ORIGINAL ARTICLE

RETROSPECTIVE ANALYSIS OF EPISTAXIS CASES: IMPACT OF COMORBIDITY AND RECURRENCE ON TREATMENT APPROACHES

Epistaksis Vakalarının Retrospektif Analizi: Eşlik Eden Hastalık ve Rekürrensin Tedavi Yaklaşımları Üzerindeki Etkisi

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ABSTRACT

Objective: This study aimed to evaluate the etiology and treatment approaches of patients who presented to our clinic with nosebleeds, in accordance with the current literature.

Material and Methods: Between January 2018 and March 2023, patients diagnosed with epistaxis who either presented to the otorhinolaryngology outpatient clinic of a tertiary university hospital or were referred from the emergency department, and whose data were accessible through the hospital information system, were retrospectively analyzed.

Results: Among 2,169 patients diagnosed with epistaxis, 658 patients aged 0–95 years who met the inclusion criteria were included in the study. The mean age was 38.4 years, and 54% were male. The highest number of admissions occurred in February. Among patients with available recurrence data, recurrent epistaxis was observed in 28.1% of cases, while a single episode occurred in 8.7%. Recurrence information was unavailable for the remaining patients. Single episodes were more frequent among females. Most patients were treated on an outpatient basis (78.9%) and received only medical therapy (90.4%). A history of surgery was present in 3.3% of cases, the majority following septorhinoplasty. Hospitalization was required in 2.6% of cases, most of whom had comorbid conditions. Recurrence rates were also higher among patients with comorbidities.

Conclusion: Epistaxis is a common otorhinolaryngologic emergency that can generally be managed effectively with outpatient medical treatment. However, recurrence and hospitalization rates are higher in elderly patients and those with comorbidities. A thorough assessment of patients' medical history and accompanying conditions is crucial for selecting the most appropriate treatment approach.

Keywords: *Epistaxis; Cauterization; Surgery; Comorbidity; Recurrence*

ÖZET

Amaç: Bu çalışmanın amacı, kliniğimize burun kanaması nedeniyle başvuran hastaların etyolojisini ve tedavi yaklaşımlarını güncel literatür ışığında değerlendirmektir.

Gereç ve Yöntemler: Ocak 2018 – Mart 2023 tarihleri arasında, üçüncü basamak bir üniversite hastanesinin Kulak Burun Boğaz (KBB) polikliniğine ayaktan başvuran veya acil servisten yönlendirilip verilerine hastane bilgi sistemi üzerinden ulaşılan epistaksis tanılı hastalar retrospektif olarak incelendi.

Bulgular: Epistaksis tanısı konan 2.169 hastadan dışlama kriteri bulunmayan, 0–95 yaş aralığındaki 658 hasta çalışmaya dahil edildi. Hastaların yaş ortalaması 38,4 yıl olup, %54'ü erkekti. En sık başvuru Şubat ayında gerçekleşti. Rekürrens verisine ulaşılabilen hastalarda tekrarlayan epistaksis %28,1, tek başvuru ise %8,7 oranında görüldü. Kalan olgularda rekürrens bilgisi mevcut değildi. Tek başvurular kadınlarda daha sık izlendi. Hastaların büyük kısmı ayaktan değerlendirildi (%78,9) ve medikal tedavi uygulandı (%90,4). Cerrahi öykü %3,3 oranında olup çoğunlukla septorinoplasti sonrası idi. Yatış gerektiren hastaların oranı %2,6 olup, çoğunda komorbid hastalık mevcuttu. Komorbid hastalarda rekürrens oranı daha yüksekti.

Sonuç: Epistaksis genellikle ayaktan medikal tedavi ile kontrol altına alınabilen yaygın bir KBB acilidir. Ancak ileri yaş ve komorbidite varlığı, rekürrens ve hospitalizasyon riskini artırmaktadır. Hastaların öyküsünün ve eşlik eden hastalıklarının dikkatle değerlendirilmesi, en uygun tedavi yaklaşımının belirlenmesi açısından büyük önem taşımaktadır.

