

EFFICACY OF INTRANASAL TRIAMCINOLONE-SOAKED GEL FOAM IN EARLY NASAL POLYPOSIS OF CRS PATIENTS: A COMPARATIVE STUDY

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ABSTRACT

Introduction: Chronic rhinosinusitis (CRS) is a persistent inflammatory condition of the nasal and paranasal sinuses (>12 weeks), presenting with nasal obstruction, rhinorrhea, facial pain, and olfactory loss. It is highly prevalent and significantly impairs quality of life. Chronic rhinosinusitis with nasal polyps (CRSwNP) is characterized by benign inflammatory polyps. Diagnosis is supported by nasal endoscopy or CT scan. Intranasal corticosteroids are the mainstay of treatment, with triamcinolone offering effective local action and minimal systemic effects.

Aim: To evaluate the efficacy of triamcinolone acetate-soaked gelfoam as a targeted, minimally invasive therapy in early nasal polyposis.

METHOD- Total of 100 CRS patients were selected as per inclusion criteria and divided into two groups (50 each); one group was treated with Triamcinolone-soaked nasal packing while the other with normal saline-soaked. SNAQ-11 scores and L-K endoscopic scores were recorded at baseline and compared with scores of 6th and 12th week follow-ups.

RESULTS—Pre-intervention SNAQ-11 and L-K endoscopic scores (mean score) in both groups were comparable. At 6 and 12 weeks, the mean SNAQ-11 and L-K endoscopic scores of the triamcinolone group showed significantly lower scores compared to the control group ($p=0.005$ and $p<0.001$, respectively).

CONCLUSION- Significant improvement in symptom and endoscopic score was noted in both the groups, but improvement was more pronounced in Group A. Thus, targeted topical therapy offers an alternative to oral steroids by avoiding their systemic side effects and decreasing morbidity in patients.

KEYWORDS: CRS, Nasal polyp, L-K Score, SNAQ-11, Triamcinolone, EPOS 2020.

INTRODUCTION

Chronic rhinosinusitis (CRS) is a common inflammatory disorder encountered in otorhinolaryngology. It is marked by inflammation of the nasal and paranasal sinus mucosa that persists for more than 12 weeks. People with this illness often have a blocked nose, discharge from the front or back of the nose, pain or pressure in the face, and a loss or decrease in their sense of smell.[1]

Some places have more CRS than others. In Asia, the range of CRS varies from 2.1% to 28.4%, while approximately 15% of the US population experiences it annually. Things like your race, gender, and where you live can make these differences, as they can influence access to healthcare resources, awareness of CRS, and the socioeconomic factors that affect treatment options.[2] CRS has a big effect on patients' quality of life, making them worry, sleep poorly, feel exhausted, and compromised work efficiency, in addition to its medical effects. It has been said that each patient loses about \$10,077.07 in productivity each year. [3,4]

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a specific subtype of chronic rhinosinusitis (CRS) that is marked by the presence of non-cancerous inflammatory polyps that usually grow from the ethmoid area in the middle meatus.[5]

Anterior rhinoscopy may not consistently detect subtle mucosal alterations in the middle meatus or ethmoidal region; however, these areas are critical sites of inflammation. Consequently, validation of chronic rhinosinusitis (CRS) necessitates objective evaluation through nasal endoscopy or computed tomography (CT) scanning in patients who satisfy clinical criteria. Nasal endoscopy is a useful first step in diagnosis because it makes diagnosis more accurate and may make CT scans less necessary, which saves money and reduces radiation exposure. [6,7] It is not enough to look at the patient's quality of life to fully understand the disease burden in CRS. People usually do this assessment with validated patient-reported outcome measures (PROMs) like SNOT-22, QOD, SCT, and SNAQ-11. Both medical and surgical interventions have demonstrated major upgrades to quality of life in these patients.[8] The main way to treat CRSwNP is with medicine. This includes saline nasal irrigation, intranasal corticosteroids, and short courses of systemic steroids when needed. Biologic drugs like dupilumab or omalizumab

