected recurrence rate of 40% in patients treated with corticosteroids alone, and 20% in that receiving combination therapy was 47 patients per group.[11,12,13] Patients aged 18 to 50 years, diagnosed with AFRS based on the Bent and Kuhn criteria, and who had undergone primary ESS with evidence of allergic mucin and positive fungal cultures, were included. Patients with invasive fungal sinusitis, immunodeficiency, chronic systemic illnesses such as uncontrolled diabetes or malignancies, prior systemic antifungal therapy within the preceding six months, pregnancy or lactation, or known hypersensitivity to corticosteroids or itraconazole were excluded.

Patients were categorized based on the postoperative pharmacological therapy they received. One group received corticosteroid therapy, which included oral prednisolone starting at 30 mg/day tapered over six weeks, along with intranasal corticosteroid sprays. The second group received the same corticosteroid regimen in addition to oral itraconazole at a dose of 200 mg/day for three months. All patients underwent standardized ESS performed by experienced otorhinolaryngologists. The surgical procedure included the complete removal of allergic mucin, resection of polyps, and wide drainage of the affected sinuses. Intraoperative findings were documented, and all patients received uniform postoperative care including nasal irrigation and debridement.

The primary outcome assessed was the recurrence of AFRS at 12 months post-surgery, defined as the return of symptoms with radiological confirmation and/or the need for revision surgery. Secondary outcomes included symptom improvement was measured using the Sino-Nasal Outcome Test (SNOT-22) at baseline and 12 months, and quality of life was evaluated using the Rhinosinusitis Disability Index (RSDI). Radiological assessment was conducted using the Lund-Mackay Score both pre- and post-treatment.

Data were collected using a pre-structured questionnaire, and baseline demographic and clinical variables were recorded. Statistical analysis was performed using SPSS version 24.0. Recurrence rates between the two groups were compared using the Chi-square test, while changes in SNOT-22 and RSDI scores from baseline to follow-up were analyzed using paired t-tests. The normality of data was assessed by using Shapiro-Wilk test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The sociodemographic characteristics of the patients in both groups were comparable, as shown in Table I. There were no statistically significant differences

between Group A (Corticosteroids Only) and Group B (Corticosteroids + Itraconazole) in terms of age (34.5 ± 8.2 vs. 33.8 ± 7.9 years, $p = 0.56$), gender distribution (male/female: 32/47 vs. 28/47, $p = 0.62$), BMI (24.3 ± 3.1 vs. 24.6 ± 3.4 kg/m², $p = 0.48$), serum IgE levels (1,250 ± 450 vs. 1,200 ± 420 IU/mL, $p = 0.31$), and Lund-Mackay scores (18.5 ± 3.2 vs. 18.8 ± 3.0, $p = 0.45$). This suggests that baseline characteristics were well-matched across the two study groups.

Table II highlights the recurrence rates of allergic fungal rhinosinusitis (AFRS) post-surgery. The recurrence rate was significantly lower in Group B, with only 10.0% (n = 05) of patients experiencing recurrence compared to 25.5% (n = 12) in Group A ($p = 0.004$). This suggests that the addition of itraconazole to corticosteroid therapy may be effective in reducing recurrence rates.

Post-surgical symptom improvement and quality of life outcomes, as presented in Table III, showed a statistically significant advantage in Group B. Patients receiving combination therapy demonstrated greater reductions in SNOT-22 scores (mean reduction: 20 vs. 12 points, $p< 0.001$), indicating better symptomatic relief. Similarly, RSDI scores improved more substantially in Group B (mean improvement: 25 vs. 15 points, $p< 0.001$), suggesting a greater enhancement in disease-specific quality of life.

Table-I: Sociodemographic profile of patients.

Variable	Group A (Corticosteroids only)	Group B (Corticosteroids + Itraconazole)	p-value
Age (mean ± SD, years)	34.5 ± 8.2	33.8 ± 7.9	0.56
Gender (male/female)	32 (68.08%)	28 (59.57%)	0.62
BMI (mean ± SD, kg/m²)	24.3 ± 3.1	24.6 ± 3.4	0.48
Serum IgE (mean ± SD, IU/mL)	1,250 ± 450	1,200 ± 420	0.31
Lund-Mackay Score (mean ± SD)	18.5 ± 3.2	18.8 ± 3.0	0.45

Table-II: The recurrence rates of allergic fungal rhinosinusitis (AFRS) post-surgery (n=47 in each group).