Anahtar Kelimeler: *Epistaksis; Koterizasyon; Cerrahi; Komorbidite; Rekürrens*

INTRODUCTION

Epistaxis is defined as spontaneous or iatrogenic bleeding within the nasal cavity that arises from vascular or coagulation disorders involving the nasal mucosa, septum, or turbinates. Epistaxis may resolve on its own or after treatment, but in exceptional instances, it can be complicated by secondary issues that can increase morbidity and, occasionally, mortality. Epistaxis is widely recognized as one of the most common otorhinolaryngologic emergencies. Epidemiological analyses consistently demonstrated a bimodal age distribution, with peak incidence among individuals aged 2–10 years and 50–80 years (1,2). Although the prevalence of epistaxis varies among populations, approximately 10% of cases require medical evaluation. Classification is based on the site of origin within the nasal cavity and is broadly categorized as anterior epistaxis—most commonly arising from Little's area at Kiesselbach's plexus—or posterior epistaxis, which originates from the posterior nasal segments (3,4). Epistaxis is primarily a symptom rather than a distinct diagnosis, with a multifactorial etiology. Potential causes include idiopathic factors, trauma, iatrogenic injury, infections, vascular abnormalities, neoplastic lesions, coagulopathies, medications, environmental influences, chronic systemic conditions such as hypertension, renal or hepatic insufficiency, and genetic predisposition. Although most episodes resolve spontaneously or with minimal intervention, recurrent or refractory bleeding may occur. To avert potentially life-threatening complications, timely and appropriate management is essential (5,6). To manage epistaxis optimally, it is first necessary to localize the bleeding focus with precision. The clinician subsequently performs a comprehensive evaluation of the underlying etiology.

This study aimed to evaluate and discuss our diagnostic and therapeutic algorithm for patients presenting with epistaxis—one of the most common otorhinolaryngologic emergencies and a symptom frequently encountered in clinical practice—within the context of current scientific evidence.

MATERIALS AND METHODS

Following the approval of the institutional review board for scientific ethical conduct (2023-07/05, 20.07.2023) and written permission from the Office of the Chief Physician and the Department of Otorhinolaryngology of our tertiary university hospital, medical records were retrospectively reviewed. The study included patients who presented to the Otorhinolaryngology outpatient clinic or were referred from the emergency department with a diagnosis of epistaxis between January 2018 and March 2023. Patients with trauma-related epistaxis, postoperative bleeding, or insufficient medical records were excluded from the study. Demographic data, season of admission, lifestyle habits (smoking and alcohol use), hematological and coagulation parameters, comorbid diseases, use of high-risk medications, recurrence status, and treatment modalities were extracted from the hospital information system and analyzed.

Definitions: Recurrence was defined as rebleeding from the same site or the contralateral nasal cavity after the initial bleeding episode had been controlled.

Comorbidity was defined as the presence of at least one chronic systemic disease (e.g., hypertension, diabetes mellitus, cardiovascular disease, asthma, chronic renal/hepatic disease, cerebrovascular disease, known coagulopathy, or malignancy) and/or the use of high-risk medications (anticoagulants, antiplatelet agents).

Medical/conservative treatment was defined as the control of bleeding without invasive intervention, using anterior nasal compression, topical vasoconstrictors and/or local agents (e.g., adrenaline with anesthetics, topical tranexamic acid), saline irrigation, and moisturizing or antibiotic ointments. Nasal packing, chemical/electrocauterization, endoscopic hemostasis, sphenopalatine artery ligation/embolization, and blood transfusion were not classified as conservative measures but were evaluated as separate treatment categories.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as numbers (n) and percentages (%), while continuous variables were expressed as mean ± standard deviation and, when appropriate, as median (minimum–maximum). The Pearson chi-square test and Fisher's exact test were used for comparisons of

the categorical variables. The independent samples t-test was applied for comparisons between the two independent groups, and the homogeneity of variances was assessed with Levene's test. One-way analysis of variance (ANOVA) was used for comparisons of three or more groups. A p-value < 0.05 was considered statistically significant.

RESULTS

Between January 2018 and March 2023, 658 patients aged 0–95 years who were diagnosed with epistaxis and met the inclusion criteria were enrolled in the study. These patients were selected from a total of 2,169 individuals presenting with epistaxis to the otorhinolaryngology clinic of a university hospital (Figure 1).

