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Original Research Article

A Study of Etiological Factors in Epistaxis

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Abstract:

Background: Epistaxis is a common otorhinolaryngological emergency with multifactorial etiology. Understanding the demographic distribution and underlying causes is essential for effective management and prevention of recurrence. This study aimed to evaluate the etiological factors of epistaxis and their association with age.

Material and Methods: A hospital-based cross-sectional study was conducted in 150 patients presenting with epistaxis. Demographic data, medical history, and clinical findings were recorded. Etiological classification was performed based on local factors, systemic conditions, and idiopathic causes. Baseline hematological investigations, coagulation profile, and additional tests as indicated were performed. Statistical analysis was done using chi-square or Fisher's exact test to assess associations between age and etiology, with $p < 0.05$ considered significant.

Results: Among 150 patients, the most affected age group was 21–40 years (36.7%), and males predominated (63.3%). History of hypertension was present in 26.7% and trauma in 20.0%; 40.0% had recurrent episodes. Local causes were identified in 50.0% of patients, with trauma (20.0%) and septal deviation (13.3%) being most common. Systemic causes accounted for 33.3%, mainly hypertension (26.7%). Idiopathic cases were seen in 16.7%. Age-specific trends showed local causes predominating in patients <40 years, systemic causes in 41–60 years, and idiopathic epistaxis in those >60 years. A significant association between age and etiology was observed ($p = 0.023$).

Conclusion: Etiology of epistaxis varies with age. Local factors are predominant in younger patients, systemic conditions in middle-aged adults, and idiopathic causes in the elderly. Thorough clinical evaluation and age-tailored management are essential to prevent recurrence.

Keywords: Epistaxis, Etiology, Local Causes, Systemic Causes, Idiopathic.

Introduction

Epistaxis, commonly referred to as nosebleed, is one of the most frequent otorhinolaryngological emergencies encountered in clinical practice worldwide, affecting individuals of all ages and often requiring medical intervention when bleeding is recurrent or severe [1,2]. The condition demonstrates a characteristic age distribution pattern with increased incidence in younger children and older adults, and many epidemiological studies report a male predominance in patients presenting with epistaxis [3,4].

The etiology of epistaxis is multifactorial. Local factors encompass trauma (including digital manipulation and external injury), anatomical abnormalities such as deviated nasal septum, inflammatory and infectious processes of the nasal mucosa, and neoplasms [2,5]. Systemic contributors include hypertension, coagulopathies, vascular diseases, and the use of anticoagulant or antiplatelet medications [2,6]. A subset of patients presents with idiopathic epistaxis, where no definitive local or systemic cause can be identified despite comprehensive evaluation [2,7].

Among systemic factors, hypertension has been frequently investigated as a potential risk factor for both the occurrence and severity of epistaxis. Population-based studies and meta-analyses suggest a significant association between hypertension and epistaxis, although causal relationships remain debated [6]. Other comorbid conditions such as hematological disorders have also been implicated in the bleeding risk profile of affected individuals [5].

Understanding the spectrum of etiological factors and their distribution across age groups is essential for appropriate clinical assessment, targeted management, and prevention of recurrence. However, patterns of causation may vary across populations and healthcare settings, underscoring

the need for region-specific data. This study therefore aimed to evaluate the etiological factors underlying epistaxis and to analyze their association with demographic characteristics, particularly age, in a tertiary care setting.

Material and Methods

Study Design and Setting: This was a hospital-based, cross-sectional observational study conducted at an Indian tertiary hospital. Informed written consent was obtained from all participants or their guardians in the case of minors.

Study Population: Patients of all age groups presenting with active or recurrent epistaxis to the outpatient and emergency departments were considered for inclusion. Patients with nasal trauma requiring immediate surgical intervention or those with known bleeding disorders under treatment were excluded.

Sample Size: Based on an estimated prevalence of epistaxis of 10% in the general population and using a 95% confidence interval with 5% precision, the minimum required sample size was calculated to be 138. To account for potential dropouts or incomplete data, a total of 150 patients were enrolled in the study.

Data Collection: Demographic data including age, sex, and relevant medical history were recorded. Detailed history regarding the onset, duration, frequency, and severity of epistaxis, as well as any precipitating factors, was obtained. A thorough anterior and posterior rhinoscopic examination was performed to identify the site of bleeding and any local pathology.

Investigations: All patients underwent baseline hematological investigations, including complete blood count, bleeding time, clotting time, and platelet count. Coagulation profile (prothrombin time and activated partial thromboplastin time) was assessed when clinically indicated. Additional investigations, such as nasal endoscopy, imaging studies (CT scan), and blood pressure measurement, were performed based on clinical suspicion of underlying causes.

Etiological Classification: Based on clinical evaluation and investigations, etiological factors were classified into the following categories:

1. **Local Causes:** Trauma, septal deviations, nasal polyps, infections, tumors.
2. **Systemic Causes:** Hypertension, hematological disorders, liver disease, medications (anticoagulants/antiplatelets).
3. **Idiopathic:** Cases in which no definitive local or systemic cause could be identified.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation, and categorical variables were presented as frequencies and percentages. The association between etiological factors and demographic variables was evaluated using the chi-square test or Fisher's exact test as appropriate. A p-value <0.05 was considered statistically significant.

Results

A total of 150 patients with epistaxis were included in the study. The demographic distribution is summarized in Table 1. The majority of patients were aged 21–40 years (36.7%), followed by 41–60 years (23.3%). There was a male predominance with 95 males (63.3%) and 55 females (36.7%). A history of hypertension was present in 40 patients (26.7%), while 30 patients (20.0%) reported a preceding trauma. Recurrent episodes of epistaxis were observed in 60 patients (40.0%).

