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Risk factors for the occurrence of epistaxis: Prospective study

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ABSTRACT

Objective: Analyse and compare the characteristics of patients with epistaxis admitted to the otolaryngology emergency department with those provided by a control group. Establish a model to identify epistaxis predictive factors.

Methods: Prospective analysis of 283 consecutive adults, admitted to the otolaryngology emergency department of a tertiary referral centre between 25 January and 25 February 2014. Comparison of gender, age, co-morbidities, usual medication, history of epistaxis or nasal trauma, presence of septal deviation and blood pressure value on admission, between the elements that were admitted to the emergency due to epistaxis (group 1) and a group composed of patients with other symptoms (group 2). Intergroup variations were analyzed using t student and chi-square tests. Multivariate logistic regression and a receiver operating characteristic curve were used to establish a predictive model and test its suitability.

Results: Male gender (OR = 2.57, 95% CI 1.1–6.0, $p = 0.029$), older age (OR = 1.03, 95% CI 1.0–1.1, $p = 0.002$), existence of peripheral vascular disease (OR = 13.47, 95% CI 1.9–95.3, p = 0.009), cardiovascular disease (OR = 3.91, 95% CI 1.6–9.7, $p = 0.003$) and previous history of epistaxis (OR = 5.53, 95% CI 2.5–12.1, $p < 0.001$) were predictors of epistaxis when adjusted for the presence of elevated blood pressure, history of hypertension, cerebrovascular disease and chronic use of anticoagulants or antiplatelet drugs. The model revealed a good applicability (area under the curve of 0.852).

Conclusions: The only predictive factors of admission to the emergency department due to epistaxis were male gender, older age, peripheral vascular disease, cardiovascular disease and history of epistaxis.

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1. Introduction

Epistaxis is a common clinical condition in the general population but its true incidence remains unknown. It is estimated to occur in 60% of adults throughout their lives [1] and it is the most common otolaryngology emergency, representing 9.5–16% of all emergencies of the speciality [2].

Epistaxis are generally preventable with moisturization of the nasal mucosa, avoidance of trauma or direct irritation, and saline treatment [1]. If these preventative measures fail, the nonlife threatening cases are still easily managed with compression and/or topical vasoconstrictor [1]. Despite being a predominantly benign condition, regardless of aetiology,

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epistaxis can become severe, particularly in the elderly and those more fragile, requiring hospitalization and aggressive treatment including repeated nasal packing, blood transfusions, arterial embolization or surgery [3]. 4–12.5% of patients seeking medical care due to epistaxis, require hospitalization [2].

Although it has been assumed that aetiology is multifactorial, epistaxis trigger factors have been classically divided into two categories: local, such as trauma or direct irritation, and systemic, such as hereditary haemorrhagic telangiectasia (HHT) or hypertension [2]. It is estimated that the cause of epistaxis is identified in only 15% of cases [4]. When no aetiology is found, it is called idiopathic or essential epistaxis [2].

Epistaxis has been associated with elevated blood pressure [5], however, the evidence for an association or causal relationship between hypertension, epistaxis and other possible risk factors, is still controversial. Some authors describe a significant relationship between epistaxis and high blood pressure, while others have found no association [6].

The present study aims to compare the characteristics of patients admitted to the otolaryngology emergency department (ENT-ED) due to epistaxis and owing to other symptoms, and establish a model to identify the predictive factors for epistaxis.

2. Materials and methods

The study was performed in a tertiary referral centre that serves a population of 500 000 inhabitants. A prospective analysis was performed on 283 consecutive patients, over the age of 18 years and admitted to the emergency department, between 8 AM and 8 PM, in the period from 25 January to 25 February 2014. All the patients, over the age of 18 years that presented to the ENT-ED in that period of time were enrolled in the study. The ENT-ED is only constituted of specialists in otorhinolaryngology and each emergency team consists of two elements.

