

Research Article

To Study the Role of Ascorbate in Preventing Epistaxis

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ABSTRACT

Background: Epistaxis is a common otorhinolaryngological condition that may be associated with nasal mucosal dryness, inflammation, crusting and increased mucosal or vascular fragility. Ascorbic acid (vitamin C) plays an important role in collagen synthesis, connective tissue integrity and vascular health. However, evidence regarding its role in reducing recurrent epistaxis is limited.

Aim: To study the role of oral ascorbate in reducing the severity and frequency of epistaxis.

Materials and Methods: This observational study was conducted in the Department of Otorhinolaryngology at a tertiary care centre in Mangalore over a period of 18 months. A total of 64 patients aged 18-60 years presenting with epistaxis were included using convenience sampling. Patients with blood disorders and procedural bleeding were excluded. Detailed history and ENT examination were performed, and eligible patients were followed up after oral ascorbate treatment. Symptom severity was assessed using Visual Analogue Scale (VAS) scores for bleeding severity, nasal blockage and discomfort. Changes in the frequency of epistaxis episodes were also assessed. Categorical variables were expressed as frequencies and percentages. Pre- and post-treatment VAS scores were compared, with $P < 0.05$ considered statistically significant.

Results: The mean age of the participants was 33.08 ± 10.77 years (range, 18-55 years), with a male predominance (65.63%). Dry or inflamed nasal mucosa was observed in 67.19% of participants, while crusting was present in 40.63%. Following treatment, the mean VAS score for severity of bleeding episodes decreased from 7.86 ± 0.91 to 2.72 ± 1.21 ($t = 23.70$, $P < 0.001$). Nasal blockage severity decreased from 2.63 ± 2.84 to 1.03 ± 1.19 ($t = 6.96$, $P < 0.001$), while discomfort due to symptoms decreased from 7.09 ± 1.32 to 1.56 ± 1.30 ($t = 21.62$, $P < 0.001$). Furthermore, 56 (87.5%) participants reported a change or reduction in the frequency of epistaxis episodes, whereas 8 (12.5%) reported no change.

Conclusion: Oral ascorbate was associated with significant improvement in bleeding severity, nasal blockage and symptom-related discomfort among patients with epistaxis. A substantial proportion of participants also reported a reduction in the frequency of epistaxis episodes. These findings suggest a potential beneficial role of ascorbate in the management of epistaxis; however, larger controlled studies are required to establish a causal and preventive effect.

Keywords: Epistaxis, Ascorbic Acid, Ascorbate, Vitamin C, Nasal Bleeding, VAS, Recurrence.

INTRODUCTION

Epistaxis, commonly referred to as a nosebleed, is one of the most frequent otorhinolaryngological complaints encountered in clinical practice. It may range from a minor, self-limiting episode to severe or recurrent bleeding requiring medical or surgical intervention. The causes of epistaxis are multifactorial and include local factors such as nasal mucosal dryness, inflammation, crusting, trauma and infection, as well as systemic factors including hypertension, coagulation abnormalities and the use of antiplatelet or anticoagulant medications. The majority of clinically encountered episodes arise from the

anterior nasal cavity and are often associated with local mucosal abnormalities [1–3].

The nasal mucosa is particularly susceptible to environmental and mechanical factors. Dryness, inflammation and crust formation can compromise mucosal integrity and make the underlying blood vessels vulnerable to minor trauma and recurrent bleeding. Appropriate identification and management of these local factors therefore remain important components of epistaxis management [1,2].

Ascorbic acid (vitamin C) is an essential water-soluble micronutrient with important functions in collagen synthesis, connective tissue

maintenance, antioxidant defence and vascular integrity. Ascorbate acts as a cofactor for enzymes involved in collagen biosynthesis, thereby contributing to the structural integrity of connective tissues and blood vessels. Vitamin C deficiency is classically associated with mucocutaneous bleeding, impaired wound healing and increased vascular fragility [4–6].

Experimental and clinical evidence suggests that adequate ascorbic acid status may influence microvascular integrity and bleeding tendency. A systematic review and meta-analysis of clinical trials found that vitamin C supplementation was associated with a reduction in gingival bleeding tendency, particularly among individuals with lower baseline vitamin C levels, suggesting a possible relationship between ascorbate status and microvascular fragility [7]. Earlier research has also examined the relationship between ascorbic acid and nasal haemorrhage, providing a historical basis for investigating the potential role of vitamin C in patients with recurrent nasal bleeding [8].