may be used in other more serious or challenging-to-treat complicated cases. Endoscopic sinus surgery (ESS) is only for people who don't respond well to medical treatment. Current guidelines, such as EPOS 2020, suggest a step-by-step method based on how bad the disease is.[9] Intranasal corticosteroids are still the most important part of treatment because they help shrink polyps, make breathing through the nose easier, and lower the chances of them coming back. Beclomethasone, budesonide, fluticasone, mometasone, and triamcinolone are some of the most common drugs used. Triamcinolone acetonide stands better among these because it works well locally with little absorption into the body. [10,11]

While triamcinolone-impregnated nasal dressings have demonstrated efficacy in postoperative contexts, evidence regarding their application in early nasal polyposis remains scarce. Using triamcinolone with bioabsorbable nasal packing materials like gelfoam (Abgel) may be a targeted, minimally invasive treatment option that could delay or even eliminate the need for surgery.

Therefore, this study aims to evaluate the efficacy of triamcinolone administered through bioabsorbable nasal packing in patients with CRS with early nasal polyposis.

MATERIALS AND METHODS

This prospective, randomized experiment was conducted in the Department of Otorhinolaryngology and Head & Neck Surgery at Swaroop Rani Nehru Hospital, MLN Medical College, Prayagraj, from July 2023 to June 2024. A total of 100 adult patients diagnosed with chronic rhinosinusitis and early nasal polyposis, according to EPOS 2020 guidelines, were included. Patients exhibiting overt polyposis, sinonasal masses, previous sinus surgery, considerable septal deviation, corticosteroid usage, medication intolerance, or substantial systemic diseases were eliminated.

All patients underwent clinical evaluation, including history and anterior and posterior rhinoscopy. Baseline assessment was performed using the SNAQ-11 questionnaire and nasal endoscopy (Lund–Kennedy scoring system). Patients were randomized into two groups using a computer-generated method.

Group A received placement of 2 × 1 cm absorbable nasal packing (Gelfoam-Abgel) soaked in 1 mL of triamcinolone (20 mg/mL) into the middle meatus at 0, 2, and 4 weeks. Group B received similar saline-soaked packing. Prior to placement, local anesthesia with 4% lignocaine and adrenaline was administered. Both groups received standard medical therapy, including clarithromycin (500 mg twice daily for 2 weeks as acute exacerbation followed by 250 mg daily for 10 weeks as long term low dose therapy), along with antihistamines and antileukotrienes for 12 weeks.[12]

Patients were followed up at 2, 4, 6, and 12 weeks. Outcome assessment was done at baseline, 6 weeks, and 12 weeks using SNAQ-11 scores and Lund–Kennedy endoscopic scoring. Statistical analysis was performed using GraphPad Prism version 10.3.0. Chi-square test, unpaired *t*-test, and ANOVA were applied, with *p* < 0.05 considered statistically significant.

RESULT

There were 100 patients with chronic rhinosinusitis and early nasal polyposis, all between the ages of 18 and 50. There were 50 patients in each group. The average age of Group A (28.1 ± 6.9 years) and Group B (28.9 ± 6.7 years) was similar. There were more men than women in both groups (64% in Group A and 52%) at baseline, [Table/Fig 1] the mean SNAQ-11 scores for Group A (30.00 ± 7.2) and Group B (30.98 ± 6.7) were not significantly different (*p* > 0.05). At 6 weeks, Group A exhibited a considerably higher reduction (21.92 ± 9.2) in comparison to Group B (26.5 ± 6.5) (*p* = 0.005). The enhancement at 12 weeks was significantly greater in Group A (17.30 ± 10.1) compared to Group B (25.48 ± 5.4) (*p* < 0.0001). In Group (B) Likewise, baseline endoscopy (Lund–Kennedy) scores [Table/Fig 2] were similar across Group A (4.36 ± 0.8) and Group B (4.36 ± 0.7) (*p* > 0.05). At the 6-week mark, Group A had scores that were much lower (2.64 ± 1.1) than those of Group B (3.4 ± 1.1). At 12 weeks, Group A showed even more improvement (1.84 ± 1.3) than Group B (3.12 ± 0.7), and the differences were statistically significant (*p* < 0.0001). Both groups exhibited a notable decrease in SNAQ-11 and endoscopic scores over time; [Table/Fig 3] however, the enhancement was markedly more pronounced in the triamcinolone group relative to the control group.

