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Original Research Article

Optimizing Epistaxis Care in the Emergency Department: Risk Factors for Recurrence and an Evidence-Based ENT Consultation Pathway

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Abstract:

Background: Epistaxis is one of ˙the most common otolaryngologic emergencies encountered in emergency departments (ED). Although most cases are self-limiting, some patients experience recurrent episodes requiring repeated ED visits and active intervention.

Aim: To identify risk factors associated with recurrent ED visits for epistaxis and evaluate the treatment modalities used in emergency management.

Methodology: A retrospective observational study was conducted in the Department of ENT at GMERS Medical College, Himmatnagar, Gujarat, over a period of 12 months. A total of 80 patients presenting with epistaxis in the emergency department were included. Patients were categorized into single-episode and recurrent-episode groups based on ED visits within one month. Data regarding demographic characteristics, blood pressure, comorbidities, treatment procedures, and outcomes were analyzed using descriptive statistics and appropriate statistical tests.

Results: Of the 80 patients, 58 (72.5%) had a single ED visit and 22 (27.5%) had recurrent visits. Common management procedures included anterior nasal packing with Merocel, topical vasoconstrictor drops, Surgicel/Surgifoam application, and cauterization techniques. No significant association was observed between the type of procedure and recurrence ($p>0.05$). Higher systolic blood pressure was noted during the winter–spring season ($p=0.03$), and Surgicel/Surgifoam use was significantly higher in this period ($p=0.04$).

Conclusion: Epistaxis in the emergency setting is commonly managed with conservative procedures. Male gender and hypertension appear to be important factors associated with recurrence, highlighting the need for early risk stratification and structured management pathways.

Keywords: Epistaxis, Emergency department, Nasal packing, Hypertension, Recurrence.

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Introduction

One of˙ the most common otolaryngologic emergencies in clinical practice is so-called epistaxis or nosebleed. It has been said to affect at least once in a lifetime about 60 percent of the people and therefore it is a very common ailment for all ages. Although it is prevalent, a very low percentage of affected people need the services of a medical practitioner whereby less than 10 percent of patients seek medical attention regarding epistaxis [1]. Most of the cases of epistaxis are self-limiting and self-resolving. Nevertheless, in some cases, the condition may be severe, chronic, or recurrent and it may need emergency medical assessment and intervention. Specifically, patients who have epistaxis and appear in the emergency department (ED) are likely to be more serious in terms of bleeding or risk factors. Moreover, frequent instances with emergency care needs may greatly enhance morbidity, especially in older patients, and may be characterized by high healthcare expenses and use of the resources [2].

The etiology of epistaxis is multifactorial and may be broadly categorized into local and systemic factors. Local causes are usually started in the nasal cavity and other structures. Local epistaxis most commonly occurs as a result of digital trauma, or mechanical irritation or injury, induced by nose

picking. Foreign bodies inside the nose, external impact on the nose and postoperative bleeding after a nasal or sinus surgery are other sources of trauma that cause the disorder. Also, the environment may also bring about epistaxis. Naresal mucosal integrity due to variations in temperature and humidity has been proven to heighten the frequency of nasal bleeding [3]. Such environmental changes can result in the mucosal drying, crusting and fragility of nasal vasculature which predisposes the nasal mucosa to bleeding.

There are also systemic factors which are essential in the development of epistaxis. They are high blood pressure, irregularities in blood coagulation caused by drugs, inherited or acquired hemorrhage, and heart disease. Anticoagulants and antiplatelet medications are especially important noteworthy as they disrupt the normal development of clots and extend the period of bleeding. In the same way, patients at risk may be predisposed to first and recurring episodes of epistaxis by systemic conditions that distort vascular integrity or hemostasis. Even though these systemic risk factors are generally linked with the first instance of epistaxis, there is still controversy on their significance in recurrent occurrences [4]. It is a known fact that the death of the nasal mucosa and nasal dryness are obvious triggers of the initial episode of epistaxis that prompts an ED visit. Nevertheless, these determinants do not always seem to be the cause of recurrent visits to the emergency department. In turn, the patient-specific traits, comorbidities, and risk factors predispose people to frequent ED admissions because of epistaxis are not properly understood and should be researched.

