Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page:www.jamdsr.com doi:10.21276/jamdsr Index Copernicus value [ICV] =82.06

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Study on the Efficacy of Steroid Therapy in Acute Rhinosinusitis

[1]Deepanshu Singhal, [2]Ruchi Ashok Vashist

[1]Assistant Professor, Department of ENT, Major S D Singh Medical College & Hospital, Farrukhabad, Uttar Pradesh, India;
[2]Assistant Professor, Department of ENT, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India

ABSTRACT:
Aim: This study aimed to evaluate the efficacy of steroid therapy in acute rhinosinusitis (ARS) by assessing its impact on symptom severity, treatment response, and overall patient outcomes. **Material and Methods:** A total of 100 patients diagnosed with ARS were enrolled in this prospective study. Patients aged 18 to 65 years with symptoms lasting less than 10 days were randomly assigned to either the steroid therapy group (50 patients) or the control group (50 patients). The steroid group received oral prednisone (40 mg daily for 5 days), while the control group received a placebo. Symptom severity was assessed using the Visual Analog Scale (VAS) for pain and the SNOT-22 (Sino-Nasal Outcome Test) score at baseline, day 7, and day 14. Statistical analysis was conducted using paired t-tests and independent t-tests to compare symptom reduction between groups. **Results:** The baseline characteristics were similar in both groups ($p > 0.05$). VAS scores in the steroid group decreased from 6.8 ± 1.2 at baseline to 3.2 ± 1.1 on day 7 and 1.4 ± 0.8 on day 14, while the control group showed a slower reduction (4.8 ± 1.5 on day 7 and 3.2 ± 1.2 on day 14) ($p < 0.001$). SNOT-22 scores also improved more significantly in the steroid group (15.2 ± 3.9 on day 14 vs. 22.7 ± 4.5 in the control group, $p < 0.001$). Symptom resolution at day 14 was higher in the steroid group for nasal congestion (80% vs. 56%, $p = 0.004$), facial pain (76% vs. 50%, $p = 0.007$), and purulent discharge (84% vs. 60%, $p = 0.002$). Adverse effects were mild, with no significant differences between groups. **Conclusion:** Steroid therapy significantly improves symptom resolution in ARS, providing faster relief from pain and nasal congestion with minimal adverse effects. The findings support the role of corticosteroids as an effective and well-tolerated treatment option, potentially reducing the need for antibiotics in non-bacterial ARS cases.
Keywords: Acute rhinosinusitis, steroid therapy, corticosteroids, symptom resolution, SNOT-22.

Received: 17 December, 2017 Accepted: 20 January, 2018

Corresponding author: Ruchi Ashok Vashist, Assistant Professor, Department of ENT, Sakshi Medical College & Research Centre, Guna, Madhya Pradesh, India

This article may be cited as: Singhal D, Vashist RA. Study on the Efficacy of Steroid Therapy in Acute Rhinosinusitis. J Adv Med Dent Scie Res 2018;6(2):233-237.

INTRODUCTION

Acute rhinosinusitis (ARS) is a common upper respiratory condition that significantly impacts patients' quality of life by causing nasal congestion, facial pain, headache, and purulent nasal discharge. It is often triggered by viral infections, but bacterial involvement can also occur in a subset of cases. The inflammation of the sinus mucosa leads to obstruction of normal drainage pathways, resulting in mucus accumulation and increased pressure within the sinuses. The severity of symptoms varies, with some patients experiencing mild discomfort while others suffer from debilitating pain and prolonged illness. Given its high prevalence and substantial burden on healthcare systems, effective treatment strategies are essential for reducing symptom duration and improving patient outcomes.[1]Traditional management of ARS includes symptomatic relief through analgesics, decongestants, nasal saline irrigation, and, in cases of bacterial involvement, antibiotic therapy. However, the role of antibiotics in ARS treatment has been widely debated due to concerns about antimicrobial resistance and the self-limiting nature of most cases. Many patients with ARS recover without the need for antibiotics, raising the question of whether alternative therapies can provide faster and more effective relief. Among these alternatives, corticosteroids have been proposed as a potential treatment option due to their strong anti-inflammatory properties.[2]Corticosteroids, particularly systemic and intranasal formulations, are known for their ability to reduce inflammation and mucosal edema, thereby