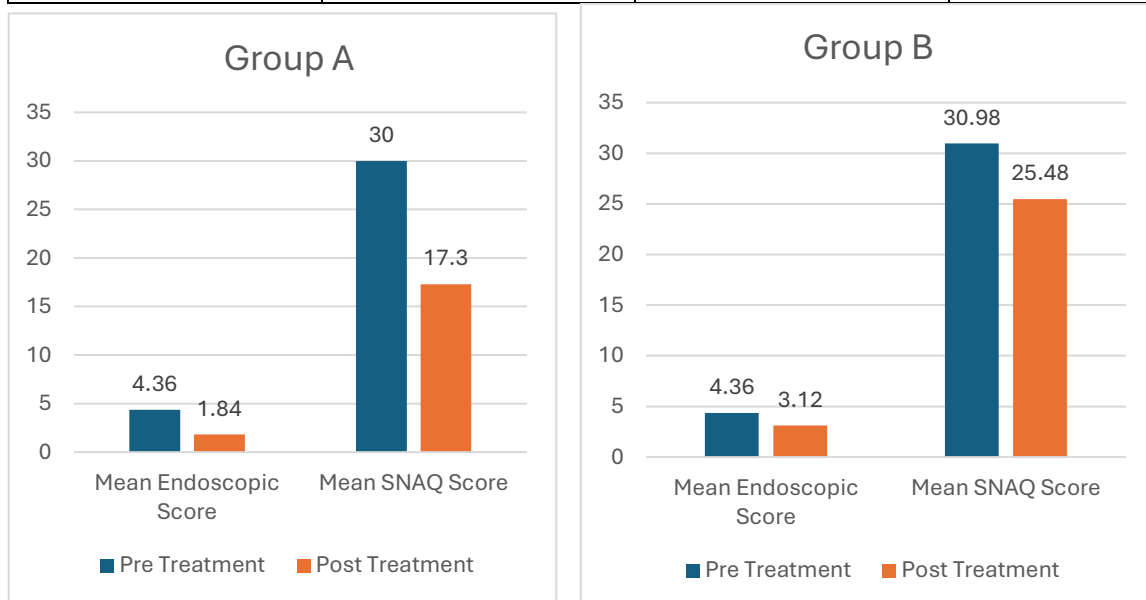
Table/Fig 1. Mean SNAQ-11 scores

Mean SNAQ-11 score	Group A (Triamcinolone)	Group B (Normal Saline)	P Value
Pre-intervention	30.00±7.2	30.98±6.7	0.482
1 st follow up (6 th week)	21.92±9.2	26.5±6.5	0.005

2 nd follow up (12 th week)	17.30±10.1	25.48±5.4	<0.0001
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Table/Fig 2. Mean Lund-Kennedy Endoscopy Scores

Mean Endoscopy Score	Group A (Triamcinolone)	Group B (Normal Saline)	P Value
Pre-intervention	4.36±0.8	4.36±0.7	1
1 st follow up (6 th week)	2.64±1.1	3.4±1.1	<0.0008
2 nd follow up (12 th week)	1.84±1.3	3.12±0.7	<0.0001



Table/Fig 3: In both group A and Group B, there was significant reduction in mean endoscopic score and mean SNAQ-11 score. Comparative improvement was more in Group A as than Group B.