Despite the biological plausibility of a role for ascorbate in maintaining mucosal and vascular integrity, evidence specifically evaluating its clinical role in recurrent epistaxis remains limited. Therefore, the present study was undertaken to evaluate the role of oral ascorbate in patients presenting with epistaxis, with particular emphasis on changes in bleeding severity, nasal symptoms, symptom-related discomfort and the frequency of epistaxis episodes during follow-up.

MATERIALS AND METHODS

Study Design and Setting

This observational study was conducted in the Department of Otorhinolaryngology (ENT) at a tertiary care centre in Mangalore over a period of 18 months. The study included adult patients presenting to the ENT outpatient department (OPD) with an episode of epistaxis who fulfilled the predefined eligibility criteria.

Sample Size

A total of 64 subjects were included in the study. The sample size was estimated based on a previous study by Teuku Husni T.R., Dramani, Kurnia Fitri Jamil, and Azwar. Assuming a prevalence (P) of 20%, a 95% confidence interval, and an allowable error (L) of 10%, the required sample size was calculated to be 64.

Study Population

The study population comprised patients aged 18–60 years presenting to the ENT OPD with

epistaxis.

Inclusion Criteria

- Subjects aged 18–60 years.
- Patients presenting to the ENT OPD with an episode of epistaxis.
- Subjects fulfilling the study requirements and providing consent for participation and follow-up.

Exclusion Criteria

- Patients with known blood disorders.
- Patients with procedural bleeding.

Sampling Technique

Convenience sampling was employed. All eligible subjects presenting to the ENT Department with an episode of epistaxis during the study period were considered for inclusion until the required sample size was achieved.

Data Collection

After obtaining the required consent, a detailed history was obtained from each subject, including relevant clinical details related to the episode of epistaxis and previous episodes. A detailed ENT examination was performed. Patients who had previously visited the department for an episode of epistaxis were followed up to assess recurrence and clinical outcomes.

The collected data were systematically recorded and subsequently assessed for statistical analysis. The use of oral vitamin C (ascorbate) and its association with recurrence of epistaxis during follow-up were also evaluated. Visual Analogue Scale (VAS) scoring was used to assess changes following ascorbate treatment.

Outcome Assessment

The primary assessment included the occurrence of recurrent epistaxis during follow-up. The proportion of patients experiencing recurrence among those receiving oral vitamin C was assessed. Changes following ascorbate treatment were evaluated using the Visual Analogue Scale (VAS).

Statistical Analysis

Categorical variables were expressed as frequencies and percentages. The Chi-square test was used to assess the association between oral vitamin C intake and recurrence of epistaxis during follow-up. VAS scores were used to assess changes following ascorbate treatment. A *P* value <0.05 was considered statistically significant.

RESULTS AND OBSERVATIONS

A total of 64 subjects presenting with epistaxis and fulfilling the predefined eligibility criteria were included in the study. The demographic

characteristics, clinical presentation, symptom severity before and after treatment, and response to oral ascorbate treatment were

assessed. The findings are presented in five tables.

Table 1. Demographic Characteristics of Study Participants (N=64)

Parameter	Value
Age, Mean $\pm$ SD (Years)	33.08 $\pm$ 10.77
Age Range (Years)	18–55
Male, N (%)	42 (65.63%)
Female, N (%)	22 (34.38%)
T Value	–1.018
P Value	0.315

Observation: The mean age of the study participants was 33.08 $\pm$ 10.77 years, with an age range of 18–55 years. There was a male predominance, with 42 (65.63%) male and 22 (34.38%) female participants. The reported

statistical analysis showed a *t* value of –1.018 and a *P* value of 0.315, indicating that the observed difference was not statistically significant.

Table 2. Duration and Clinical Characteristics of Epistaxis among Study Participants (N=64)

Clinical Parameter	Category	N (%)
Duration Of Epistaxis	Days	48 (75.00%)
	Months	16 (25.00%)
Nasal Blockage	Present	31 (48.44%)
	Absent	33 (51.56%)
Headache	Present	18 (28.13%)
	Absent	46 (71.88%)
Current Medication	Antihistamines	10 (15.63%)
	None	54 (84.38%)
Rhinorrhea	Present	21 (32.81%)
	Absent	43 (67.18%)
Nasal Mucosa	Normal	21 (32.81%)
	Dry/Inflamed	43 (67.19%)
Crusting	Present	26 (40.63%)
	Absent	38 (59.38%)
Bleeding Point Localization	Present	34 (53.13%)
	Absent	30 (46.87%)

Observation: The majority of participants, 48 (75.0%), reported epistaxis occurring over a period of days, whereas 16 (25.0%) reported episodes extending over months. Nasal blockage was present in 31 (48.44%) participants, while headache was reported by 18 (28.13%). Antihistamine use was reported in 10 (15.63%) participants. Rhinorrhea was present in 21 (32.81%)

subjects. On ENT examination, 43 (67.19%) participants had dry or inflamed nasal mucosa, while crusting was observed in 26 (40.63%). A bleeding point could be localised in 34 (53.13%) participants. Overall, dryness or inflammation of the nasal mucosa was one of the common clinical findings among the study participants.