Of the patients aged 0–95 years (mean 38.40 ± 26.04 years), 355 were male (54%) and 303 were female (46%), with mean ages of 37.33 ± 26.28 and 39.66 ± 25.74 years, respectively. Presentations for epistaxis peaked in February (9.59%). Recurring presentations were noted in 185 patients (28.1%), in contrast to a single presentation, which was documented in 57 patients (8.7%). None of the patients presenting with a single condition required inpatient care. Among the female patients, 38 (12.5%) had a single presentation, whereas this was observed in 19 male patients (5.4%) (p = 0.04). A total of 139 patients (21.1%) were referred from the emergency department, whereas 519 patients (78.9%) presented directly to the outpatient clinic. Of the patients referred from the emergency department, 67.6% were successfully managed with medical therapy. In total, 595 patients (90.4%) received medical treatment on their own, with the interventions given to the other patients outlined in Table 1.

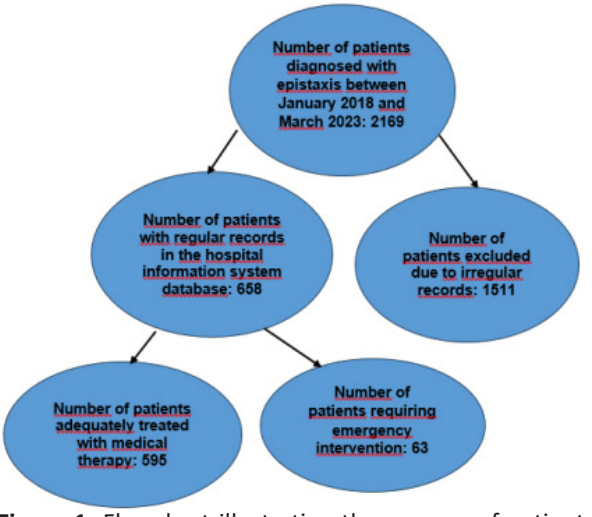

Figure 1. Flowchart illustrating the process of patient inclusion from the cohort of patients diagnosed with epistaxis.

A history of surgical intervention was present in only 22 patients (3.3%), of whom 17 (77.3%) developed epistaxis following septorhinoplasty. In total, 17 patients (2.6%) required inpatient treatment. The cohort included 327 patients (49.7%) aged 10–50 years, 255 patients (38.8%) older than 50 years, and 76 patients (11.6%) younger than 10 years. The hemoglobin (Hb) levels according to age and sex groups are presented in Table 2. Mean values of INR, PT, and aPTT according to age groups are shown in Table 3. One-way ANOVA demonstrated a statistically significant difference only in the INR values among age groups ($p < 0.001$), while no significant differences were observed for PT and aPTT values. The effect size for this difference was small ($\eta^2 = 0.024$).

Research into the link between sex and recurrence found a recurrence rate of 29.9% in males and 26.1% in females. According to Pearson's chi-square analysis, the association was found to be statistically significant ($\chi^2 = 10.886$; $p = 0.004$). Male sex was associated with a 2.68-fold higher risk of recurrence (OR = 2.68, 95%

Table 1. Interventions performed during epistaxis

Interventions performed during epistaxis	Frequency n (%)
Conservative	595(90.4%)
Anterior Nasal Packing	47(7.1%)
Chemical Cauterization	7(1.1%)
Anterior Nasal Packing + Chemical Cauterization	4(0.5%)
+Endoscopic Bleeding Control	5(0.6%)
+ Blood Product Tranfusion	2(0.3%)

Table 2. Distribution of mean hemoglobin levels gram/deciliter (g/dL) across different age and sex groups

Age ranges	Mean	N	Std.Deviation
0–6 years of age	12.23	35	1.46
6-18 years of age	15.53	182	1.23
Adult male	14.70	227	2.27
Adult female	13.00	214	1.68
Total	13.69	658	1.96

g/dL: gram/deciliter

Table 3. Comparison of INR, PT, and aPTT values according to age groups

Parameter	Age group	N	Mean±SD	Minimum-Maximum	ANOVA F	p-value
INR	0-14years	151	1.07±0.08	0.9-1.4		
	15-50years	252	1.07±0.11	0.8-2.1	8.178	<0.001*
	>50years	255	1.18±0.52	0.6-5.5		
	Total	658	1.11±0.34	0.6-5.5		
PT(sec)	0-14years	151	12.23±8.67	8.0-116.0		
	15-50years	252	11.85±1.57	7.7-19.1	1.139	0.321
	>50years	255	12.60±5.81	8.1-63.0		
	Total	658	12.23±5.59	7.7-116.0		
aPTT(sec)	0-14years	151	28.81±3.93	20.5-43.1		
	15-50years	252	28.58±4.49	0.0-42.2	0.080	0.923
	>50years	255	28.69±7.06	15.9-98.2		
	Total	658	28.68±5.52	0.0-98.2		

INR: International Normalized Ratio; PT: Prothrombin Time; aPTT: Activated Partial Thromboplastin Time, sec: second.

