# *Severity factors of epistaxis: A retrospective study of 60 cases.*

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**Abstract**

***Objective:*** Studying the severity factors of epistaxis.

***Methods:*** Retrospective study involving patients hospitalized in the emergency department and ENT (Ear, Nose, and Throat) department for epistaxis over a period of 5 years (2018-2022). Based on the recommendations of the French Society of Otorhinolaryngology in 2015, we considered epistaxis severe when there was a sudden blood loss leading to acute anemia or signs of hypovolemic shock.

***Results:*** Our study included 60 patients. Epistaxis was considered severe in 12 patients (20%). We found that female sex, black race, and patients with heart failure are severity factors for epistaxis.

***Conclusion:*** Epistaxis is a common condition often considered benign, but in some cases, it can be serious. It is essential for clinicians to recognize forms that are initially or subsequently severe and to initiate optimal management to improve prognosis.

***Keywords:*** epistaxis, severe, serious, shock state

## INTRODUCTION

Epistaxis is one of the most common emergencies encountered in otorhinolaryngology (ENT) [1]. While it is often trivial, it can also pose a serious threat to life. This severity may stem from its volume or recurrence. Several factors can influence the severity of epistaxis, including patient characteristics, etiology, and the nature of management [2]. The role of the clinician is crucial in presuming the "dangerous" forms of initial or secondary epistaxis and initiating early, comprehensive, and effective management to improve prognosis.

This study aims to investigate the severity factors of epistaxis.

## METHODS

### *1. Material*

This is a retrospective study of patients hospitalized for epistaxis in the emergency and/or ENT departments of the Gabes University Hospital over a period of 5 years (from 2018 to 2022).

We included in this study patients requiring hospitalization for epistaxis due to: - The abundance of epistaxis: we do not have a figure specifying the amount of blood lost. It is thanks

to the data from the interview, the clinical examination, and the biological parameters that we subjectively determined the abundance of the state of health. We considered that:

An epistaxis is of low abundance: any epistaxis

• that helps spontaneously or with bidigital compression.

• An epistaxis is of high abundance: any epistaxis responsible for a state of shock or a drop in the hemoglobin level of more than 2g/dl.

• Epistaxis is of average abundance: any epistaxis that does not meet the criteria for epistaxis of low abundance or high abundance.

In this case, we hospitalized patients with epistaxis of high abundance.

- Repetition of epistaxis: we hospitalized patients with more than two episodes of epistaxis of average abundance in the last 24 hours preceding their admission.

- The need for posterior packing

- Retention on general condition: secondary to anemia: skin and mucous membrane pallor, asthenia, palpitations.

- Living far from the hospital without the possibility of close monitoring for patients with epistaxis of average abundance.

We excluded patients consulting for benign epistaxis in the emergency room without the need for hospitalization.

***2. Methods***

Based on the recommendations of the French Society of Otorhinolaryngology (SFORL) [3], we considered epistaxis to be severe in the presence of one of the following signs:

- sudden blood loss causing acute anemia

- signs of hypovolemic shock manifested by:

• Arterial hypotension (systolic blood pressure <90mmHg, with pinched differential)

• Tachycardia

• Impaired consciousness and/or polypnea and/or cyanosis of the lips and extremities and/or mottling

We defined recurrent epistaxis as any recurrent epistaxis after the performance of an effective local hemostasis procedure and after etiological treatment:

- The local hemostasis procedure must include at least an anterior packing +/- associated with a posterior packing.

-Etiological treatment may be:

• Regulation of high blood pressure

• Correction of a hemostasis disorder

• Reduction of a fracture

• Cauterization of a bleeding blood vessel

• Treatment of rhinosinusitis

• Removal of a bleeding tumor lesion

We studied the severity and recurrence factors of epistaxis: age, sex, race, season, revelations of hypertension, diabetes, renal failure, and heart disease, smoking, taking anticoagulants, the location of the murmur, hemodynamic parameters,

hemoglobin levels, PT percentage, etiology of epistaxis, and the nature of the treatment.