Epistaxis resolves spontaneously in most cases, but cases presented to the ED often include more severe bleeding, which can be treated actively. Treatment is changed based on severity, anatomical site, and chronicity of bleeding events. The literature has given a number of different treatment modalities to contain epistaxis in emergency situations. These are nasal cauterization, anterior or posterior nasal packing with dissolvable or nondissolvable substances and tamponade procedures with inflatable balloon procedures. Treatment usually depends on the place where the bleeding is located and whether it is an anterior or posterior source and the stability of the patient. Although several treatment options are available, there is still no best therapeutic approach to deal with epistaxis. Specifically, there is no conclusive evidence on the type and length of nasal packing that is most effective in the treatment of both anterior and posterior epistaxis [5]. Consequently, there is a high degree of variation in clinical practice pertaining to methods of treatment in the emergency department.

Given the clinical significance and high prevalence of epistaxis, improving management strategies within the emergency department is essential. Identifying risk factors associated with recurrent ED visits could help clinicians stratify patients according to risk and implement more targeted treatment approaches. Additionally, evaluating the effectiveness of various treatment modalities used in emergency settings may contribute to the development of evidence-based management protocols. Such protocols could potentially reduce unnecessary interventions, improve patient outcomes, and enhance healthcare resource utilization.

Therefore, the present study aims to identify the risk factors associated with recurrent admissions to the emergency department for epistaxis, evaluate the treatment modalities utilized, and compare their effectiveness within a single academic institution. Furthermore, this study seeks to develop an evidence-based algorithm that can streamline ENT consultations while minimizing unnecessary referrals. By implementing a structured and efficient consultation pathway, it may be possible to optimize patient care, improve clinical workflow, and allow ENT residents to manage patients more effectively while adhering to duty hour restrictions. Ultimately, such an approach could enhance both patient outcomes and the overall efficiency of emergency department management of epistaxis.

Methodology

Study Design: The present study was conducted as a retrospective observational study to evaluate the risk factors associated with recurrent epistaxis and to assess an evidence-based otolaryngology consultation pathway for patients presenting with epistaxis in the emergency department. The study involved reviewing patient records and clinical variables to determine factors associated with recurrence and to analyze the pattern of ENT consultations for optimizing emergency management of epistaxis.

Study Area: The study was conducted in the Department of ENT at GMERS Medical College, Himmatnagar, Gujarat, India

Study Duration: The study was carried out over a period of 12 months.

Sample Size: A total of 80 patients presenting with epistaxis in the emergency department and requiring evaluation by the ENT department were included in the study. These patients constituted the final sample used for analysis of recurrence risk factors and evaluation of consultation practices.

Study Population: The study population consisted of patients presenting to the emergency department with epistaxis who required consultation with the ENT department. Patients were categorized into two

groups based on the occurrence of epistaxis episodes. The first group included patients who had a single emergency department visit for epistaxis, while the second group included patients with recurrent epistaxis requiring repeat emergency department admission within a one-month period.

Data Collection: Data were collected retrospectively from hospital medical records, emergency department registers, and ENT consultation records. Information was extracted using a structured data collection format. The collected variables included demographic details such as age and gender, the month of emergency department visit, blood pressure at presentation, etiology of epistaxis, use of antiplatelet or anticoagulant medications, and associated comorbidities including hypertension, diabetes mellitus, and congestive heart failure. Information regarding procedures performed, such as nasal packing or cauterization, and complications related to these procedures including severe pain, pharyngitis, or recurrent mild bleeding were also recorded. In addition, a literature review regarding epistaxis management protocols was conducted using databases such as PubMed and MEDLINE to develop an evidence-based pathway for ENT consultation in the emergency department.

