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RELATIONSHIP BETWEEN EPISTAXIS AND HYPERTENSION: A STUDY OF PATIENTS SEEN IN THE EMERGENCY UNITS OF TWO TERTIARY HEALTH INSTITUTIONS IN NIGERIA

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ABSTRACT

Background: Both epistaxis and hypertension are common in the general population.

Objective: This study aimed at determining the prevalence of hypertension among epistaxics, and the relationship between epistaxis and hypertension.

Methods: Retrospective analysis of 62 adults comprising 31 each of males and females with a mean age of 41.4 ± 16.6 years (range: 18-90 years) that presented in the emergency units of two tertiary health institutions seen over 11 years was done. Main outcome measure was the prevalence of hypertension amongst epistaxics. Seventy-six age and sex-matched patients with bleeding from sites other than the nostrils with no record of epistaxis were selected by simple random sampling as controls.

Results: Peak prevalence of epistaxis occurred during the months of January and March. Compared to the controls, the epistaxics had significantly higher blood pressures: (146.1 ± 40.7 mmHg versus 123.2 ± 16.3 mmHg systolic, P =0.001), and (91.3 ± 24.8 mmHg versus 78.2 ± 12.8 mmHg diastolic, P=0.001), and higher proportions of patients with previous history of hypertension (32.3% versus 7.9%; p<0.001) and family history of hypertension (12.9% versus 2.6%; p<0.02)..The proportion of subjects with blood pressure elevation at presentation that remained sustained was significantly higher among the epistaxics than the nonepistaxics (87.5% versus 47.6%, χ^2=8.1, P=0.005). The epistaxics had significantly higher prevalence of hypertension than the non-epistaxics (45.2% versus 13.2%, χ^2=17.5, p=0.001). Univariate analysis demonstrated association between epistaxis and hypertension (OR=5.4, 95% CI=2.4-12.5, P=0.001), and between epistaxis and age (OR=0.9, 95% CI=1.3-12.5, P=0.02). On multivariate analysis using logistic regression the association between epistaxis and hypertension persisted, after adjusting for age, sex, season and causes of epistaxis (OR=5.6, 95% CI=1.7-15.6, P=0.01).

Conclusions: Our findings support an association between epistaxis and hypertension in the study population.

Key Words: Epistaxis, Hypertension. *(Accepted 27 November 2007)*

INTRODUCTION

Both epistaxis and hypertension are common in the general population. Though the data from nation-wide survey showed that 10-15% of Nigerians are hypertensive[1], recently emerging reports suggest the prevalence rates of hypertension may be between 20 and 25% in this population [2, 3]. Populationbased data on epistaxis are rare. A hospitalbased study from the middle belt region of Nigeria nonetheless shows that it constitutes 1.9% and 46.5% of total otorhinolaryngologic patient load and nasal emergencies, respectively [4]. The prevalence rates of hypertension among patients with epistaxis range from 17-67% [4-6]. Whether there is an association or cause and effect relationship between epistaxis and hypertension is a subject of longstanding controversy. While some workers have reported an association between the two conditions [4-6], others did not [7, 8]. There is paucity of data addressing this subject in Nigeria. This study aimed at determining the prevalence of hypertension among epistaxics, and the relationship between epistaxis and hypertension.

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METHODOLOGY

The records of 73 adults aged 18 years and above who were hospitalised between January 1995 and May 2006 on account of epistaxis in the emergency units of two tertiary health care facilities in Nigeria

(Usmanu Danfodiyo University Teaching Hospital, and University of Ilorin Teaching Hospital, located in Sokoto, Northern Nigeria and Ilorin, middle belt of Nigeria, respectively) were retrieved. Data collected included age, sex, occupation, and causes, duration and month of presentation with epistaxis, history and family history of hypertension, blood pressure levels and antihypertensive medications. Eleven patients with incomplete data were excluded from the study. All patients with epistaxis and/or hypertension had been seen by the investigating Physician or Otorhinolaryngologist as applicable.

Epistaxis was defined as bleeding from the nostril. The diagnosis of hypertension was made on the basis of blood pressures = 140 mmHg systolic and/or = 90 mmHg diastolic or use of antihypertensive medications[9]. Patients without history of hypertension whose blood pressures were elevated on admission but normalised without antihypertensive medication during the period of hospital stay were not considered as hypertensives. Seasons were defined as follows: (Harmattan: November - February, Hot: MarchMay and Rainy seasons: JuneOctober).

Patients who were hospitalised in the emergency unit during the same period with bleeding from sites other than the nostril and with no record of history of epistaxis were selected by simple random sampling as controls. The sites of injury and bleeding in these patients included head and neck, 39 (51.3%), upper Limb, 8 (10.5%), lower limb, 13 (17.1%), trunk, 3 (4.0%), mouth, 2 (2.6%), ear, 1 (1.3%) and multiple sites 10 (13.2%).