DISCUSSION

The current study assessed the efficacy of intranasal triamcinolone-soaked biodegradable gel foam in patients diagnosed with chronic rhinosinusitis (CRS) accompanied by early nasal polyposis. This study uniquely investigates the role of steroid-impregnated nasal dressings in the preoperative context, contrasting with prior literature that has primarily concentrated on their postoperative applications, thereby broadening the potential therapeutic scope of topical corticosteroid delivery systems. Numerous studies have demonstrated the advantageous effects of steroid-impregnated nasal packing in promoting postoperative mucosal healing and mitigating inflammation. **Côté and Wright** concluded significant improvement in postoperative sinonasal healing utilizing triamcinolone-impregnated absorbable nasal packing [12]. In their study, **Zhao et al.** also found that mometasone-impregnated biodegradable nasal dressings worked better for endoscopic procedures, especially when the duration and dose were increased [13]. **More et al.** noted that steroid-impregnated dressings were similar to systemic corticosteroids in treating early nasal polyposis [14]. **Xu et al.** [15], on the contrary, concluded that triamcinolone-impregnated biodegradable nasal dressing was not related to improvement in subjective symptoms compared to saline but had significant improvement in postoperative wound healing and improvement of olfactory function. These results underscore the variability in both subjective and objective responses to topical steroid therapy. A significant advantage of the current study is the baseline comparability of the study groups. The demographic characteristics, encompassing age and sex distribution, exhibited no significant differences between groups,

thereby reducing the likelihood of confounding bias. The average age of the participants (about 28 years) was similar to what **Sabarinath et al.** [16] found, but **Xu et al.** [15] and **Hong et al.** [17] found higher average ages. This difference is probably because the studies had different disease demographics and broader inclusion criteria. A male predominance was noted, aligning with previous studies, including **Rudmik et al.** [18], although not reaching statistical significance. The SNAQ-11 score showed that the severity of symptoms at the start of the study was similar in both groups (30.00 ± 7.2 for Group A and 30.98 ± 6.7 for Group B), which made it possible to compare treatment results reliably. The SNAQ-11 symptom scores, validated by **Fahmy et al.** [19], provide a rhinology-specific evaluation and are superior to other commonly utilized scores such as SNOT-20 and SNOT-22. **Xu et al.** [15] emphasized the importance of balanced preintervention symptom scores for accurate postoperative comparisons using SNOT-20; the mean score observed in his study was 31.86 in the TA group and 38.70 in the saline group ($p = 0.1201$) [15]. In our study, at the 6-week follow-up, patients administered triamcinolone exhibited a statistically significant decrease in SNAQ-11 scores (Group A, 21.92 ± 9.2 vs. Group B, 26.5 ± 6.5 , $p = 0.005$), relative to controls, indicating early symptomatic improvement. This result is consistent with several previous studies demonstrating early benefits of topical steroid therapy. **Pletcher et al.** showed a big drop in SNOT-20 scores within a week of treatment [20], while **Xu et al.** saw a big improvement in symptoms after a month [15]. Nonetheless, certain studies, such as **More et al.** [14], failed to exhibit statistically significant differences at early follow-up 4 weeks ($p = 0.129$), indicating that the initiation of symptomatic improvement may differ based on study design and patient characteristics. In the present study at 12 weeks, the triamcinolone group had lower SNAQ-11 (Sino-Nasal Outcome Test-11) scores than the control group; these findings correspond with previous studies on the efficacy of triamcinolone. This is in line with what **Xu et al.** [15] found, which showed a significant improvement in SNOT-20 scores after three months, and **Yogesh More et al.** (2011) [14] showed that the mean SNAQ-11 scores were 9.42 in the triamcinolone group and 7.60 in the control group at 8 weeks ($p = 0.235$). These support the hypothesis that dressings with steroids in them are good for managing symptoms in the long run. The steady decrease in symptom scores seen in this trial suggests a cumulative therapeutic benefit of extended local corticosteroid treatment. The Lund-Kennedy (L-K) endoscopic scoring system provided an objective assessment that corroborated these findings. The initial L-K scores were identical for both groups (4.36 ± 0.8 and 4.36 ± 0.7 , respectively), indicating proper matching. **Zhao et al.** [13] reported that baseline L-K and POSE scores were the same across different study arms. These balanced preintervention scores ensure comparability between groups. At six weeks, the triamcinolone group exhibited markedly lower L-K scores relative to controls, signifying enhanced mucosal healing. This aligns with the results from **Xu et al.** [15], which indicated substantial enhancement in endoscopic scores among steroid-treated cohorts. Nonetheless, investigations conducted by **More et al.** [14] and **Côté and Wright** [12] revealed non-significant differences at initial time points, possibly due to discrepancies in intervention techniques, length, or sample size. In this study, we discovered that at the second follow-up, 12 weeks later, patients in Group A who received triamcinolone exhibited significantly lower L-K endoscopic scores compared to those in Group B who received saline (1.84 ± 1.3 vs. 3.12 ± 0.7 , with $p < 0.001$). These results confirm the conclusions of **Xu et al.** [15] and **Côté and Wright** [12], who observed significant improvements during prolonged follow-up intervals. Nevertheless, **Rudmik et al.** (2012) found no significant change in postoperative L-K ratings between the treatment and placebo groups, with $p = 0.631$ [18]. Both study groups demonstrated significant improvement over time in both subjective and objective measures, reflecting the efficacy of standard medical treatment. Nonetheless, the extent of improvement was markedly greater in the triamcinolone cohort. The decrease in L-K scores ($\sim 57.8\%$ at 12 weeks) and the notable reduction in SNAQ-11 scores noted in this study align with previously documented results. **Côté and Wright** documented a 62.4% enhancement in endoscopic scores at three months [12], whereas **Pletcher et al.** indicated substantial improvement in both symptom and endoscopic scores subsequent to steroid-infused foam application [20]. The findings of this study demonstrate that intranasal administration of triamcinolone via biodegradable gel foam provides symptomatic relief and a quantifiable improvement in mucosal healing. Notably, the preoperative application of this therapy may optimize disease management prior to surgical intervention, potentially resulting in enhanced surgical outcomes and a decreased disease burden. Even with these strengths, the fact that different studies have different results shows that we need more large-scale, multicentric trials to standardize treatment protocols and find out if they work in the long term.