3. Statistical analysis

We used SPSS 22 in data collection. We checked the normality of quantitative variables by the Shapiro-Wilk test.

-For the comparison of qualitative variables, we used the Chi-square test.

-For the comparison of quantitative variables, we used the Student test if the normal distribution was verified and the non-parametric Mann-Whitney test if it was not verified.

We performed a univariate and multivariate analysis, considering that the test is significant for any $p < 0.05$.

## RESULTS

Our study included 60 hospitalized patients with epistaxis. The mean age of the patients was 59.2 years (range: 10 to 93 years; SD=21.2 years). Patients over 60 years old represented 50% of the population. The cohort comprised 38 male patients (63.3%) and 22 female patients. White patients accounted for 80% of cases, while black patients represented 20% of cases. Hypertension was present in 55% of cases, and diabetes in 18% of cases. Four patients had heart failure, and three patients had renal insufficiency. Two patients underwent endonasal surgery: one septoplasty and one tubinectomy.

Epistaxis was post-traumatic in two patients. Thirty-three-point three percent (33.3%) of patients were on antiplatelet therapy such as Lysine Acetylsalicylate (Aspegic*), 5% were on clopidogrel (Plavix*), and 5% were on vitamin K antagonists (Sintrom*). A history of smoking was observed in 23.3% of patients. Most admissions occurred in the winter season, accounting for 36% of cases.

At admission, all patients had active bleeding from the nasal cavities and/or oropharynx. Anterior epistaxis was present in 73.3% of cases, and bilateral epistaxis was seen in 43.3% of cases.

Epistaxis was considered severe in 12 patients (20% of cases). General causes of epistaxis were predominant (58%), followed by essential epistaxis (25%) and local causes (17%). Traumatic causes (6 patients) dominated local etiologies of epistaxis, followed by inflammatory causes (3 patients), then tumoral causes (one patient). Hypertension (41.7% of patients) dominated the general causes of epistaxis. Hemostatic disorders due to medication represented 16.7% of etiologies.

Before hospitalization, bidigital compression was performed in most patients (96.7%), and anterior packing was done in 24 patients (40%).

At admission, patients with profuse epistaxis, poor general condition, or hypovolemic shock were admitted to the intensive care unit. A general hemostatic agent (Dicynone*) was administered to 91.7% of patients. Four patients were given tranexamic acid (Exacyl*). Vitamin K was administered intramuscularly at a dose of 10 mg in 12 patients. Most patients (85%) received antibiotic prophylaxis. Red blood cell transfusion was performed in 3 patients with hemoglobin levels below 8g/dl and in 4 patients with levels below 10g/dl in a fragile condition (coronary and

diabetic patients). The average number of red blood cell units transfused was 1.8. Fresh frozen plasma (FFP) transfusion was performed in one patient with a prothrombin percentage below 35%.

Bilateral anterior nasal packing was performed in 44 patients (73.3% of cases), and anterior-posterior double packing was done in 16 patients (26.7% of cases). Bipolar cautery under local anesthesia was performed in one patient. One patient required embolization of the right maxillary artery for persistent unilateral epistaxis.

Blood pressure regularization was necessary in 27 patients. Discontinuation of anticoagulation with a switch to an anticoagulant (Heparin) was required in two patients. These patients received Vitamin K supplementation. Recurrence of bleeding was observed in 36 patients (60%). These patients required reinsertion of anterior packing in 55% of cases (33 patients). Repositioning of posterior packing was performed in two patients.

The average length of hospital stay was 4.67 days (ranging from 2 to 14 days; SD=2 days). After discharge, two patients required readmission due to recurrence of epistaxis. The time between discharge and readmission was 2 days for one patient and 7 days for the other.