improving sinus drainage and alleviating symptoms. Their use in ARS has gained attention as they may help shorten the duration of symptoms and reduce the need for additional medications. By targeting the inflammatory response, corticosteroids may decrease nasal congestion, facial pain, and overall discomfort more effectively than standard symptomatic treatments alone. Despite their potential benefits, concerns remain regarding their safety, particularly with systemic corticosteroids, which have been associated with adverse effects such as insomnia, gastrointestinal discomfort, and mood changes. Thus, determining the efficacy and safety of corticosteroid therapy in ARS is crucial for guiding clinical decision-making.[3]The mechanism of corticosteroids in ARS treatment involves the suppression of inflammatory mediators such as cytokines and prostaglandins. By inhibiting the production of these inflammatory substances, corticosteroids reduce tissue swelling and improve airflow through the nasal passages. Additionally, they decrease vascular permeability, which helps in reducing nasal secretion and congestion. While intranasal corticosteroids are often preferred due to their localized effect and minimal systemic absorption, oral corticosteroids have been considered for more severe cases, offering a more rapid and potent anti-inflammatory effect. The comparison between these different forms of corticosteroid therapy remains an area of ongoing research.[4]A major challenge in the treatment of ARS is differentiating between viral and bacterial cases, as clinical symptoms often overlap. Viral ARS typically resolves within 10 days without intervention, whereas bacterial ARS can persist and lead to complications such as sinus abscesses or orbital cellulitis. The difficulty in making this distinction contributes to the overuse of antibiotics, which has fueled the global issue of antibiotic resistance. This has led clinicians to explore steroid therapy as an alternative or adjunct to antibiotics, particularly in cases where inflammation is the primary driver of symptoms rather than bacterial infection. If corticosteroids can effectively reduce symptom severity and duration, they may serve as a viable treatment option, potentially reducing antibiotic prescriptions and minimizing the risk of complications.[5]Several clinical studies have explored the efficacy of corticosteroids in ARS, with varying results. While some studies suggest that steroids significantly improve symptom resolution, others indicate only modest benefits. The variation in findings may be attributed to differences in study design, patient selection, dosage, and duration of steroid use. Additionally, concerns about the risk-benefit ratio of systemic corticosteroids have led to hesitancy in their widespread adoption. Adverse effects such as hyperglycemia, mood disturbances, and gastrointestinal irritation must be weighed against the potential therapeutic gains. In contrast, intranasal corticosteroids are generally considered safer, but their efficacy in ARS treatment remains a subject of debate.[6]This study aims to evaluate the efficacy of steroid therapy in ARS by assessing its impact on symptom severity, treatment response, and overall patient outcomes. By comparing steroid therapy with a control group receiving standard symptomatic treatment, this study seeks to determine whether corticosteroids offer a clinically significant advantage in relieving symptoms and accelerating recovery. Additionally, the study will assess the safety profile of steroids, particularly in relation to adverse effects and patient tolerance.The findings of this study have important implications for clinical practice. If corticosteroids demonstrate clear benefits in ARS treatment, they could become a recommended option for patients seeking faster symptom relief without the use of antibiotics.

MATERIAL AND METHODS

A total of 100 patients diagnosed with acute rhinosinusitis (ARS) were enrolled in this prospective study. The inclusion criteria consisted of patients aged 18 to 65 years, presenting with symptoms of acute rhinosinusitis (nasal congestion, facial pain, and purulent nasal discharge) for less than 10 days. Patients with chronic sinusitis, immunocompromised conditions, or those who had previously received steroid therapy for rhinosinusitis were excluded. After obtaining informed consent, patients were randomly assigned to two groups: the steroid therapy group (50 patients) and the control group (50 patients). The steroid therapy group received oral prednisone at a dose of 40 mg daily for 5 days, while the control group received a placebo. Both groups were monitored for symptom severity using the Visual Analog Scale (VAS) for pain and the SNOT-22 (Sino-Nasal Outcome Test) score at baseline, day 7, and day 14. Statistical analysis was conducted to compare the effectiveness of steroid therapy in reducing symptom severity, using paired t-tests for within-group comparisons and independent t-tests for between-group comparisons. This study aimed to evaluate the efficacy of steroid treatment in improving patient outcomes in acute rhinosinusitis.

RESULTS

The study analyzed the efficacy of steroid therapy in acute rhinosinusitis by comparing symptom severity, treatment response, and adverse effects between the steroid and control groups.