Statistical Analysis

Data entry and analysis was done using SPSS software. Continuous and categorical variables are presented as mean plus or minus standard deviation and percentages, respectively. Mean values between two groups were compared using independent ttest (2-tailed). The means between three or more groups were compared using analysis of variance (ANOVA). Chi square test and Fisher Exact test, where appropriate, were utilised in comparing proportions. The relationship between epistaxis and hypertension was determined using univariate and multivariate analysis. A pvalue < 0.05 was considered statistically significant.

RESULTS

The characteristics of patients with epistaxis and controls are shown in Table 1. The diseases identified among the epistaxics are shown in Table 2. Some patients had more than one conditions. Peak prevalence of epistaxis occurred during the months of January and March. Blood pressure ranged from 100160 mmHg systolic and 60100 mmHg diastolic among the epistaxic group, and from 90160 mmHg

Table 1: **Comparison of Patients with Epistaxis and Controls.**

Characteristic	Epistaxics N = 62 N (%)	Control N = 76 N (%)	P – value
Sex: Male	31 (50.0)	40 (52.6)	0.8
Female	31 (50.0)	36 (47.4)	
Place of domicile: Urban	37 (59.7)	38 (50.0)	0.3
Rural	25 (40.3)	38 (50.0)	
Tribe: Hausa and Fulani	44 (69.4)	59 (7.6)	0.5
Ibo	6 (9.6)	5 (6.6)	
Yoruba	4 (6.5)	6 (7.9)	
Others	9 (4.5)	6 (7.9)	
Socioeconomic status: Upper	7 (11.3)	9 (11.8)	0.5
Middle	13 (21.0)	22 (29.0)	
Lower	42 (67.6)	45 (59.2)	
Season : Harmattan	27 (43.5)	18 (23.7)	0.02
Hot	22 (35.5)	30 (39.5)	
Rain	13 (21.0)	28 (36.8)	
Previous history of hypertension	20 (32.3)	6 (7.9)	<0.001
Family history of hypertension	8 (12.9)	2 (2.6)	0.02
Elevated blood pressure on presentation	32 (51.6)	21 (27.6)	0.004
Sustained hypertension	28 (45.2)	10 (27.6)	<0.001
	Mean ± SD	Mean ± SD	
Age (years)	41.4 ± 16.6	39.6 ± 12.6	0.4
Systolic blood pressure (mmHg)	146.1 ± 40.7	123.2 ± 16.3	<0.001
Diastolic blood pressure (mmHg)	91.3 ± 24.8	78.2 ± 12.8	<0.001

Table 2: **Diseases Identified In Patients with Epistaxis**

Disease	No of Patients (%) N=62
Hypertension	28 (45.2)
Non-determinable	20 (32.3)
Coryza	19 (30.6)
Trauma	4 (6.5)
Nasal and nasopharyngeal tumour	2 (3.1)
Renal failure	2 (3.1)
Bleeding disorder	1 (1.6)
Eclampsia	1 (1.6)
Sickle cell disease	1 (1.6)

Table 3: **Comparison of Hypertensive and Normotensive Patients with Epistaxis**

Characteristic	Hypertensive epistaxic N = 28 N (%)	Normotensive epistaxic N = 34 N (%)	p-value
Sex: Male	11 (39.3)	20 (58.3)	0.1
Female	17 (60.2)	14 (41.2)	
Place of domicile: Urban:	9 (57.1)	16 (52.9)	0.9
Rural	19 (42.9)	18 (47.1)	
Socioeconomic status: Upper	4 (14.3)	3(8.8)	0.6
Middle	7 (25.0)	6(17.6)	
Lower	17 (60.7)	25 (73.5)	
Season: Harmattan	14 (50.0)	13 (38.2)	0.6
Hot	9 (32.1)	13 (38.2)	
Rain	5 (17.9)	8 (23.5)	
Previous epistaxis	11 (39.3)	15 (44.1)	0.04
	Mean ± SD	**Mean ± SD**	
Age (years)	46.3 ± 9.5	38.3 ± 9.2	0.08
Duration of epistaxis(days)	3.8 ± 4.0	2.9 ± 3.7	0.5

Table 4: **Multivariate Logistic Regression Analysis Relating Epistaxis to Hypertension**

Model	Standard Error	Odd Ratio	P - Value	95% Confidence Interval
1	0.5	5.4	0.001	2.4-12.5
2	2.1	0.027	0.03	1.00-1.16
3	3.8	1.532	0.001	1.77-12.1
4	4.1	0.255	0.01	0.42-1.40
5	5.6	0.627	0.001	1.7-15.6