Upon studying the severity factors of epistaxis, we found that female sex is a risk factor for the severity of epistaxis: 36.4% of females had severe epistaxis compared to 10.5% of males, and this difference was significant (p=0.022). Similarly, the black race was considered a severe factor for epistaxis, as 50% of black patients had severe epistaxis compared to 12.5% of white patients, and this difference was significant (p=0.02). We also observed that 75% of patients with heart failure had severe epistaxis compared to 16% of patients without heart failure, and this difference was significant (p=0.023). Regarding other factors such as anticoagulant use, site of bleeding, hemodynamic parameters, laboratory data, and etiology of epistaxis, no significant difference between patients with and without severe forms of epistaxis was observed (Tables 1,2).

***Table 1: Risk Factors for Severity of Epistaxis (Qualitative Variables)***

| Risk Factors | | n/N | (%) | P |
|---|---|---|---|---|
| **Age** | <60 years | 5/30 | 16.7 | 0.51 |
| | =60 years | 7/30 | 23.3 | |
| **Sex** | Male | 4/38 | 10.5 | **0.02** |
| | Female | 8/22 | 36.4 | **2** |
| **Race** | Black | 6/12 | 50 | **0.02** |
| | White | 6/48 | 12.5 | |
| **Season** | Winter/Spring | 10/43 | 23 ;3 | 0.31 |
| | Autumn/ Summer | 2/17 | 11.7 | |
| **Hypertension** | Yes | 9/33 | 27.3 | 0.19 |
| | No | 3/27 | 11.1 | |
| **Heart Failure** | Yes | 3 /4 | 75 | **0.02** |
| | No | 9/56 | 16 | **3** |
| **Diabetes** | Yes | 1/11 | 9.1 | 0.43 |
| | No | 11/51 | 21.5 | |
| **Renal Insufficiency** | Yes | 2/3 | 66.7 | 0.09 |
| | No | 10/57 | 17.5 | |
| **Anticoagulant Use (VKA)** | Yes | 1/3 | 33.3 | 0.49 |
| | No | 11/57 | 19.2 | |
| **Antiplatelet Use (Aspirin*)** | Yes | 5/20 | 25 | 0.49 |
| | No | 7/40 | 17.5 | |
| **Antiplatelet Use (Plavix*)** | Yes | 1/3 | 33.3 | 0.49 |
| | No | 11/57 | 21.5 | |
| **Anterior/Posterior Bleeding** | Anterior | 8/44 | 18.2 | 0.77 |
| | Posterior | 1/3 | 33.3 | |
| | Anterior-Posterior | 3/13 | 23.1 | |
| **Unilateral/Bilateral Bleeding** | Unilateral | 7/34 | 20 | 0.73 |
| | Bilateral | 5/26 | 19.2 | |
| **Etiology** | Local | 1/10 | 10 | 0.66 |
| | General | 8/35 | 22.9 | |
| | Essential | 3/15 | 20 | |

*VKA: Vitamin K Antagonists; AAP: Antiplatelet Agent*

In the multivariate analysis, we did not find any severity or recurrence factors.

***Table 2: Severity risk factors for epistaxis (Quantitative variables)***

| Risk Factors | Severe Epistaxis | No Severe Epistaxis | p |
|---|---|---|---|
| **SBP (mmHg)** | 140 (ET=34) | 136 (ET=28) | 0.33 |
| **DBP (mmHg)** | 76 (ET=14) | 77 (ET=16) | 0.69 |
| **MAP (mmHg)** | 97 (ET=14) | 96 (ET=19) | 0.93 |
| **TP (%)** | 86 (ET=10) | 95 (ET=11) | 0.67 |
| **INR** | 1.19 (ET=0.27) | 1.04 (ET=0.22) | 0.17 |

*SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; MAP: Mean Arterial Pressure; PT: Prothrombin Time; INR: International Normalized Ratio*

## DISCUSSION

Epistaxis is a common ENT emergency. Usually benign, but it can be severe in certain cases, jeopardizing the patient's life prognosis. The vast majority of epistaxis cases do not require hospitalization, and invasive treatment is only necessary in 6% of cases [3]. There has been a persistent problem with assessing the severity of epistaxis, which has traditionally been based on subjective criteria. In most studies, epistaxis was classified based on its abundance or recurrence [4]. There is no clear definition of severity in the literature, often relying on subjective criteria such as estimating the volume of bleeding (mild, moderate, or severe epistaxis) or localization (anterior and/or posterior), with posterior epistaxis being considered severe or potentially more severe. Some authors [5] believe that hospitalization due to spontaneous epistaxis may be considered a sign of severity. However, there may be a bias, as admission may be related to the patient's fragility (elderly, comorbid patient) rather than solely to the epistaxis itself. Nonetheless, hospitalization typically implies some clinical instability, often requiring invasive treatment, including surgery [6]. Thus, in reality, all cases subjectively deemed "severe" or "serious" epistaxis inevitably require hospitalization.