CONCLUSION

In the present study we have compared the effect of intranasal application of triamcinolone-soaked gel foam in the management of early nasal polyposis in chronic rhinosinusitis with saline soaked gel foam. The results of present study have shown that there was significant improvement in symptom score and endoscopic score with intranasal Triamcinolone-soaked gel foam as well as with intranasal saline-soaked gel foam in chronic rhinosinusitis patients and the improvement was more with triamcinolone-soaked gel foam compared to saline-soaked gel foam. The primary advantage of absorbable packing was that it does not require removal, thus eliminates the need of painful removal procedure and placement of packing in middle meatus was well tolerated by patients and does not cause any additional discomfort.

Strengths of the Study

The present study highlights the effectiveness of targeted topical therapy as a potential alternative to systemic corticosteroids, thereby avoiding associated systemic adverse effects. The use of intranasal biodegradable gel foam reduced the frequency of drug administration from daily dosing to fortnightly application, which may improve patient compliance. Given the high prevalence and morbidity associated with chronic rhinosinusitis with nasal polyposis, this modality may help delay the need for surgical intervention. Furthermore, it may serve as a useful therapeutic option in patients who are unfit for surgery due to associated comorbid conditions.

Limitations of the Study

The study is limited by a relatively short duration of follow-up and a modest sample size. Further studies with larger populations and longer follow-up periods are required to evaluate the long-term efficacy and safety of this treatment modality. Continued research is also necessary to develop and refine novel therapeutic strategies for improved management of CRS with nasal polyposis.

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Ethical Approval and Informed Consent

The study was conducted after obtaining approval from the Institutional Ethics Committee of Motilal Nehru Medical College (MLNMC), Prayagraj, Uttar Pradesh, affiliated with Atal Bihari Vajpayee Medical University, Lucknow, Uttar Pradesh, India. Written informed consent was obtained from all participants prior to inclusion in the study.

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