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A CORRELATION OF SYMPTOMATOLOGY WITH NASAL SMEAR EOSINOPHILIA IN NON-INFECTIOUS CHRONIC RHINITIS PRELIMINARY REPORT

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ABSTRACT

Objective: To correlate subjective and objective clinical features with nasal smear cytology findings in non-infectious chronic rhinitis.

Design: An analysis of prospectively collected data of consecutive patients with non-infectious seasonal and perennial rhinosinusitis seen at a tertiary health institution.

Methodology: Clinical assessments including Visual Analog Scale (VAS) scoring of presenting symptoms of 45 patients suffering from non-infectious chronic rhinosinusitis are measured. Subjects had a medical questionnaire regarding presence and duration of symptoms, family history of atopy or allergy, occupational exposure to allergens, provocative agents, and medication usages. Subjects had detail Ear, Nose, and Throat assessment, and nasal secretions were analyzed for eosinophils counts and statistically correlated with clinical parameter.

Result: A total of 45 patients were recruited. Age range was 13 to 71 years (SD 11.516). 73% (n=33) were females while 27% (n=12) were males. The modal occupation was homemaking (24%, n=11). 38% (n=17) had family history of atopy, while 13% (n=6) had family history of allergy. Symptoms were perennial in 62% (n=28) and seasonal in 38% (n=17). 9% (n=4) of the subjects keep pets at home, while 40% (n=18) grow flowers or trees around the house. All subjects gave a history of identifiable provocative agents. There is positive correlation of itchy nose with total symptom score. There was negative history of occupational exposure to allergens in all subjects. The average subjective symptom score are Sneezing (6.3), Itchy nose (6.1), Nasal obstruction (6.2) and Runny nose (6.7). There is a high positive correlation of sneezing with runny nose (r = 0.51), but poor correlation with nasal obstruction (r = 0.15). There is negative correlation of total individual symptom score with keeping of pets (r = -0.24) or growing of flowers or trees around house (r = -0.039). There is also low correlation of total symptom score with family history of atopy (r = 0.06). There is positive correlation of total symptom score with number of provocative agents identified (r = 0.34). There is low positive correlation of nasal smear eosinophilia with total symptom score (r = 0.030) and itchy nose score (r = 0.038). Nasal smear eosinophilia show negative correlation with sneezing score (r = -0.076).

Conclusion: The best predictors of nasal smear eosinophilia in non-infectious chronic rhinosinusitis are itchy nose score and Individual Total Symptom (ITS) score.

Keywords: Rhinitis, Allergy, Eosinophilia, Symptom Score. *(Accepted 1 December 2006)*

INTRODUCTION

Non-infectious chronic rhinosinusitis (NCR) is a common, yet poorly documented otolaryngological condition in developing countries. It is an inflammatory, non-infective reaction of mucosal lining of the nose and paranasal sinuses. NCR comprises seasonal rhinitis and perennial rhinitis, and includes Allergic rhinosinusitis as well as non-infectious non-allergic rhinosinusitis termed intrinsic rhinitis.

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The common symptomatology of rhinitis congestion, sneezing, nasal itching, and rhinorrhoea show significant overlap among the subtypes of NCR [1]. Clues to diagnosis of subtypes are often given by age at onset and severity of eosinophilia in nasal smear secretion. It is generally accepted that rhinitis presenting in childhood is almost invariably of allergic aetiology, and nasal eosinophilia is always associated with allergic rhinitis, while approximately a third of intrinsic rhinitis patients have nasal secretion eosinophilia [2]. Epidemiological data on NCR in West Africa is lacking. Several studies have

attempted correlating nasal smear cytology with subtypes of rhinitis [3, 4, 5], though very little is known about correlation of different symptoms with each other as well as with nasal smear eosinophilia in NCR. The present study is a preliminary report of a study undertaken to address this.

METHODOLOGY

Forty-five individuals attending the Ear, Nose & Throat Clinic of National Hospital, Abuja between May and September 2005, were recruited into the study based on the following criteria: History of excessive sneezing, nasal obstruction, clear or mucoid rhinorrhoea, and itchy nose and throat. Patients with purulent rhinorrhoea were excluded, as were patients with frontal headache, fetor naris or facial pains.

Subjects were clinically assessed using a standard protocol which encompasses detail of age, sex, duration of symptoms, seasonality, family history of allergy or atopy, medication and occupational history, provocative agents. The subjective scoring of rhinitis symptoms was done using the Numerical Analog Scale of 1 to 10, with 1 representing 'least concern' and 10 'most concern'. Score of 1 to 3 is grouped under 'mild', 4 to 6 under 'moderate', and 7 or above under 'severe' Subject then had detail ENT examination, and nasal smear taken for cytology. The nasal smear was done using the cotton wool technique and smear was taken from the inferior turbinate of each nasal cavity in all subjects.

