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ORIGINAL ARTICLE

# Epidemiology of epistaxis admitted to a tertiary hospital

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**Abstract**
*Introduction and objectives:* Epistaxis has been known since antiquity. However, we have limited epidemiological data at our disposal. The aim of this study was to know the main epidemiological characteristics of the cases of epistaxis admitted and to determine the factors associated with the recurrence of bleeding.
*Methods:* A retrospective study was conducted including admissions for epistaxis in the ENT department of our hospital during the period between January 2003 and December 2008. We analysed the distribution by gender, age, location and time of year. The aetiological causes identified included systemic and local factors. We analyzed the variables related to bleeding recurrence.
*Results:* We evaluated 178 cases of epistaxis: 68%of patients were male (121/178), compared to 32%of women (57/178). The median age (p25-p75) was 65 (53-75) years. Epistaxis was most noticeable during the months of January and April. Among the systemic causes, hypertension (56%), anti-platelet treatment (23%), and anti-coagulant therapies (18.5%) predominated. Local factors were much less numerous than general ones (11%vs 68%). Recurrent bleeding was present in 14% of cases (25/178) and only the posterior location was shown to influence this variable ($P<.05$).
*Conclusions:* The typical pattern of the patients admitted to our department for epistaxis is a middle-aged or elderly male with underlying co-morbidity and posterior epistaxis.


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**PALABRAS CLAVE**
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Antiinflamatorios no esteroideos;
Anticoagulación

**Epidemiología de las epistaxis ingresadas en un hospital de tercer nivel**

**Resumen**
*Introducción y objetivos:* La epistaxis es un cuadro que se conoce desde la antigüedad. Sin embargo, los datos epidemiológicos de los que disponemos son escasos. Los objetivos de este trabajo son conocer las principales características epidemiológicas de las epistaxis ingresadas y determinar qué factores se asocian con la aparición de resangrado.
*Métodos:* Se realizó un estudio retrospectivo sobre los ingresos por epistaxis en el servicio de ORL de nuestro centro hospitalario en el periodo comprendido entre enero de 2003 y diciembre de 2008. Se analizó la distribución por sexo, edad, localización y época estacional. Entre las causas etiológicas se determinaron los factores sistémicos y los factores locales. Se examinaron las variables que se asociaron al resangrado.
*Resultado:* Se valoraron 178 ingresos por epistaxis. El 68% fueron hombres (121/178), frente al 32% de mujeres (57/178). La mediana de edad (p25-p75) fue de 65 (53-75) años. Predominaron las epistaxis en los meses de enero y abril. Las causas sistémicas más prevalentes fueron la HTA (56%), el tratamiento antiagregante (23%) y el tratamiento anticoagulante (18,5%). Los factores locales fueron menos frecuentes (11% frente a 68%). Se presentó resangrado en el 14% de los casos (25/178) y solo la localización posterior demostró tener influencia sobre esta variable ($p < 0,05$).
*Conclusiones:* El patrón tópico del paciente que ingresa por epistaxis en nuestro centro es un paciente varón, de edad media o avanzada, con alguna enfermedad de base y que presenta una epistaxis de localización posterior.


## Introduction

Epistaxis is an otolaryngologic affection known since antiquity. The term epistaxis limited to nasal bleeding was introduced by the Englishman Cullen in 1785 and the Frenchman Pinel in 1818 and later became widespread in medical language.[1]

This is a common condition that has had historical references for centuries (5th century BCE), but its epidemiological characteristics were not studied until the late twentieth century with the works of Juselius and Small.[2,3]

Data on incidence and prevalence in the general population are difficult to calculate. Epistaxes usually behave as benign and self-limiting conditions that resolve spontaneously or after conservative measures undertaken by the patients themselves without recourse to medical care. However, it is estimated that approximately 60% of the adult population will experience an episode of epistaxis throughout their life and only a small percentage (between 6 and 10%) will require hospital assistance.[4]

The aetiology is presumed to be multifactorial and has classically been divided into 2 categories: local and systemic. It is estimated that for 10% of cases, no cause can be found. In these situations, it is termed idiopathic or essential epistaxis.[5] It affects mostly males and has an incidence that rises with age. Approximately 60% of patients who require ENT attention present ages over 50.[2,6,7] It has been argued that the episodes increase during full moon cycles or in connection with weather changes, predominantly in dry climates or at low temperatures. However, published data is not conclusive.[8] Some authors have documented an increased incidence in patients with blood type 0 in relation to a decreased expression of factor IX of Willebrand.[9]

This is a condition of great relevance in the field of ENT, as its attention influences a very important part of our assistance. It represents one of the most common emergencies in our speciality[10-13] and is also the pathology with most admissions at ENT emergency services.[10]

The objectives of our study were to know the main epidemiological characteristics of patients admitted for epistaxis and to determine the factors associated with the appearance of rebleeding during their hospital stay.

