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Original article

# Cardiovascular risk and severity factors in patients admitted to hospital for spontaneous epistaxis

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ABSTRACT

*Objectives:* To assess the role of cardiovascular risk factors, intake of drugs altering hemostasis and severity signs in patients admitted with spontaneous epistaxis.
*Material and methods:* A single-center retrospective study covering a 7-year period in a university hospital center included 205 patients admitted with spontaneous epistaxis. Study variables comprised: cardiovascular risk factors (cardiovascular disease or history of cardiovascular disease with hemorrhagic or thromboembolic risk, high blood pressure, type-2 diabetes, dyslipidemia), intake of drugs altering hemostasis, blood pressure and minimum hemoglobin level during hospital stay. Groups of serious and non-serious epistaxis were distinguished.
*Results:* There were no significant inter-group differences for mean age, sex ratio, history of high blood pressure or number of cardiovascular risk factors. Serious epistaxis was associated with significantly lower blood pressure and hemoglobinemia. Number of cardiovascular risk factors correlated with probability of blood transfusion.
*Conclusion:* The real influence of the various study factors, including severity factors, on onset of spontaneous epistaxis remains to be elucidated.



## 1. Introduction

Epistaxis is one of the most frequent ENT emergency situations [1]. Management may necessitate hospital admission, especially for elderly persons [2] with comorbidities such as medication with risk of hemorrhage or underlying cardiopathy, or even require invasive treatment with iterative nasal packing, embolization under arteriography of the facial artery and/or maxillary or sphenopalatine arteries, surgical coagulation/clipping by sphenopalatine artery endoscopy, surgical ligature/coagulation of the ethmoidal arteries on a medial paracanthal approach, and packed red blood-cell transfusion in case of severe or poorly tolerated acute anemia [3–5].

Spontaneous epistaxis is a special case, raising the problem of identifying etiological factors, as it is by definition unrelated to surgery or trauma or to hereditary factors or disease such as Rendu-Osler's diffuse familial angiomatosis [6–8].

Cardiovascular risk factors, in the wide sense, and high blood pressure in particular, are systematically suspected as causal or trigger factors in onset of spontaneous epistaxis [9–12], but their real implication is controversial [13–18] in the absence of hard evidence.

Spontaneous epistaxis also raises the problem of how to evaluate severity, complicating clinical assessment and treatment. The present study aimed to identify predictive factors for severity and precise etiological factors, in particular cardiovascular risk factors, in patients admitted with spontaneous epistaxis.

## 2. Material and method

A single-center retrospective study covering a 7 year period (January 2010 to December 2016) in a university hospital center included all patients admitted with spontaneous epistaxis.

Admission was mainly to allow at least one nasal packing (anterior packing with Vaseline® gauze or hydroxylate polyvinyl acetate nasal sponge) or double-balloon catheterization.

Exclusion criteria comprised: post-traumatic epistaxis (post-surgical or following trauma within 3 months), Rendu-Osler's disease, benign or malignant nasal cavity tumor, and epistaxis not requiring hospital admission.

Study variables comprised: age; gender; height (meters); body-weight (kg); personal history of emergency consultation for spontaneous epistaxis at least 1 month prior to the index event; number of cardiovascular risk factors (true cardiovascular risk

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**Box 1: cardiovascular risk factors (from [19])**

A. Non-modifiable risk factors:

- male, aged ≥ 50 years;
- female, aged ≥ 60 years or in menopause;
- family history of early coronary disease:
  - myocardial infarction or sudden death of father/brother before 55 years of age,
  - myocardial infarction or sudden death of mother/sister before 65 years of age,
  - stroke with visible infarction in first-degree relative before 45 years of age.

B. Modifiable risk factors:

- smoking: active or ceased for less than 3 years;
- hypercholesterolemia (> 1.9 g/L [5 mmol/L], LDL-cholesterol [LDLc] > 1.6 g/L [4.1 mmol/L]);
- HDL-cholesterol (HDLc) < 0.40 g/L (1 mmol/L);
- high blood pressure (systolic/diastolic > 140/90 mmHg);
- chronic kidney failure (creatinine clearance < 60 mL/min/1.73 $m^2$ or micro-albuminuria [*30 à 300 mg/24 h*]);
- diabetes, controlled or not (fasting glucose > 1.26 g/L) and metabolic syndrome.

factors identified according to the European cardiovascular disease prevention guidelines [19] (Box 1) (Table 1), and cardiovascular disease or history of cardiovascular disease with hemorrhagic or thromboembolic risk); usual medication, including hemostasis-modifying drugs; minimum hemoglobinemia during hospital stay; and systolic and diastolic blood pressure during hospital stay.