Table 3. Comparison of Pre- and Post-Treatment VAS Scores among Study Participants (N=64)

Parameter	Pre-Treatment Mean $\pm$ SD	Post-Treatment Mean $\pm$ SD
Severity Of Bleeding Episodes	7.86 $\pm$ 0.91	2.72 $\pm$ 1.21
Nasal Blockage Severity	2.63 $\pm$ 2.84	1.03 $\pm$ 1.19
Discomfort Due To Symptoms	7.09 $\pm$ 1.32	1.56 $\pm$ 1.30

Observation: Before treatment, the mean VAS score for the severity of bleeding episodes

was 7.86 $\pm$ 0.91, while the mean score for discomfort due to symptoms was 7.09 $\pm$ 1.32.

The mean VAS score for nasal blockage severity was 2.63 ± 2.84 .

Following treatment, a marked reduction in all assessed symptom scores was observed. The mean score for severity of bleeding episodes

decreased to 2.72 ± 1.21 , nasal blockage severity decreased to 1.03 ± 1.19 , and discomfort due to symptoms decreased to 1.56 ± 1.30 .

Table 4. Statistical Comparison of Pre- and Post-Treatment VAS Scores (N=64)

Parameter	Pre-Treatment Mean $\pm$ SD	Post-Treatment Mean $\pm$ SD	T Value	P Value
Severity Of Bleeding Episodes	7.86 ± 0.91	2.72 ± 1.21	23.70	<0.001*
Nasal Blockage Severity	2.63 ± 2.84	1.03 ± 1.19	6.96	<0.001*
Discomfort Due To Symptoms	7.09 ± 1.32	1.56 ± 1.30	21.62	<0.001*

*Statistically significant.

Observation: Comparison of pre- and post-treatment VAS scores demonstrated a statistically significant reduction in all three assessed parameters. The severity of bleeding episodes decreased significantly from 7.86 ± 0.91 to 2.72 ± 1.21 ($t = 23.70$, $P < 0.001$). Similarly, nasal blockage severity decreased from 2.63 ± 2.84 to 1.03 ± 1.19 ($t = 6.96$, P

< 0.001).

The mean discomfort score also showed a significant reduction from 7.09 ± 1.32 to 1.56 ± 1.30 ($t = 21.62$, $P < 0.001$). Thus, all assessed symptom parameters showed statistically significant improvement following treatment.

Table 5. Impact of Ascorbate Treatment on Frequency of Epistaxis Episodes (N=64)

Change In Frequency Of Epistaxis Episodes	N	Percentage
No Change	8	12.5%
Change Present	56	87.5%
Total	64	100.0%

Observation: Following oral ascorbate treatment, 56 (87.5%) participants reported a change/reduction in the frequency of epistaxis episodes, whereas 8 (12.5%) participants reported no change. Thus, the majority of participants showed an improvement in the frequency of epistaxis episodes following treatment.

DISCUSSION

The present observational study evaluated the clinical response to oral ascorbate among 64 patients presenting with epistaxis. The principal findings were a reduction in the severity of bleeding episodes, nasal blockage and symptom-related discomfort following treatment. In addition, 87.5% of participants reported a change or reduction in the frequency of epistaxis episodes. These findings suggest a potentially favourable association between ascorbate supplementation and improvement in epistaxis-related symptoms. In the present study, the mean age of participants was 33.08 ± 10.77 years, with an

age range of 18–55 years. Males constituted 65.63% of the study population, indicating a male predominance. Similar male predominance has been reported in previous epidemiological studies of epistaxis. Razdan et al. reported a higher incidence of epistaxis among young males in an Indian study [9]. Other hospital-based studies have also demonstrated a greater frequency of epistaxis among males [10,11]. The relatively younger age profile in the present study may be related to the inclusion of patients presenting to the ENT outpatient department rather than a population restricted to hospitalised or emergency cases.

Regarding clinical characteristics, 75% of participants reported episodes occurring over days, while 25% reported episodes extending over months. Nasal blockage was present in 48.44% of participants, and rhinorrhea was reported by 32.81%. Importantly, 67.19% of participants had dry or inflamed nasal mucosa and 40.63% had nasal crusting. These findings are clinically relevant because

mucosal dryness and inflammation can compromise the integrity of the nasal mucosa and increase susceptibility to bleeding. Previous literature has similarly recognised dryness, inflammation, upper respiratory tract conditions and local mucosal trauma as important contributors to epistaxis [2,3].