## Material and methods

We conducted a descriptive study on sample which was obtained by consecutive sampling of all admissions for epistaxis at the Service of Otolaryngology of our centre, in the period between 1 January 2003 and 31 December 2008. It is a tertiary care hospital which has 851 beds (32 of them for ENT) and covers the population from Health Department No. 19 in Alicante, comprising 255,439 inhabitants.

Our protocol contemplates admission for patients requiring the placement of an anteroposterior blocking and those patients with a compromised haemodynamic status regardless of the blocking performed. To determine the factors associated with rebleeding, a retrospective study of the cohort was conducted with only internal comparisons.

In the statistical analysis, we used measurements of central tendency and of dispersion for quantitative variables (age and length of hospital stay) and absolute and relative frequencies for qualitative variables (gender, location of the epistaxis, anti-aggregation, anticoagulation, hypertension and rebleeding). The univariate analysis considered the appearance of rebleeding as the dependent variable and

the others as independent variables using the chi square test, the Fisher exact test and the Mann-Whitney U test. The value of 0.05 was taken as alpha probability of error. All this was done using the program SPSS14.

## Results

A total of 1,001,988 emergencies were registered at the Emergency Department of our hospital during the study period. Of these, 18,296 (1.83%) were ENT emergencies, with epistaxis representing 13%(2,342/ 18,296) (Table 1). Of the epistaxis, 8%(178/ 2.342) required hospital admission, thus constituting our study sample.

Of the study subjects, 68%(121/ 178) were men and 32% (57/ 178) were women, with a male/ female ratio of 2.12/ 1, although this ratio varies by age group (Figure 1). The median age (p25-p75) was 65 (53-75) years with a range of 2-94 years. Of the total, 79%(141/ 178) were aged over 50 years (Figure 2).

According to the anatomical location, the cases of epistaxis were distributed into posterior (43%; 78/ 178), anterior (18%; 30/ 178) and non-localised (39%; 58/ 178). We observed a predominance of hospitalised epistaxis in the months of April and January, with a decrease in summer periods (Figure 3).

Associated local factors were much less frequent than systemic factors, accounting for 11% versus 68% of the total. Regarding the latter, arterial hypertension was the most prevalent and was present in 56%(99/ 178) of cases, while 42%of patients (42/ 99) were aged over 60 years. Anti-aggregation accounted for 23%(41/ 178) and anticoagulation for 19% (33/ 178). In 21% (37/ 178), no factor favouring epistaxis could be associated (Tables 2 and 3).

The median hospital stay (p25-p75) was 4 (3-6) days. Rebleeding was present in 14%(25/ 178) of cases. In subjects with rebleeding, 76%(19/ 25) were men and 24%(6/ 25) were women, with 52%(13/ 25) of cases being over the age of 65. With respect to treatment, 64%(16/ 25) were receiving antihypertensive therapy, 12%(3/ 25) were anticoagulated, and 32%(8/ 25) were anti-aggregated.

Only the posterior location proved to have an influence on subsequent rebleeding, with a relative risk of 4.55 and a 95%CI of 1.76-11.55. This association could not be

**Table 1** Percentage of epistaxis at different hospital centres in Spain

| Hospital Centre | | Percentage of Total ENT Emergencies |
|---|---|---|
| Miguel Servet | Zaragoza | 16% (1995) |
| Infanta Cristina | Badajoz | 13% (2005) |
| Virgen del Rocío | Sevilla | 15%(1990) |
| La Paz | Madrid | 12.1% (2004) |
| Virgen de la Salud | Toledo | 9.5%(1997) |
| Vall d'Hebron | Barcelona | 9.6%(2009) |
| CHUS | Santiago | 13.3%(2000) |
| HGUA | Alicante | 13%(2008) |

CHUS: University Hospital Complex of Santiago de Compostela; HGUA: University General Hospital of Alicante.