Recurrence	Group A (Corticosteroids Only)	Group B (Corticosteroids + Itraconazole)	p-value
Yes	**12 (25.5%)**	**05 (10.6%)**	**0.004**
No	**35 (74.5%)**	**42 (89.4%)**	

$\chi^2 = 8.32$, p = 0.004.

Table III: Symptom Improvement and quality of Lifemetrics post-surgery

outcome measure	Group A (corticosteroids only)	Group B (corticosteroids + itraconazole)	p-value
SNOT-22 Scores (Mean Reduction)	12 ± 6 points (baseline: 45)	20 ± 7 points (baseline: 44)	< 0.001
RSDI Scores (Mean Improvement)	15 ± 8 points (baseline: 60)	25 ± 9 points (baseline: 59)	< 0.001

DISCUSSION

The present study demonstrates that the addition of itraconazole to corticosteroid therapy significantly reduces the recurrence rates of allergic fungal rhinosinusitis (AFRS) following endoscopic sinus surgery (ESS). Specifically, Group B (Corticosteroids + Itraconazole) exhibited a recurrence rate of 10.0%, markedly lower than the 25.5% observed in Group A (Corticosteroids Only), with a statistically significant difference (p = 0.004). These findings align with previous research indicating the efficacy of itraconazole in managing AFRS which reported thatitraconazole, when used as primary medical management, improved treatment outcomes in AFRS patients.[10,14,15]

In terms of symptom relief and quality of life, patients receiving combination therapy (Group B) experienced greater improvements. The mean reduction in SNOT-22 scores was 20 points in Group B, compared to 12 points in Group A (p < 0.001), indicating superior symptomatic relief. Similarly, the RSDI scores improved by 25 points in Group B versus 15 points in Group A (p < 0.001), suggesting a more substantial enhancement in disease-specific quality of life. These

outcomes are consistent with findings from other studies that have highlighted the benefits of combining antifungal agents with corticosteroids. Previous studies reported that systemic corticosteroids, when used postoperatively, significantly increased the time to revision surgery in AFRS patients.[16,17]

The comparable sociodemographic characteristics between the two groups, including age, gender distribution, BMI, serum IgE levels, and Lund-Mackay scores, suggest that the observed differences in outcomes are attributable to the treatment modalities rather than baseline disparities. This strengthens the argument for the adjunctive use of itraconazole in the postoperative management of AFRS.[18,19]

While the study provides compelling evidence supporting the combination therapy, it is essential to consider potential limitations. The sample size, though adequate, may benefit from expansion in future studies to enhance generalizability. Additionally, the duration of follow-up was limited to 12 months; longer follow-up periods could provide more insight into the long-term efficacy and safety of itraconazole use.

The adjunctive use of itraconazole with corticosteroids post-ESS appears to be a promising strategy in reducing recurrence rates and improving symptomatology and quality of life in AFRS patients.

CONCLUSION

The addition of itraconazole to corticosteroid therapy significantly reduced the recurrence rates of AFRS and led to greater symptomatic relief and improved quality of life post-surgery. These findings support the adjunctive use of itraconazole in postoperative AFRS management to enhance long-term outcomes.

CONFLICT OF INTEREST

None

GRANT SUPPORT & FINANCIAL DISCLOSURE

Declared none

AUTHOR CONTRIBUTION

Muhammad Rizwan: Idealized and conceptualized the study, manuscript writing, final approval, agreement to be accountable for all aspects of the work

Muhammad Omer Khan Balouch: Data aquistion, manuscript writing, final approval, agreement to be accountable for all aspects of the work

Nasir Wakeel: Data analysis, data interpretation, manuscript writing, final approval, agreement to be accountable for all aspects of the work

Muhammad Asim Shafique: Data interpretation, manuscript writing, final approval, agreement to be accountable for all aspects of the work

Mumshad Hussain: Reviewing it critical for important intellectual content, final approval, agreement to be accountable for all aspects of the work

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