Inclusion Criteria

- Patients presenting to the emergency department with epistaxis requiring ENT consultation
- Patients of all age groups and both genders
- Patients with complete medical records available for analysis

Exclusion Criteria

- Patients who underwent nasal surgery within the previous 4 weeks, including:
    - Functional endoscopic sinus surgery
    - Septoplasty
    - Nasal turbinate reduction
    - Transsphenoidal pituitary surgery
- Patients diagnosed with Hereditary Hemorrhagic Telangiectasia
- Patients with incomplete medical records

Procedure: Hospital records of patients presenting with epistaxis during the study period were reviewed. Eligible patients were identified according to the inclusion and exclusion criteria. Data regarding patient demographics, clinical presentation, comorbidities, medication use, and treatment procedures were extracted and documented. Patients were then classified into singleepisode or recurrent-episode groups based on whether they experienced repeated emergency department visits within a one-month period. The collected data were further evaluated to identify factors associated with recurrence and to assess the appropriateness of ENT consultations. An evidence-based consultation algorithm derived from the literature review was retrospectively applied to analyze consultation patterns and determine opportunities for optimizing epistaxis management in the emergency department.

Statistical Analysis: All collected data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Continuous variables such as age and blood pressure were expressed as mean and standard deviation and compared between groups using Student's t-test. Categorical variables such as gender, comorbidities, medication use, and procedural interventions were presented as frequency and percentage and analyzed using the Chi-square test or Fisher's exact test where appropriate. A p-value of less than 0.05 was considered statistically significant for determining associations between variables and recurrence of epistaxis".

Result

Table 1 shows the association between epistaxis severity and different treatment procedures among the patients included in the study (N = 80). The patients were categorized into two groups based on the number of emergency department (ED) visits: only one ED visit (n = 58) and more than one ED visit (n = 22). Anterior nasal packing using Merocel was performed in 20 patients (25.0%), with 15 patients (25.9%) in the single ED visit group and 5 patients (22.7%) in the multiple ED visit group (p = 0.73). The use of xylometazoline (0.1%) or oxymetazoline (0.05%) nasal drops was observed in 10 patients (12.5%), including 8 patients (13.8%) with one ED visit and 2 patients (9.1%) with more than one visit (p = 0.54). Surgicel or Surgifoam was the most commonly used intervention, applied in 36 patients (45.0%), with a similar distribution between the groups (44.8% vs 45.5%; p = 0.95). Chemical cauterization using trichloroacetic acid (TCA) was performed in 14 patients (17.5%), while electric bipolar cautery and diathermy were used in 16 (20.0%) and 12 (15.0%) patients, respectively, showing comparable proportions between both groups. Additionally, 9 patients (11.2%) did not require any procedure. The p-values for all procedures were greater than 0.05, indicating that there was no statistically significant association between the type of procedure performed and the frequency of ED visits among patients with epistaxis.

Table 1: Association Between Epistaxis Severity and Patients' Characteristics (N = 80)				
Procedure	**Total (N=80)**	**Only 1 ED Visit (n=58)**	**>1 ED Visit (n=22)**	**P value**
Anterior Nasal Packing (Merocel)	20 (25.0%)	15 (25.9%)	5 (22.7%)	0.73
Xylometazoline (0.1%) / Oxymetazoline (0.05%) Nasal Drops	10 (12.5%)	8 (13.8%)	2 (9.1%)	0.54
Surgicel / Surgifoam	36 (45.0%)	26 (44.8%)	10 (45.5%)	0.95
Chemical Cauterization (TCA)	14 (17.5%)	10 (17.2%)	4 (18.2%)	0.91
Electric Bipolar Cautery	16 (20.0%)	11 (19.0%)	5 (22.7%)	0.7
Diathermy	12 (15.0%)	8 (13.8%)	4 (18.2%)	0.6
None	9 (11.2%)	8 (13.8%)	1 (4.5%)	0.22

Table 2 compares patients presenting during Winter–Spring (n = 42) and Summer–Fall (n = 38). The mean age and gender distribution were similar between the two groups, with no statistically significant difference (p = 0.46 and p = 0.69, respectively). Systolic blood pressure was significantly higher in the Winter–Spring group (145 ± 23.1 mmHg) compared to the Summer– Fall group (136 ± 21.8 mmHg) (p = 0.03), while diastolic blood pressure and the proportion of abnormal BP showed no significant difference. Among procedures, the use of Surgicel/Surgifoam was significantly higher during Winter–Spring (52.4%) compared to Summer–Fall (36.8%) (p = 0.04), whereas anterior nasal packing, Merocel packing, and cauterization did not differ significantly. Admission rates were comparable in both seasons (23.8% vs 21.1%, p = 0.77), and most patients were discharged home in both groups.