Baseline Characteristics (Table 1)

The baseline characteristics of the study population were comparable between the two groups, ensuring that any observed differences in outcomes were attributable to the intervention rather than underlying patient differences. The mean age of patients was 42.3 ± 10.2 years in the steroid group and 41.7 ± 9.8 years in the control group ($p = 0.72$), indicating no significant difference. Gender distribution was also similar, with 56% males and 44% females in the

steroid group compared to 52% males and 48% females in the control group (p = 0.68 and 0.75, respectively). Symptom prevalence at baseline, including nasal congestion (90% vs. 86%, p = 0.64), facial pain (84% vs. 80%, p = 0.58), and purulent discharge (80% vs. 76%, p = 0.55), showed no significant variation between the groups. This balance in baseline characteristics supports the validity of the comparative analysis.

Pain Reduction (Table 2)

The Visual Analog Scale (VAS) scores were recorded at baseline, day 7, and day 14 to assess pain severity. At baseline, VAS scores were similar between the steroid (6.8 ± 1.2) and control groups (6.7 ± 1.3) (p = 0.81). However, by day 7, patients in the steroid group experienced a significantly greater reduction in pain (3.2 ± 1.1) compared to the control group (4.8 ± 1.5) (p < 0.001). This trend continued at day 14, with the steroid group showing further pain relief (1.4 ± 0.8) versus the control group (3.2 ± 1.2) (p < 0.001). These findings suggest that steroid therapy provided faster and more effective pain relief in acute rhinosinusitis patients.

SNOT-22 Score Improvement (Table 3)

SNOT-22 scores, which measure sinonasal symptom burden, were assessed over time. At baseline, scores were similar between the steroid (42.5 ± 5.3) and control groups (41.8 ± 5.7) (p = 0.66). By day 7, the steroid group exhibited a significantly greater reduction in symptom severity (28.6 ± 4.8) compared to the control group (34.1 ± 5.1) (p < 0.001). This improvement was even more pronounced by day 14, with scores decreasing to 15.2 ± 3.9 in the steroid group versus 22.7 ± 4.5 in the control group (p < 0.001). These results indicate that steroid therapy was associated with a more rapid and substantial improvement in sinonasal symptoms.

Symptom Resolution (Table 4)

At day 14, the percentage of patients reporting complete resolution of key symptoms was significantly higher in the steroid group than in the control group. Nasal congestion resolved in 80% of patients in the steroid group compared to 56% in the control group (p = 0.004). Similarly, facial pain resolution was reported in 76% of steroid-treated patients versus 50% in the control group (p = 0.007). Purulent discharge resolved in 84% of steroid-treated patients compared to 60% in the control group (p = 0.002). These findings demonstrate that steroid therapy facilitated faster symptom relief and greater overall improvement in acute rhinosinusitis symptoms.

Adverse Effects (Table 5)

Adverse effects were recorded to assess the safety profile of steroid therapy. Gastrointestinal upset was reported by 12% of patients in the steroid group compared to 4% in the control group (p = 0.18). Insomnia was more common in the steroid group (8%) compared to the control group (2%) (p = 0.36). Mood changes were reported by 6% of steroid-treated patients versus 2% in the control group (p = 0.41). Despite these minor adverse effects, the majority of patients in the steroid group (74%) and control group (92%) reported no adverse effects (p = 0.09). The results suggest that steroid therapy was well tolerated, with minimal side effects.

Table 1: Baseline Characteristics of Patients

Characteristic	Steroid Group (n=50)	Control Group (n=50)	p-value
Age (Mean ± SD)	42.3 ± 10.2	41.7 ± 9.8	0.72
Male (%)	28 (56%)	26 (52%)	0.68
Female (%)	22 (44%)	24 (48%)	0.75
Nasal Congestion (%)	45 (90%)	43 (86%)	0.64
Facial Pain (%)	42 (84%)	40 (80%)	0.58
Purulent Discharge (%)	40 (80%)	38 (76%)	0.55

Table 2: Mean Visual Analog Scale (VAS) Pain Scores Over Time

Time Point	Steroid Group (Mean ± SD)	Control Group (Mean ± SD)	p-value
Baseline	6.8 ± 1.2	6.7 ± 1.3	0.81
Day 7	3.2 ± 1.1	4.8 ± 1.5	<0.001
Day 14	1.4 ± 0.8	3.2 ± 1.2	<0.001

Table 3: Mean SNOT-22 Scores Over Time

Time Point	Steroid Group (Mean ± SD)	Control Group (Mean ± SD)	p-value
Baseline	42.5 ± 5.3	41.8 ± 5.7	0.66
Day 7	28.6 ± 4.8	34.1 ± 5.1	<0.001
Day 14	15.2 ± 3.9	22.7 ± 4.5	<0.001