In a study by André et al. [7], they classified spontaneous epistaxis as "severe" if admitted with anterior nasal packing for 48 with epistaxis cessation by day 3 of hospitalization and as "serious" if hospitalized for >3 days requiring double hours balloon packing, or if significant decompensation with hemoglobin levels <10 g/dL requiring red blood cell transfusion, or if invasive surgical treatment and/or selective arterial embolization were necessary under arteriography.

In our study, we relied on the 2015 SFORL recommendations [3], which consider epistaxis severity to be evaluated based on clinical, hemodynamic, and biological criteria:

Anterior-posterior epistaxis and/or bilateral epistaxis suggest severe epistaxis and warrant investigation for signs of hypovolemic shock.

Hemorrhagic shock is absolute hypovolemia secondary to sudden and significant blood loss, also resulting in acute anemia [8].

The diagnosis of shock is made based on the following signs [9] (Level 4 evidence):

-Low blood pressure (systolic blood pressure <90 mmHg, with pinched differential)

-Tachycardia

-Altered consciousness and/or tachypnea and/or cyanosis of the lips and extremities and/or mottling

The most commonly described risk factors for severe epistaxis in the literature include age, male sex, summer season, hypertension, and anticoagulant use.

In most studies, advanced age has been a severe factor for epistaxis. In this context, Hadar et al. [2] found that age (OR 1.02; CI 1.01-1.023) was significantly correlated with clinical symptoms of epistaxis severity. However, André et al. [7] found no significant differences in epistaxis severity between patients over 60 and those under 60 years old. Paradoxically, the average age was slightly lower in the severe epistaxis group in their study.

In our study, we found that 23.3% of patients over 60 years old had severe epistaxis compared to 16.7% in patients under 60 years old, but the difference was not significant.

Male sex has been a significant factor in several studies. Hadar et al. [2] found that male sex (OR 2.07; CI 1.59-2.69) was significantly correlated with severe epistaxis symptoms. This male predominance might be explained by estrogen protection in females against epistaxis. The preventive role of estrogen in epistaxis recurrence was reported by Daniell in 1995 [10]. However, in our study, paradoxically, we found that women were more likely to have severe epistaxis (36.4% vs. 10.5% in men). This could be explained by sampling bias, as only patients requiring hospitalization were studied, not all patients with epistaxis.

Several studies have found a higher incidence of hospital admissions due to epistaxis during winter, likely due to decreased humidity and increased dryness, leading to drier nasal mucosa and increased bleeding tendency. For instance, Min et al. observed that nosebleeds typically occur in winter and spring when there's a significant temperature difference between indoor and outdoor areas, causing obvious nasal blood vessel contraction and relaxation, resulting in dry nasal mucosa and an increased risk of nasal blood vessel rupture. Low temperature and dryness are risk factors for nosebleeds.

Hypertension is generally considered a severe factor for epistaxis. In a meta-analysis [14], the relationship between epistaxis severity and hypertension was controversial. While hypertension was considered a bleeding risk factor, it was not determined whether it was the cause, as biases caused by sex and age were not excluded. In another study, Hadar et al. [2] found that hypertension (OR 1.76; CI 1.27-2.45) was significantly correlated with severe epistaxis symptoms. The British Rhinological Society's multidisciplinary consensus considers only hypertension [15] as a major risk factor for severe clinical progression. However, it should be noted that measuring hypertension during an epistaxis episode may not be reliable, as it is a stressful event.