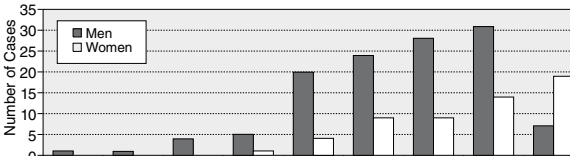


**Figure 1** Distribution of epistaxis admissions by gender and age group.

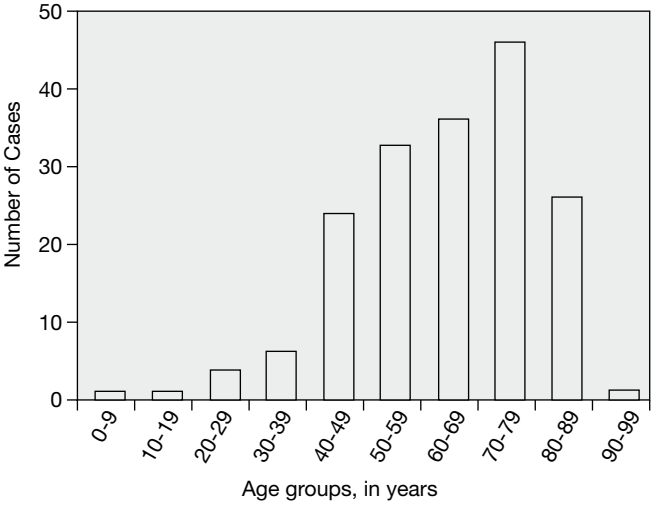


**Figure 2** Distribution of epistaxis admissions by age group.

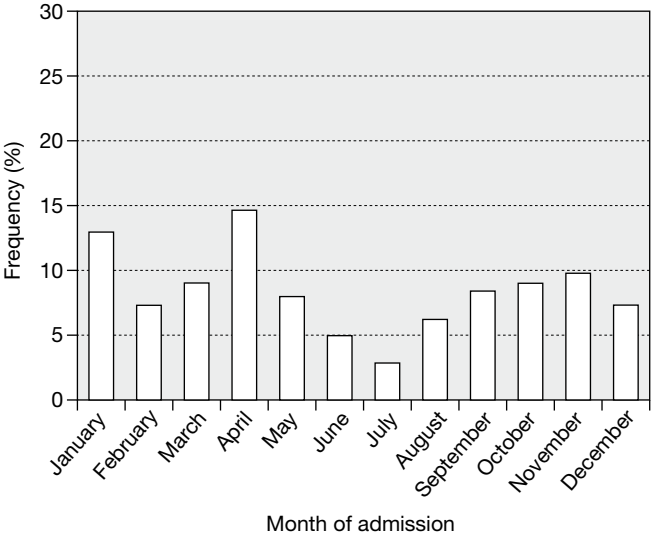


**Figure 3** Distribution of epistaxis admissions by month of admission to hospital.

**Table 2** Associated systemic factors (n=178)

| Cause | Percentage of the Total | Associations | Percentage of the Total |
|---|---|---|---|
| AHT | 99 (55.6%) | AHT | 25 (14%) |
| Anti-aggregation | 41 (23%) | AHT+ASA | 19 (10.7%) |
| Anticoagulation | 33 (18.5%) | AHT+OAC | 15 (8.4%) |
| Rendu-Osler disease | 10 (5.6%) | AHT+hepatopathy | 7 (3.9%) |
| Hepatopathy | 16 (8.9%) | ASA/ OAC+haematological disease | 7 (3.9%) |
| Alcoholic | 10 | | |
| Viral | 6 | | |
| CRI | 10 (5.6%) | AHT+ASA/ OAC+CRI | 6 (3.4%) |
| Haematological disease | 13 (7.3%) | AHT+OAC+ASA | 4 (2.2%) |
| | | Other associations | 38 (21.3%) |
| | | TOTAL | 121 (68%) |

AHT: arterial hypertension; ASA: acetylsalicylic acid; CRI: chronic renal insufficiency; OAC: oral anticoagulation.

**Table 3** Associated local factors (n=178)

| Cause | Percentage of the Total |
|---|---|
| Cause of tumour | 4 (2.2%) |
| Cavum carcinoma | 1 |
| Inverted papilloma | 1 |
| Capillary hemangioma | 1 |
| Masson tumour | 1 |
| Cold | 5 (2.8%) |
| Trauma | 11 (6.1%) |
| Post-surgical | 6 |
| Septorhinoplasty | 1 |
| Dacryocystorhinostomy | 2 |
| Endoscopic nasal surgery | 3 |
| Cocaine | 2 |
| Nasal fracture | 3 |
| TOTAL | 20 (11%) |

demonstrated for the remaining variables studied: arterial hypertension, anti-aggregation, anticoagulation, age and gender (Table 4).

## Discussion

Epistaxis is one of the most common emergencies of our specialty, representing between 9.5% and 16% of total otolaryngology emergencies.[10-16] Between 4% and 12.5% of patients seeking hospital care require admission for its management and control.[10,11,14,17]. The data collected in our study coincided with that published (Table 1).