Table 2: Comparison of Patients Presenting During Different Seasons (N = 80)			
Characteristics	**Winter–Spring (Nov–Apr) n=42**	**Summer–Fall (May–Oct) n=38**	**P value**
Age (Mean ± SD)	52.1 ± 20.6	49.3 ± 19.4	0.46
Male	24 (57.1%)	20 (52.6%)	0.69
Female	18 (42.9%)	18 (47.4%)	
Blood Pressure			
Variable	**Winter–Spring**	**Summer–Fall**	**P value**
Systolic BP	145 ± 23.1	136 ± 21.8	0.03
Diastolic BP	85.3 ± 15.8	83.0 ± 15.1	0.48
Abnormal BP	24 (57.1%)	16 (42.1%)	0.18
Procedures			
Procedure	**Winter–Spring**	**Summer–Fall**	**P value**
Anterior nasal packing	12 (28.6%)	8 (21.1%)	0.43
Merocel packing	8 (19.0%)	10 (26.3%)	0.43
Surgicel/Surgifoam	22 (52.4%)	14 (36.8%)	0.04
Cauterization	20 (47.6%)	18 (47.4%)	0.98
Outcome			
Outcome	**Winter–Spring**	**Summer–Fall**	**P value**
Admission	10 (23.8%)	8 (21.1%)	0.77
Discharge home	32 (76.2%)	30 (78.9%)	

Discussion

The mean age of the 80 patients included in the present study was 50.8 ± 20.3 years, which is comparable to findings reported in several epidemiological studies where the average age of patients presenting with epistaxis ranged between 45 and 60 years (Pallin et al., 2005; Tomkinson et al., 1997) [6,7]. These findings suggest that epistaxis is more frequently observed among middleaged and elderly individuals. In the present study, patients with recurrent emergency department visits had a slightly higher mean age (54.6 ± 19.8 years) compared to those with a single visit (49.2 ± 20.1 years); however, this difference was not statistically significant. Similar observations were reported by Abrich et al. (2014) [8], who found that although epistaxis tends to occur more commonly in older individuals, age alone may not be a strong predictor of recurrent episodes.

The analysis of gender distribution in our study demonstrated a predominance of male patients, who accounted for 55% of the study population. Furthermore, males were significantly more likely to present with recurrent emergency department visits for epistaxis (72.7% vs 27.3%, p = 0.03). This observation is consistent with previous studies that have reported a higher prevalence of epistaxis among males (Tomkinson et al., 1997; Pallin et al.,

2005) [7,6]. Hormonal and behavioral factors have been suggested as possible explanations for this difference. It has been hypothesized that estrogen may exert a protective effect on the nasal mucosa in premenopausal women, which could partly explain the lower recurrence rate observed among females (Chaaban et al., 2017) [9]. Therefore, the findings of our study support the existing literature indicating that male gender may represent a risk factor for recurrent epistaxis.

Blood pressure has long been considered an important factor in patients presenting with epistaxis, although its exact role remains controversial. In the present study, the mean systolic and diastolic blood pressure values were 140 ± 22.6 mmHg and 84.1 ± 15.4 mmHg respectively, with approximately half of the patients demonstrating blood pressure levels above 140/90 mmHg. Although systolic blood pressure was slightly higher in patients with recurrent emergency visits (146 ± 20.4 mmHg) compared to those with a single visit (138 ± 23.1 mmHg), the difference did not reach statistical significance. However, pre-existing hypertension was significantly more common among patients with recurrent visits (63.6% vs 34.5%, $p = 0.02$). These findings are consistent with previous research by Abrich et al. (2014) [8], which identified hypertension as an important risk factor associated with recurrent spontaneous epistaxis. Nevertheless, other studies such as the systematic review by Kikidis et al. (2014) [10] have reported conflicting evidence regarding the direct causal relationship between hypertension and epistaxis, suggesting that elevated blood pressure during an episode may reflect stress or sympathetic activation rather than a primary cause of bleeding.