A meta-analysis by Jin Min et al. in 2017 of 10 studies showed an increased odds ratio for epistaxis in patients with hypertension (OR = 1.253; 95% CI: 1.080-1.453) [14]. A retrospective cohort study in 2020 by Byun et al. demonstrated hypertension as a significant risk

factor for epistaxis with an adjusted risk ratio of 1.47 (95% CI: 1.30-1.66). They also found that hypertensive patients were more likely to require posterior nasal packing [15]. Another retrospective review by Sethi et al. in 2017 showed that hypertensive patients presenting to the emergency department were more likely to require nasal packing (41.2% vs. 30.3%, $p < 0.001$) [16]. Hayoung et al. [17] demonstrated that hypertensive patients were more likely to visit the emergency department for epistaxis and undergo posterior nasal packing compared to non-hypertensive patients.

In our study, hypertensive patients were more likely to have severe epistaxis (27.3% vs. 11.1% in non-hypertensive patients), but the difference was not significant (p=0.19). When comparing SBP, DBP, and MAP at admission between patients with severe epistaxis and those without, no significant difference was found.

The role of anticoagulant use in the occurrence of severe epistaxis is controversial from one author to another and from one product to another. Hadar et al. [3] found that the use of antiplatelet agents or anticoagulation (OR=2.53; CI=1.93–3.33, OR=1.65; CI=1.11–2.44, respectively) was significantly correlated with severe clinical symptoms of epistaxis. The British Rhinological Society's multidisciplinary consensus considers anticoagulant therapy to carry a higher risk of severe syndrome [18]. Studies have examined the association between the use of different types of anticoagulant/antiplatelet drugs and the risk of epistaxis. Conventional medications (e.g., warfarin; enoxaparin) were significantly associated with more severe nosebleeds than new-generation oral anticoagulants (e.g., Apixaban, Rivaroxaban) [19, 20]. Tunkel et al. consider that although anticoagulants increase the severity and frequency of epistaxis, other preventive and therapeutic measures should be considered before stopping these medications unless bleeding is severe [21]. In this context, saline nasal sprays and nasal emollients are recommended as first-line preventive measures despite the lack of evidence, as they have shown significant improvement in epistaxis with these moisturizing agents [22, 23].

Contrary to previous studies, Gavin et al. did not find that anti-thrombotic use was a severity factor for epistaxis [24].

Another study found that the incidence of nosebleeds increased with increased use of oral anticoagulants, but the number of patients requiring hospitalization did not increase [25].

In a study by André et al. [7], they found that the use of hemostasis-altering medications does not appear to be a significant severity factor, unlike Soyka's study, where aspirin use appears to be a severity factor for epistaxis [26].

In our study, we compared the frequency of severe epistaxis based on the nature of each type of anticoagulant (VKAs, AAPs, or anti-thrombotic), and no significant difference was found regardless of the product used. Additionally, comparing PT and INR between the two patient groups found no difference

despite TP being lower in patients with severe epistaxis (86% vs. 95%).

In a study by Chaaban et al., in addition to hypertension, elevated blood lipid levels, especially LDL, grade III retinal arteriosclerosis, hyperglycemia, heart failure, and obstructive sleep apnea syndrome were found to be severity factors for epistaxis [27]. This may be explained by endothelial vascular alteration due to arteriosclerotic phenomena leading to impaired vascular repair and persistent epistaxis.

In our study, we found that patients with heart failure were more likely to have epistaxis compared to patients without it (75% vs. 16%), and the difference was significant (p=0.023). However, for other factors (diabetes, renal failure), no significant difference was found.

This study has the advantage of determining the severity and recurrence factors of epistaxis, but its limitation was the sampling bias, as only severe forms of epistaxis were included in the study due to a lack of data. This could affect the results of the analytical study.

## CONCLUSION

Severe epistaxis is much less common than its benign form. Understanding it based on clinical and biological criteria is essential to initiate early and appropriate management. Age, sex, and patient comorbidities (such as hypertension, heart failure, and anticoagulant use) are always severity factors.

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