Legend
Model 1: Crude (unadjusted)
Model 2: Model 1 adjusted for age
Model 3: Model 2 adjusted for sex
Model 4: Model 3 adjusted for season
Model 5: Model 4 adjusted for causes of epistaxis

systolic and 60100 mmHg diastolic in the non-epistaxic group. Compared to the nonepistaxics, patients with epistaxis had significantly higher systolic blood pressure (146.1 ± 40.7 mmHg versus 123.2 ± 16.3 mmHg, t=4.5, P =0.001), and diastolic blood pressure (91.3 ± 24.8 mmHg versus 78.2 ± 12.8 mmHg, t= 4.2, P=0.001). Patients with epistaxis did not however differ significantly during the harmattan, hot and rainy seasons with respect to blood pressure: systolic, (152.4 ± 46.3 mmHg versus 136.5 ± 27.0 mmHg versus 152.4 ± 36.2 mmHg, F=0.8, P=0.5); diastolic, (94.8 ± 23.3 mmHg versus 86.0 ± 21.4 versus 92.5 ± 36.5 mmHg, F=0.7, P= 0.6). Compared to the nonepistaxics, patients with epistaxis had a significantly higher proportion of subjects with blood pressure elevation at presentation that remained sustained (87.5% versus 47.6%, χ^2=8.1, P=0.005). Overall, the prevalence of hypertension was significantly higher among patients with epistaxis compared to those without (45.2% versus 13.2%, χ^2=17.5, p=0.001). Of the 28 hypertensive epistaxis, 8 (28.6%) were previously unaware of a diagnosis of hypertension. In the previously known hypertensives, the duration of diagnosis of hypertension ranged from 0.5 to 8 years. Though there was a higher proportion of patients with hypertension in the lower than the middle class (75.5% versus 60.9%) the difference was not statistically significant (χ^2 = 1.9; p=0.40).Hypertensive and normotensive with epistaxis are compared in Table 3. Though the hypertensive were older than the normotensive epistaxis, the difference was statistically insignificant (46.3 ± 9.5 versus 38.3 ± 9.2 years; p=0.08). The normotensives had significantly higher proportion of patients with previous history of epistaxis compared to the hypertensive epistaxics (44.1% versus 39.3%; p=0.04).

Univariate analysis demonstrated association between epistaxis and hypertension (OR=5.4, 95% CI = 2.4-12.5, P=0.001), season (OR=1.8, 95% CI=1.1-2.9, P=0.01) and age (OR=0.9, 95% CI=1.3-12.5, P=0.02). On multivariate analysis using logistic regression (Table 4), the association between epistaxis and hypertension persisted after adjusting for age, sex, season and causes of epistaxis (OR=5.6, 95% CI=1.7-15.6, P=0.001).

DISCUSSION

The age, peak season of presentation and diseases identified among patients with epistaxis in the current report are similar to the findings in previously reported studies [4, 5, 10, 11]. Patients with epistaxis are more likely to present during the harmattan season (NovemberMarch) in Nigeria partly because this season is characterised by low temperature and low humidity which may predispose individuals to decreased nasal ciliary movement, mucosal breakdown and nasal bleeding [12]. In contrast to the findings in the Japanese, we observed no seasonal variation in blood pressure among epistaxics. Seasonal variation in conventional hypertension-

related morbidities has however been documented in Nigeria [10].

The prevalence of hypertension among epistaxics in the current report is higher than the value of 17.4% reported in the middle belt of Nigeria [4]. This wide difference may be due to the fact that the study population in the latter was larger and made up of both adult and paediatric population. Our findings corroborate with some previous reports that demonstrated association between epistaxis and hypertension [5, 6], but differ from others with contrary observation [7, 8]. The difference in findings may, again be partly a reflection of differences in the study population. Most hospitalbased studies [5, 6] tend to demonstrate an association between epistaxis and hypertension, while population-based data do not [7, 8]. One important limitation of populationbased studies is the reliance of the diagnosis of epistaxis on volunteered or recalled history of nose bleeding which may be inaccurate.

Blood pressure elevation in patients with epistaxis can not be fully explained by the anxiety associated with bleeding. This is evidenced in the current report by the significantly higher proportion of patients with initial blood pressure elevation who developed sustained hypertension among the epistaxics compared to those with bleeding from other sites. In a study of a Caucasian population, about 79% of epistaxics with initial blood pressure elevation had sustained hypertension [13]. This is just a little below the value of 88% obtained in the current report. The aetiologic role of hypertension in epistaxis is not certain. It is possible that hypertension causes arteriolosclerotic nasal vascular changes that predispose hypertensives to increased susceptibility to epistaxis. Fundus examination of hypertensive epistaxics has, for example, demonstrated high prevalence of hypertensive retinal arteriolosclerosis, which is an index of arteriolosclerotic changes in other parts of the body [14]. Similarly, an association between duration of hypertension and left ventricular hypertrophy and nasal artery enlargement determined by rhinoscopy has been described among hypertensives with history of epistaxis [15].

In conclusion, our findings support an association between epistaxis and hypertension in the study population. Further studies are required to whether there is a cause and effect relationship.

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