CI: 1.44–5.00). These results demonstrate that the incidence of recurrent epistaxis is higher among male patients than among female patients.

The prevalence of comorbid conditions was found to be 29.6%. The recurrence rate was 34.4% in patients with comorbidities, compared with 25.5% in those without ($\chi^2 = 18.162$; $p < 0.001$). These results indicate that comorbidities may constitute a significant risk factor for the occurrence of recurrent epistaxis. The recurrence rate was 25.1% in patients aged 10–50 years, increasing to 32.2% in those over 50 years.

Of the patients requiring hospitalization, 70.6% had comorbidities ($p = 0.001$), while 64.7% presented via the emergency department (Table 4). Comorbidity increased the likelihood of hospitalization nearly sixfold (OR = 5.99, 95% CI: 2.08–17.26), while emergency presentation was strongly associated with hospitalization (OR = 7.28, 95% CI: 2.64–20.05). The results indicate that comorbid conditions and emergency presentation significantly predict hospitalization among patients with epistaxis.

Recurrent epistaxis is significantly associated with hospitalization, surgical intervention, and patient age. Recurrence was observed in 58.8% of hospitalized patients, whereas the rate was 27.8% among non-hospitalized patients, a difference that was statistically significant ($\chi^2 = 8.229$; $p = 0.016$). Surgical intervention was performed in 62.5% of hospitalized patients, whereas only 1.9% of non-hospitalized patients required surgery, a difference that was highly significant ($\chi^2 = 173.028$; $p < 0.001$). Recurrence was more frequent among patients older than 50 years, with a statistically significant association identified between age and recurrence ($\chi^2 = 11.373$; $p = 0.023$) (Table 5).

DISCUSSION

Epistaxis is a common condition, affecting nearly 60% of individuals at least once during their lifetime. In most cases, epistaxis occurs spontaneously in the absence of

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Table 4. Association of comorbidity and emergency admission with hospitalization

Variable	Category	Hozpitalization (+)	Hozpitalization (-)	Chi-square (X^2)	p-value
Comorbidity	Present	12 (70.6%)	5 (29.4%)	13.978	<0.001
	Absent	179 (28.6)	447 (71.4%)		
Emergency admission	Yes	11 (64.7%)	6 (35.3%)	19.616	<0.001
	No	126 (20.1%)	500 (79.9%)		

Table 5. Factors Associated with Hospitalization and Recurrence in Patients with Epistaxis

Variable	Category	Group (%)	Comparison	Chi-square (X^2)	p-value
Hospitalization vs. Recurrence	No hospitalization	Recurrence: 27.8 % No recurrence: 6.9 %	Higher recurrence in hospitalized patients (%58.8)		
	Hospitalization	Recurrence: 58.8 % No recurrence: 0.0 %		8.229	0.016
Hospitalization vs. Surgical Intervention	No hospitalization	Surgery: 1.9 % No surgery: 98.1 %	Surgical intervention more frequent in hospitalized patients (%62.5)		
	Hospitalization	Surgery: 62.5 % No surgery: 37.5 %		173.028	<0.001
Age Group vs. Recurrence	<10 years	Recurrence: 27.6 % No recurrence: 3.9 %	Recurrence more frequent in patients >50 years (%32.2)		
	10-50 years	Recurrence: 25.1 % No recurrence: 7.3 %		11.373	0.023
	>50 years	Recurrence: 32.2 % No recurrence: 11.8 %			