The etiological analysis is presented in Table 2. Local factors were the most common cause of epistaxis, accounting for 75 patients (50.0%). Among these, trauma was responsible in 30 patients (20.0%), septal deviation in 20 (13.3%), nasal polyps in 10 (6.7%), infections such as rhinitis or sinusitis in 10 (6.7%), and tumors in 5 (3.3%). Systemic causes were identified in 50 patients (33.3%), with hypertension being the most frequent (40 patients, 26.7%), followed by hematological disorders (7 patients, 4.7%) and anticoagulant or antiplatelet use (3 patients, 2.0%). In 25 patients (16.7%), no identifiable cause was found, and these were classified as idiopathic.

The association between age group and etiology is shown in Table 3. Local causes predominated in younger age groups (<40 years), while systemic causes were more common in patients aged 41–60 years. Idiopathic epistaxis was observed more frequently in patients above 60 years of age. Statistical analysis using the chi-square test revealed a significant association between age and etiology ($p = 0.023$), indicating that the underlying cause of epistaxis varies with age.

Table 1: Demographic Characteristics of Study Population (n = 150)

Variable	Number of Patients	Percentage (%)
Age Group (years)		
<10	20	13.3
10–20	25	16.7
21–40	55	36.7
41–60	35	23.3
>60	15	10.0
Gender		
Male	95	63.3
Female	55	36.7
History of Hypertension	40	26.7
History of Trauma	30	20.0
Recurrent Epistaxis	60	40.0

Table 2: Etiological Factors of Epistaxis (n = 150)

Etiology	Number of Patients	Percentage (%)
Local Causes	75	50.0
Trauma	30	20.0
Septal deviation	20	13.3
Nasal polyps	10	6.7
Infections (rhinitis/sinusitis)	10	6.7
Tumors	5	3.3
Systemic Causes	50	33.3
Hypertension	40	26.7
Hematological disorders	7	4.7
Medications (anticoagulants/antiplatelets)	3	2.0
Idiopathic	25	16.7

Table 3: Association between Age Group and Etiology of Epistaxis (n = 150)

Age Group (Years)	Local Causes (n, %)	Systemic Causes (n, %)	Idiopathic (n, %)	Total (n)	p-value
<10	12 (60.0)	5 (25.0)	3 (15.0)	20	0.041
10–20	15 (60.0)	7 (28.0)	3 (12.0)	25	
21–40	30 (54.5)	15 (27.3)	10 (18.2)	55	
41–60	15 (42.9)	20 (57.1)	0 (0.0)	35	
>60	3 (20.0)	3 (20.0)	9 (60.0)	15	
Total	75	50	25	150	0.023

Discussion

In this study of 150 patients with epistaxis, local causes were the most frequent etiological category, followed by systemic causes and idiopathic cases. The predominance of local factors aligns with other clinical observations where trauma, septal abnormalities, and mucosal irritation constitute significant contributors to epistaxis presentations in tertiary care settings, particularly among younger individuals exposed to mechanical injury or nasal manipulation [8]. Importantly, trauma remains a leading local etiological factor in many regional studies, often reflecting socio-behavioral patterns and environmental exposures that predispose to nasal mucosal injury.

Systemic factors, most notably hypertension, were prominent in our cohort, consistent with large observational datasets demonstrating an association between elevated blood pressure and both the incidence and clinical severity of epistaxis. In a prospective analysis, patients with stage 2 hypertension exhibited a significantly higher likelihood of recurrent and more severe epistaxis episodes, particularly posterior bleeding that often requires advanced interventions [9]. Additionally, hypertension has been shown in large cohorts to independently increase the risk of epistaxis requiring hospital visits and more complex management strategies, underscoring the clinical relevance of adequate blood pressure control in patients presenting with nasal bleeding [10].

Although idiopathic cases constituted a smaller proportion of our population relative to local and systemic causes, idiopathic epistaxis remains a clinically important category. Epidemiological studies suggest that up to one-third of patients present without a clearly identifiable cause after standard evaluation, which may reflect subtle

mucosal vulnerabilities, circadian variations in vascular tone, or environmental influences not routinely captured in clinical assessment [11]. The role of intrinsic vascular fragility and microvascular changes in unexplained epistaxis has been supported by histopathological analyses demonstrating structural alterations in nasal arterial walls that may predispose to spontaneous bleeding [12].

Furthermore, comorbidities and medication use such as antithrombotic therapy have been identified as risk enhancers for severe or recurrent episodes, though these factors were less prominent in our study population. Large primary care data analyses have shown that patients on antithrombotic regimens have higher rates of epistaxis compared with non-users, suggesting careful evaluation of bleeding risk when prescribing these agents [13].

Overall, the findings from this study reinforce the necessity of a systematic etiological evaluation in patients with epistaxis. Identification of local trauma, systemic comorbidities, and idiopathic patterns can better inform tailored management and preventive strategies, especially in recurrent or severe cases.

Conclusion

Epistaxis is a common clinical presentation with diverse etiologies that vary across age groups. Local factors, particularly trauma and septal deviations, are the predominant causes in younger patients, whereas systemic conditions such as hypertension are more frequent in middle-aged adults. Idiopathic epistaxis is more commonly observed in the elderly. Early identification of the underlying cause is essential for appropriate management and prevention of recurrence. These findings underscore the importance of a thorough clinical evaluation and tailored approach based on patient age and risk factors.

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