It was carried out a comparison of gender, age, co-morbidities, usual medication, history of epistaxis or nasal trauma, existence of septal deviation and blood pressure (BP) value on admission, between the elements that were admitted to the ENT-ED due to epistaxis (group 1) and a control group composed of patients that recurred during the same period to the ENT-ED but with other symptoms (group 2).

The following co-morbidities were considered: hypertension, diabetes mellitus, dyslipidaemia, cardiovascular/cerebrovascular or peripheral vascular disease, cancer, and alcoholism. None of these patients suffered from coagulopathies or HHT. As for medication, they were questioned about treatments with antiplatelet, anticoagulant, anti-hypertensive and anti-inflammatory drugs.

Data entry and analysis was performed using IBM SPSS Statistics for Macintosh, version 23 (IBM Corp., Armonk, N.Y., USA). The continuous and categorical variables were expressed as mean ± standard deviation, and percentages, respectively. For intergroup comparison the chi-square test was used when the variables were categorical, and the t student, when the variables were continuous. The relationship between epistaxis and the variables was determined by univariate and multivariate analysis. A p value <0.05 was considered statistically significant. Univariate logistic regression was performed to identify variables independently associated with the presence of epistaxis. The presence/absence of epistaxis was considered as the dependent variable and the following parameters as independent variables: gender; age; co-morbidities; usual medication; history of epistaxis or nasal trauma; existence of septal deviation and blood pressure value on admission. The variables that differed between groups in univariate analysis ($p < 0.2$), and the presence of epistaxis, were subjected to multivariate logistic analysis to control potential confounders. The results were expressed as odds ratios (OR) with 95% confidence intervals (CI). In addition, a receiver operating characteristic (ROC) curve was determined to establish the suitability of the model. One usually considers that the model is good when the value of the area under de curve (AUC) is higher than 0.7. A well discriminating model should have an AUC between 0.87 and 0.9. A model with an AUC above 0.9 is excellent.

The Health Ethics Committee of Centro Hospitalar de São João approved the study design and methodology.

3. Results

A total of 283 patients admitted to the ENT-ED of our hospital were included. Table 1 shows the characteristics of patients presenting to the ENT-ED. Group 1 consisted of 52 patients, 37 were males; and group 2 had 231 patients, with 117 males. In group 1 the mean age was 66 ± 18 years and in group 2 was 49 ± 19 years ($p < 0.001$); so patients with epistaxis were older than those without epistaxis and this difference was statistically significant. The mean systolic blood pressure was 140 ± 24 mmHg in group 1 and 136 ± 17 mmHg in group 2 ($p = 0.213$). The diastolic blood pressure was 80 mmHg ± 11 and 77 ± 14 mmHg in groups 1 and 2, respectively ($p = 0.276$). There were no significant differences in the mean BP at admission between both groups.

The following characteristics were found more frequently in patients with epistaxis (group 1): high blood pressure on admission [(>140/90 mmHg); 40%, $p = 0.001$], diabetes mellitus (33%, $p = 0.001$), dyslipidaemia (33%, $p = 0.004$), cardiovascular disease (40%, $p < 0.001$), peripheral vascular disease (10%, $p = 0.007$), alcoholism (16%, $p = 0.001$), history of epistaxis (58%, $p < 0.001$), chronic medication with antiplatelet (33%, $p < 0.001$) or anti-coagulants drugs (17%, $p < 0.001$) and deviated septum (63%, $p < 0.001$) (Table 1).

The model obtained by multivariate logistic analysis revealed that male gender (OR = 2.57, 95% CI [1.10–5.99], $p = 0.029$), older age (OR = 1.03, 95% CI [1.01–1.06], $p = 0.002$), existence of peripheral vascular disease (OR = 13.47, 95% CI [1.90–95.28], p = 0.009), cardiovascular disease (OR = 3.91, 95% CI [1.58–9.66], $p = 0.003$) and previous history of epistaxis (OR = 5.53, 95% CI [2.53–12.07], $p < 0.001$) were predictors for occurrence of epistaxis when excluded the effect of high blood pressure, history of hypertension, cerebrovascular disease and medication with antiplatelet agents or anticoagulants (Table 2). The

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