The male predominance of epistaxis has been well documented by most authors. It is a constant feature in the literature, which in our series was reflected across all age groups until the eighth decade of life, after which females were predominant (Figure 1). Epistaxis incidence by gender and age distribution was described by Tomkinson et al.[18] in 1997, with a male predominance between the ages of 20 and 49 years. However, this difference by gender was not present after the age of 50 years in his study. From this age, the incidence in men was similar to that in women, a fact that the author relates to the possible protective effect of estrogens in pre-menopausal women.

It is a condition that can affect all age groups, but there is an increased incidence in the population above age 50. In 1974, Juselius reported that up to 71.4% of his patients exceeded this age.[2] This finding was later confirmed by other authors. Walker et al.,[19] in their extensive series of 21,770 admitted epistaxis cases, reported a median age of 70 years, in which approximately 75% of patients were over 40. The classification by decades in our series showed an ascending distribution, and the vast majority of cases were over 50, with admissions under the fourth decade being virtually nonexistent.

Another epidemiological datum in the literature has been the environmental and seasonal incidence of nasal haemorrhages. We recorded a non-uniform distribution with a higher incidence during the months of April and January, thus supporting the seasonal variability described in classic references.[2,3] Danielides et al.[20] showed a significant association between weather changes and the incidence of epistaxis, with the maximum and minimum daily temperatures and the pressure of water vapour being the most influential environmental factors. A greater influence of the environment during the coldest and driest periods of the year has also been highlighted. However, there is no full agreement in this respect and other authors such as Bray et al.[21] have failed to demonstrate this relationship.

In our series, epistaxis with a non-localised source accounted for a high percentage. This could be due to the great difficulty, at times, of locating the specific anatomical point when it comes to copious bleeding. Vaamonde et al.[14] showed a frequency of epistaxis without localisation similar to ours (42.9%). In agreement with other studies, the posterior epistaxis predominated over the anterior.[17,22] The high percentage of epistaxis with a posterior location is evident in the case of a hospitalised population, which is over the sixth decade in its vast majority and which is also associated with high comorbidity. In the work of Pino V. et al., which evaluated the aetiopathogenesis and treatment of cases of epistaxis

**Table 4** Results of the univariate analysis. Gender, location of the epistaxis, anti-aggregation and anticoagulant therapy, arterial hypertension, age and rebleeding during hospital stay

| | Frequency | RR (CI 95%) | *P* |
|---|---|---|---|
| Gender | | | |
| Male | 15.7%(19/121) | 1.49 (0.63-3.53) | .354 |
| Female | 10.5%(6/57) | 1 | |
| Location | | | |
| Posterior | 23.9%(17/71) | 4.55 (1.76-11.75) | <.05 |
| Anterior/not localized | 5.3% (5/95) | 1 | |
| Anti-aggregation | | | |
| Yes | 19.5%(8/41) | 1.57 (0.73-3.38) | .251 |
| No | 12.4%(17/137) | 1 | |
| Anticoagulants | | | |
| Yes | 9.1%(3/33) | 0.59 (0.19-1.88) | .578 |
| No | 15.2%(22/145) | 1 | |
| Arterial hypertension | | | |
| Yes | 16.2%(16/99) | 1.42 (0.66-3.04) | .363 |
| No | 11.4%(9/79) | 1 | |
| Age | | | |
| >65 | 14.1%(13/92) | 1.01 (0.49-2.09) | .973 |
| ≤65 | 14% (12/86) | 1 | |

CI: confidence interval; RR: relative risk.

admitted between 1990 and 2000, the percentage of posterior epistaxis slightly exceeded 70%[22]

In our series, no factor favouring the bleeding could be associated in up to 21% of the admissions. This is a higher percentage than what is documented in the literature[5] and it could be justified by a possible loss of information in the retrospective collection of data. Local factors associated were present in 11% of cases, with a predominance of trauma, followed by infections of the upper airway and tumour causes. Table 3 specifically details this data. The vast majority of patients presented an associated systemic disease, primarily in the form of hypertension, anti-aggregation and anticoagulation. Despite this, the descriptive design of the study prevents us from stating that these were the direct causes of bleeding.

The data provided by the "Spanish Guide to arterial hypertension 2005"[23] reported a prevalence of arterial hypertension of 68% in the Spanish population over 60 years. We observed a lower prevalence which, far from being associated as a direct cause of the bleeding, could be considered a mere reflection of what happens in the general population.