Table 4: Symptom Resolution at Day 14 (% of Patients)

Symptom	Steroid Group (n=50)	Control Group (n=50)	p-value
Nasal Congestion	40 (80%)	28 (56%)	0.004
Facial Pain	38 (76%)	25 (50%)	0.007
Purulent Discharge	42 (84%)	30 (60%)	0.002

Table 5: Adverse Effects Reported by Patients

Adverse Effect	Steroid Group (n=50)	Control Group (n=50)	p-value
Gastrointestinal Upset	6 (12%)	2 (4%)	0.18
Insomnia	4 (8%)	1 (2%)	0.36
Mood Changes	3 (6%)	1 (2%)	0.41
None	37 (74%)	46 (92%)	0.09

DISCUSSION

The results of this study indicate that steroid therapy significantly improves symptom resolution in acute rhinosinusitis, particularly in terms of pain relief, overall symptom burden reduction, and faster resolution of nasal congestion, facial pain, and purulent discharge.

The reduction in Visual Analog Scale (VAS) scores observed in this study supports previous findings that corticosteroids accelerate pain relief in acute rhinosinusitis. In the present study, pain scores in the steroid group decreased from 6.8 ± 1.2 at baseline to 3.2 ± 1.1 by day 7 and 1.4 ± 0.8 by day 14. In contrast, the control group exhibited a slower reduction from 6.7 ± 1.3 at baseline to 4.8 ± 1.5 at day 7 and 3.2 ± 1.2 at day 14. A similar study by Meltzer et al. (2006) reported that intranasal corticosteroids significantly reduced pain scores by 50% within the first week of treatment compared to placebo.[7] Likewise, Dolor et al. (2001) found that systemic corticosteroids reduced pain severity more effectively than placebo, with a 40% reduction in VAS scores at day 7 compared to a 20% reduction in the control group. These findings further validate the significant improvement in pain relief observed in the current study.[8]

The reduction in SNOT-22 scores in this study (from 42.5 ± 5.3 at baseline to 28.6 ± 4.8 on day 7 and 15.2 ± 3.9 on day 14 in the steroid group) is consistent with other trials that have demonstrated the efficacy of corticosteroids in reducing sinonasal symptom burden. A study by Benninger et al. (2003) reported a mean decrease of 14.5 points in SNOT-22 scores over two weeks in patients treated with corticosteroids, which is comparable to the 13.4-point reduction observed in the present study over the same period.[9] Similarly, Garbutt et al. (2012) found that patients treated with prednisone exhibited significantly greater improvements in SNOT-22 scores than the placebo group, with a mean score reduction of 16.2 points at day 14, supporting the findings of this study.[10]

Symptom resolution rates observed in this study were significantly higher in the steroid group compared to the control group. Nasal congestion resolved in 80% of patients receiving steroids compared to 56% in the control group ($p = 0.004$), facial pain resolved in 76% versus 50% ($p = 0.007$), and purulent discharge resolved in 84% versus 60% ($p = 0.002$). These results are in agreement with a randomized controlled trial by van Loon et al. (2013), which found that intranasal corticosteroids improved nasal congestion resolution by 75% at day 14 compared to 52% in the placebo group.[11] Similarly, Lindbaek et al. (1998) demonstrated that patients receiving systemic corticosteroids had a significantly higher rate of symptom resolution (77% vs. 54%) by day 10. [12]

The safety profile of corticosteroids observed in this study aligns with previous research. In the present study, gastrointestinal upset (12% vs. 4%), insomnia (8% vs. 2%), and mood changes (6% vs. 2%) were slightly more common in the steroid group than in the control group, but the differences were not statistically significant. These findings are comparable to those of Williamson et al. (2007), who reported minor gastrointestinal and sleep-related side effects in 10-15% of steroid-treated patients, with no significant differences in overall tolerability compared to the placebo group.[13] Another study by Hayward et al. (2012) found that corticosteroids caused mild adverse effects in 8-12% of patients, consistent with the present study's results.[14]

CONCLUSION

This study demonstrated that steroid therapy significantly improves symptom resolution in acute rhinosinusitis by reducing pain, nasal congestion, and overall symptom burden more effectively than standard treatment alone. Patients receiving steroids experienced faster symptom relief, as reflected in lower VAS and SNOT-22 scores, with minimal adverse effects. The findings support the potential role of corticosteroids as a viable treatment option, reducing the need for antibiotics in non-bacterial cases. Given the favorable safety profile, corticosteroids may be considered as an adjunct or alternative therapy for ARS.

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