All blood pressure measurements were systematically recorded, in line with the department's protocol [2]:

- on admission in emergency or ENT consultation, with nicardipine administered by electric syringe under blood pressure monitoring in case of systolic pressure > 160 mmHg;
- at least twice daily in the department;
- and at discharge.

Other variables comprised: type of packing; need for invasive treatment (embolization under arteriography of the facial artery and/or maxillary or sphenopalatine arteries, surgical coagulation by sphenopalatine artery endoscopy, surgical ligature/coagulation of the ethmoidal arteries on an medial paracanthal approach, or none of the three) and need for packed red blood-cell transfusion.

Patients were divided between two groups:

- serious epistaxis: requiring packed red blood-cell transfusion and/or invasive treatment;
- or otherwise, non-serious epistaxis.

The main aim of the present study was to compare these two groups so as to identify any predictive factors for serious spontaneous epistaxis, and notably: intake of medication altering hemostasis, high blood pressure, and also the number of cardiovascular risk factors.

Secondary objectives were to investigate a possible dose-effect between number of cardiovascular risk factors and severity of epistaxis.

Quantitative variables were compared between groups on Student test for independent samples, and qualitative variables on $chi^2$ test.

## 3. Results

Two hundred and five patients were included: 71 female, 134 male; mean age, 70 years.

Fifty-eight (28% of all patients) presented at least 1 severity criterion. Forty-six (79% of patients with serious epistaxis) had packed red blood-cell transfusion, 27 (47% of patients with serious epistaxis) embolization under arteriography or surgery for sphenopalatine or ethmoidal artery hemostasis, and 55 (27% of all patients) double-balloon catheterization.

There were no significant inter-group differences in mean age, sex ratio, history of high blood pressure or number of cardiovascular risk factors (Table 2).

There was, however, a significant difference ($chi^2 = 4.592$, $P < 0.05$) in personal history of epistaxis: 38 of the 58 patients with serious epistaxis (66%) had personal history of spontaneous epistaxis, versus 71 of the 174 patients with non-serious epistaxis (48%).

Mean systolic and diastolic blood pressure were significantly lower in serious epistaxis ($P = 0.013$ and $P = 0.020$ respectively). Anticoagulant or antiplatelet treatment was not more frequent in serious epistaxis, but hemoglobinemia was significantly lower ($P < 0.0001$).

Regarding secondary objectives, the percentage of patients with serious epistaxis requiring invasive local treatment (surgery or embolization under arteriography) did not correlate with number

**Table 1**
Metabolic syndrome (from [19]).

| Definition of metabolic syndrome | |
|---|---|
| Risk factor | Threshold |
| Abdominal obesity (waist) | |
| Male | > 102 cm |
| Female | > 88 cm |
| Triglycerides | ≥ 1.5 g/L |
| HDL-cholesterol | |
| Male | < 0.4 g/L |
| Female | < 0.5 g/L |
| Blood pressure | ≥ 140/90 mmHg |
| Fasting glucose | ≥ 1.10 g/L |

Conversely, HDL-cholesterol ≥ 0.60 g/L (1.5 mmol/L) is a protective factor: therefore, deduct "1 risk factor" from the total.

**Table 2**
Comparison of the two groups.

| | Serious epistaxis: 58 patients | Non-serious epistaxis: 147 patients | 95% CI/*P* |
|---|---|---|---|
| Mean age (years) | 67 | 71 | [−8.127, 0.1899] $P = 0.061$ |
| Sex ratio | 1.9 | 1.88 | [−0.1441, 0.1483] $P = 0.977$ |
| History of high blood pressure | 38 (66%) | 96 (65%) | [−0.1441, 0.1483] $P = 0.977$ |
| Mean number of cardiovascular risk factors per patient | 1.84 | 1.89 | [−0.4192, 0.3265] $P = 0.807$ |
| Mean systolic blood pressure (mmHg) | 132 | 138 | [−10.4798, −1.2469] $P = 0.013$ |
| Mean systolic blood pressure (mmHg) | 71 | 75 | [−6.4128, −0.5523] $P = 0.020$ |
| Taking antiplatelets | 17 (29%) | 60 (41%) | [−0.2701, 0.0263] $P = 0.107$ |
| Taking anticoagulants | 30 (52%) | 74 (50%) | [−0.1843, 0.2256] $P = 0.843$ |
| Taking antiplatelets and anticoagulants | 47 (81%) | 134 (91%) | [−0.3057, 0.1032] $P = 0.33$ |
| Hemoglobinemia (g/dL) | 8.3 | 12.1 | [−4.456, −3.251] $P < 0.0001$ |

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