There are many publications that have attempted to explain the influence of arterial hypertension in epistaxis. Contrary to what is classically considered, there is, to date, insufficient evidence to say that arterial hypertension behaves as a risk factor. Most studies do not permit an assessment of this association as they are case series without a control group.[4] Moreover, the impossibility of knowing the figures of blood pressure prior to bleeding and the inability to know whether these are a cause or an effect in patients with nasal haemorrhage greatly impedes their study. Knopfholz et al.[24] studied a series of 121 patients with epistaxis and a prior history of hypertension. They investigated the blood pressure values during episodes of bleeding and the incidence of epistaxis according to the severity of hypertension, classifying their sample into three groups. They found no differences between baseline blood pressure figures in routine checks and the figures recorded during active bleeding. Neither were the cases of epistaxis more frequent in patients with higher levels of hypertension. Neto et al.[25] failed to confirm a definite association between these two parameters. They argue that the real factors contributing to bleeding is sustained hypertension (for more than 5 years), because it produces a series of arteriosclerotic degenerative changes in the vessel walls, weakening them and thus making it easier for them to break. There are very few publications that have continued this avenue of research.

A high proportion of our patients presented abnormalities of haemostasis by anti-aggregation or anticoagulation due to drugs, which could indicate that drugs altering haemostasis influenced patients hospitalised for epistaxis. In general terms, it is estimated that up to 1% of the general population in Spain is anticoagulated.[26,27] The percentage is much higher for patients with anti-aggregation. Specifically, between 2000 and 2005, a percentage of 24% was estimated for ASA anti-aggregation patients in the Region of Valencia.[28]

The relationship between anticoagulant drugs and epistaxis has been poorly documented in the literature. Nationally, anticoagulation is carried out through the oral drug acenocoumarol, which is an antagonist of vitamin K. Its range of therapeutic hypocoagulability is measured by its international normalised ratio (INR); its normality index values typically range between 2.5 and 3.5, depending on the pathology being treated. The classic belief considering

that poor anticoagulation control carried an increased risk of epistaxis was challenged by Garcia Callejo et al.[29] in a 1990-1995 study. In their extensive series of 1410 anticoagulated patients, nasal haemorrhages were more prevalent in patients with correct anticoagulation control, and only 20% of patients with nasal bleeding presented altered INR levels. Most authors agree that, in these patients, the average hospital stay is longer than that for patients not requiring anticoagulation. However, this is a fact that we could not confirm.[30]

The association between consumption of non-steroidal anti-inflammatory drugs (NSAIDs) and epistaxis is better documented. It is presumed that they play a favouring role in nasal bleeding, a fact that may have influenced 23% of cases in our series. In 1990, Watson et al.[31] had already confirmed this association, showing that 32% of patients admitted for epistaxis in their study were anti-aggregated, compared to 6% who required hospitalisation for other causes. Within the broad group of NSAIDs, aspirin is one of the most potent platelet anti-aggregation agents. It interferes with the metabolism of arachidonic acid, producing an irreversible inhibition of the synthesis of cyclooxygenase. It thus promotes a permanent platelet dysfunction for 5-7 days, which is the average life of a platelet. This is one of the main aspects that differentiate it from other NSAIDs, as the latter have shorter duration and potency because the inhibition they generate on cyclooxygenase is variable in level and reversible. In their work with cases and controls, Tay et al.[32] confirmed a significant association between aspirin therapy and epistaxis in an admitted population. The patients prescribed the drug had a relative risk of hospitalisation of 2.17, 95% CI (1.35-3.47) with respect to the control group. They did not observe an association between epistaxis and NSAIDs other than aspirin.

Several factors may contribute to the failure of a blocking. Other publications have revealed the relationship between rebleeding and age and location of the epistaxis.[14] In our study, the only variable that behaved as a risk factor was location, with a relative risk slightly over 4. The large CI obtained for this variable (1.76-11.75) could be justified by the limited sample size of our study. This factor may also have contributed to the failure to find an association with other variables.

The current study has several limitations, mainly due to its retrospective and descriptive study design. Despite this factor and although our results are not representative of the general population, we estimate that it represents a significant contribution to knowledge of epistaxis epidemiology from the perspective of admitted patients.

Future lines of research are based on carrying out a prospective cohort study, as a primary data source that allows us to assess the risk factors for all epistaxis treated in the emergency service; this will enable us to analyse potential epidemiological differences between patients requiring admission and those requiring only outpatient care.

## Conclusions

The typical pattern of patients admitted for epistaxis is a preferably male patient, of middle or advanced age with an epistaxis in a posterior location and who displays some associated comorbidity or treatment. In our study, the only variable that behaved as a risk factor for rebleeding was the posterior location of the epistaxis. We could not associate rebleeding with hypertension, age, gender or use of anti-aggregation or anticoagulation agents.

## Conflict of interests

The authors declare no conflict of interests.

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