A bleeding point could be localised in 53.13% of the participants. Identification of the bleeding site is an important component of epistaxis evaluation because localised anterior bleeding can often be managed with conservative measures or targeted treatment. Current approaches to epistaxis emphasise examination of the nasal cavity, identification of the bleeding source and appropriate local measures such as compression, cautery and topical therapy when indicated [12].

The most important finding of the present study was the change in VAS scores following ascorbate treatment. The mean VAS score for severity of bleeding episodes decreased from 7.86 ± 0.91 before treatment to 2.72 ± 1.21 after treatment. This reduction was statistically significant ($t = 23.70$, $P < 0.001$). Similarly, the mean VAS score for nasal blockage decreased from 2.63 ± 2.84 to 1.03 ± 1.19 ($t = 6.96$, $P < 0.001$), while discomfort due to symptoms decreased from 7.09 ± 1.32 to 1.56 ± 1.30 ($t = 21.62$, $P < 0.001$).

The observed improvement has a plausible biological basis. Ascorbic acid is essential for collagen synthesis and maintenance of connective tissue integrity. Collagen provides structural support to mucosal tissues and blood vessel walls, and inadequate ascorbate can result in impaired tissue integrity and increased bleeding tendency [4–6]. In addition, experimental evidence indicates that ascorbate may influence endothelial function and vascular integrity [5]. These mechanisms could potentially contribute to improved mucosal resilience in individuals with inadequate vitamin C status.

The findings of the present study are broadly consistent with evidence linking ascorbate status to bleeding tendency. Hujoel et al. conducted a systematic review and meta-analysis of controlled clinical trials and reported that ascorbic acid supplementation reduced gingival bleeding tendency, particularly in individuals with lower baseline ascorbate concentrations [7]. Although gingival bleeding is not equivalent to epistaxis, both represent mucosal bleeding and may share mechanisms related to microvascular integrity. These findings therefore provide

biological support for further investigation of ascorbate in recurrent mucosal bleeding.

An earlier study by Neivert et al. specifically investigated ascorbic acid in relation to nasal haemorrhage and highlighted the potential contribution of ascorbate deficiency to nasal bleeding [8]. However, the evidence base for routine vitamin C supplementation specifically for recurrent epistaxis remains limited. Therefore, the improvement observed in the present study should be interpreted as an association rather than definitive proof of a preventive or therapeutic effect.

The frequency of epistaxis episodes also showed an encouraging pattern. Following treatment, 56 (87.5%) participants reported a change or reduction in the frequency of episodes, whereas 8 (12.5%) reported no change. This finding suggests that a substantial proportion of participants experienced improvement during follow-up. However, because the present study was observational and did not include a separate untreated control group, the reduction in episodes cannot be attributed exclusively to ascorbate. Natural variation in epistaxis frequency, concurrent local care, avoidance of precipitating factors and other clinical interventions may also have contributed to the observed improvement.

The presence of dry or inflamed nasal mucosa in a considerable proportion of participants is particularly noteworthy. Local nasal care remains an important component of preventing recurrent mucosal trauma and bleeding. Thus, the possible benefit of ascorbate should be considered complementary to appropriate evaluation and management of local and systemic causes rather than as a replacement for established epistaxis management [12,13].

The present study has several limitations. First, its observational design limits the ability to establish a causal relationship between ascorbate treatment and reduction in epistaxis. Second, the sample size was relatively small, with only 64 participants. Third, baseline serum vitamin C concentrations were not assessed, so it was not possible to determine whether patients with vitamin C deficiency derived greater benefit. Finally, the absence of a parallel control group limits direct comparison between ascorbate-treated and untreated patients.

Despite these limitations, the study provides useful preliminary clinical evidence regarding the potential role of ascorbate in patients with

epistaxis. The statistically significant improvement in VAS scores and the reduction in reported episode frequency support the need for larger, controlled prospective studies incorporating baseline vitamin C assessment and standardised follow-up.

Overall, the findings suggest that oral ascorbate may have a beneficial role in reducing symptom severity and recurrence of epistaxis, particularly in patients in whom impaired mucosal or microvascular integrity may contribute to bleeding. However, further randomised controlled studies are required before routine ascorbate supplementation can be recommended specifically for the prevention of recurrent epistaxis.

CONCLUSION

Oral ascorbate was associated with significant improvement in bleeding severity, nasal blockage, symptom-related discomfort, and frequency of epistaxis episodes. These findings suggest that ascorbate may have a beneficial role in reducing epistaxis symptoms and recurrence. However, larger controlled studies are needed to confirm its preventive efficacy.

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