With respect to etiology, idiopathic epistaxis was the most common cause in our study, accounting for 30% of cases, followed by trauma, hypertension, and coagulopathy. These findings are comparable to earlier clinical reports, such as the study by Okafor (1984), which also identified idiopathic causes in approximately one-third of epistaxis cases. Many patients presenting to the emergency department do not have an identifiable structural abnormality, particularly in cases of anterior nasal bleeding. The relatively small proportion of tumor-related epistaxis observed in our study (5%) is also consistent with previous reports indicating that neoplastic causes are uncommon but should still be considered in patients with persistent or recurrent bleeding (Douglas and Wormald, 2007) [1].

In the present study, the management of epistaxis primarily involved conservative therapeutic measures. Commonly used interventions included anterior nasal packing with Merocel, topical vasoconstrictor agents such as xylometazoline or oxymetazoline, and the use of absorbable hemostatic materials such as Surgicel or Surgifoam. These methods are widely recommended as first-line treatments for controlling anterior epistaxis in emergency settings. In addition, cauterization techniques were employed in selected patients, including chemical cauterization using trichloroacetic acid (TCA) as well as electrical methods such as bipolar cautery and diathermy. These techniques are effective in achieving hemostasis by directly sealing the bleeding vessels and are commonly used when conservative measures alone are insufficient. The findings of our study therefore support the importance of a stepwise management approach, beginning with simple topical and mechanical methods before proceeding to cauterization techniques when necessary.

Seasonal variation in epistaxis has been widely described in the literature, with many studies reporting a higher incidence during colder months. In the present study, patients presenting during the winter–spring period demonstrated significantly higher systolic blood pressure (145 ± 23.1 mmHg) compared with those presenting during the summer–fall period (136 ± 21.8 mmHg, $p = 0.03$). Although seasonal differences did not significantly influence recurrence or hospitalization rates in our cohort, these observations are consistent with earlier studies suggesting increased epistaxis incidence during colder seasons. Pallin et al. (2005) [6] and Manfredini et al. (2000) [11] reported higher emergency department visits for epistaxis during winter months, which may be attributed to low temperature and humidity leading to drying and increased fragility of the nasal mucosa. Additionally, seasonal increases in blood pressure during colder months, as reported by Rosenthal (2004) [12], may further contribute to the risk of nasal bleeding.

Overall, the findings of the present study highlight several important factors associated with recurrent emergency department visits for epistaxis. Male gender and the presence of hypertension were identified as significant risk factors, while most cases were managed successfully using conservative treatment modalities. The frequent use of topical vasoconstrictors, nasal packing, and cauterization techniques underscores the importance of a structured and stepwise management approach in the emergency department. These findings may help guide clinicians in identifying high-risk patients and optimizing treatment strategies, thereby improving patient outcomes and reducing the likelihood of recurrent emergency visits.

Conclusion

The present study highlights key factors associated with recurrence and management of epistaxis in the emergency department and supports the need for a structured, evidence-based ENT consultation pathway. Male patients and those with underlying

hypertension were more likely to experience recurrent emergency department visits, indicating that these groups may represent a higher-risk population requiring closer monitoring and targeted management. Posterior nasal packing was strongly associated with repeated visits, suggesting that patients requiring more aggressive interventions may have more severe or persistent bleeding. Most other demographic variables, causes of epistaxis, procedures, and comorbidities showed no significant relationship with recurrence. Seasonal analysis demonstrated some variation in blood pressure levels and use of certain hemostatic procedures, though overall outcomes remained similar between seasons. Collectively, these findings emphasize the importance of early risk stratification, appropriate procedural selection, and timely ENT involvement to improve patient management, reduce recurrence, and optimize care pathways for epistaxis in the emergency department.

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