an identifiable trigger. The etiology may involve local factors, such as trauma, mucosal dryness, intranasal medications, infection, inflammation, or neoplasms, as well as systemic factors, including hematologic disorders, leukemia, atherosclerosis, hypertension, and congestive heart failure (7). Although nearly 90% of epistaxis episodes are clinically insignificant, resolving spontaneously within minutes without the need for medical care, in patients with comorbidities, they may result in severe complications including hypotension, aspiration, hypoxia, and myocardial infarction (8). Epidemiological research on epistaxis remains relatively limited. Previous large population-based studies, which are similar to this research, have mainly relied on hospital records; nevertheless, the absence of systematic collection of patient data remains a significant obstacle to conducting a thorough investigation of this widespread condition. The majority of studies in the literature demonstrated a higher incidence of epistaxis among males. In a cohort of 104 emergency and outpatient cases, Ruhela et al. reported that 68.3% occurred in male patients (9). Similarly, Kaygusuz et al. reported that 67.7% of the patients who were hospitalized for treating epistaxis were male. In contrast, Shaw et al., in their study of 65 cases of epistaxis, reported that 47% occurred in males and 53% in females (10). In a comprehensive analysis of 1,724 patients presenting with epistaxis, Juselius reported a male predominance of 58%. This finding aligns with the 54% observed in our series and confirms a comparable gender distribution. The slightly lower male ratio in our cohort may be

attributable to the inclusion of outpatients and the broader population base, which could have diluted the relative predominance of male cases (11).

Environmental factors such as humidity and temperature have been implicated in the occurrence of epistaxis, leading many authors to investigate its seasonal and monthly distribution. A study conducted in India in 2022 reported that 42.31% of epistaxis presentations occurred during the cold winter months (9). Similarly, Pallin et al., in their analysis of approximately 4.5 million epistaxis visits, did not identify any significant variation across different months, consistent with the findings of our study (12). Geographical differences, levels of regional development, and occupational profiles may substantially modify the environmental conditions, thereby influencing the seasonality of epistaxis presentations. Some authors have specifically reported an increased frequency of epistaxis during months characterized by hot and dry climates (13).

Recurrent epistaxis is clinically significant because it may represent the initial manifestation of an underlying systemic or neoplastic disease. The likelihood of recurrent bleeding and clinically relevant blood loss or transfusion is particularly high in patients receiving anticoagulant or antiplatelet therapy (14). In our study, the recurrence rate among patients with comorbid conditions was found to be 34.4%. Moreover, 70.6% of the hospitalized patients had comorbidities ($p = 0.001$). In a meta-analysis including 896 cases, the frequency of recurrent epistaxis was reported as 13.4% , whereas in our cohort this rate was notably higher at 28.1% (15). It has been reported that 6% of patients treated for epistaxis in emergency departments require hospitalization for the aggressive management of severe nasal bleeding (12). In contrast, our research found this rate to be 2.6%. In a study including 104 patients diagnosed with epistaxis, 79.81% of the cases were managed on an outpatient basis (9). In our study, a very similar rate of 78.9% was observed. In previous studies, medical or conservative treatment was sufficient in 69.1%–85.6% of patients (6,9). In our study, medical or conservative management proved sufficient in 90.4% of the cases. Nevertheless, arterial ligation or embolization remains an option for refractory, persistent, or recurrent episodes. Similarly, Kucur et al. reported that surgical intervention was required in only 1.5% of patients with epistaxis, underscoring that operative approaches are reserved for a very limited subset of cases (3). In our study, 0.9% of the patients required surgical intervention in the form of endoscopic hemostasis or sphenopalatine artery ligation. This technique is effective in controlling recurrent, intractable bleeding in approximately 98% of cases (16).

A history of previous surgical intervention was present in only 22 patients (3.3%) in our cohort, of whom 17 (77.3%) experienced epistaxis following septorhinoplasty. This rate is comparable to the incidence of postoperative epistaxis reported in the literature after septorhinoplasty (2–4.5%) (17,18). As rhinoplasty procedures become more common, it is likely that the rates of such surgeries will continue to increase.

Notably, 67.6% of the patients transferred from the emergency department required only medical treatment. This outcome may suggest either the general practitioner's inability to handle initial and emergency nosebleed cases or a preference for referring patients due to medicolegal concerns in university hospitals that have residents or specialists available in the relevant field. Future studies and targeted training programs for emergency physicians should be planned to address this issue.

The limitations of this study include its retrospective, single-center design, irregular data, the broad categorization of comorbidities, and the absence of information on the localization of bleeding and hospital stay. Validation of these findings requires future prospective, multicenter studies.

CONCLUSION

Epistaxis is a common condition that should not be underestimated. Careful evaluation of the patient's medical history and comorbidities is crucial, and recurrent episodes must be recognized as potential indicators of underlying systemic or local disease. Future large-scale cohort studies with systematic data collection are warranted to provide more robust insights into its clinical significance.

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