Cytological smear was taken and fixed with alcohol. Staining was done using Haematoxylin and Eosin (H&E) stain. Eosinophilia was categorized into three: Scanty if there are less then 2 eosinophil per high power field; Moderate if there are 2 to 5 eosinophils per high power field and Clustered if there are over 5 eosinophils per high power field.

RESULTS

The age range of patients studied was 13 to 71 years (Mean 33.72 years, Std. Dev 11.516). Only three of the subjects are aged 56 years or over. There are 33 females and 12 males (ratio 3:1). The distribution of respective symptom score according to occupational group is shown in Table1.49 per cent (n=22) of patients gave family history of either atopy or allergy while 51 per cent (n=23) gave no family history. Of the group with positive family history, 44 per cent (n=20) have first degree relative with atopic eczema or asthma, 13 per cent (n=6) had family history of food or drug allergy, while 9 per cent (n=4) gave family history of asthma / eczema, as well as drug / food allergy. The group with positive allergy history score higher in all the symptoms except nasal obstruction, while the difference in the score between the two groups is highest for nasal itching (Table2). Majority of subjects in both groups experience perennial symptoms. 3 subjects from the allergy group keep pets in the home as opposed to only one subject in the non-allergy group. None of the subjects gave a history of occupational exposure to allergen.

The mean subjective symptom score are Sneezing (6.3), Rhinorrhoea (6.7), Nasal obstruction (6.2) and Nasal itching (6.1). The nasal itching score correlates positively with individual total symptom (ITS) score (obtained by a sum of the 4 scores for each subject). The sneezing score shows positive correlation with rhinorrhoea score (r = 0.51), but poor correlation with nasal obstruction score (r = 0.15).

ITS score shows negative correlation with keeping of pets (r = -0.24) and growing of flowers around subject's home (r = -0.04), but positive correlation with the number of provocative agents identified by each subject (r = 0.34).Nasal smear eosinophilia was detected in 49% (n=22) of the test subject. Table III shows correlation of nasal itching with eosinophilia.

Nasal smear eosinophilia shows negative correlation with sneezing score (r = -0.08), number of provocative agents identified (r = -0.26) and family history of food/drug allergy (r = -0.36), but positive correlation with ITS score (r = 0.03), nasal itching score (0.04), as well as family history of asthma / eczema (r = 0.10).

Clinical findings from ENT examinations include nasal mucosal pallor (62.5%, n=28), inferior turbinate hypertrophy (82.1%, n=40), rhinorrhoea (55.3%, n=25), nasal polyposis (8.9%, n=4), and periorbital fullness (2.2%, n=1).

Table1: Distribution of average symptom score according to occupational groups

Occupational Group	Number Seasonal	Number Perennial	Average Group Score Sneezing	Nasal obstruction	Rhinorrhoea	Nasal itching
Housewife	2	9	7.1	6.7	7.8	8.2
Civil servants	4	6	6.2	6.2	6	5.5
*Medical	2	2	7.25	5	6.3	5.8
Business	5	3	4.4	5.9	6	4
**Education	1	10	6.9	6.3	6.6	6

Table II. **Comparison of Symptom score, Seasonality and other parameters between subjects with personal / family history of atopy or allergy and those without.**

	Allergy Group	Non-Allergy Group
Total Number	22	23
Av. Sneezing Score	6.6	6.3
Av. Rhinorrhoea Score	6.7	6.5
Av. Nasal itching Score	6.5	5.9
Av. Nasal obstruction score	6.1	6.2
Symptoms Perennial	59% (n=13)	74% (n=17)
Symptoms Seasonal	41%	26%
Keep Pets (Dogs, Cats)	3	1
Flowers/Trees around home	9	8

Table III: **Distribution of nasal smear eosinophilia according to severity of nasal itching in patients with non-infectious chronic rhinitis.**

Severity of nasal itching	Subjects No.	%	No Eosinophilia No.	%	Eosinophilia Present Scanty	Moderate	Clusters
Mild	11	24	5	46	5	1	0
Moderate	9	20	6	67	2	0	1
Severe	25	56	9	36	7	7	4

Table IV: **Distribution of nasal smear eosinophilia among subjects with seasonal and perennial non-Infectious chronic rhinitis.**

Occurrence of Symptoms	No. of Subjects No.	%	No Eosinophilia No	%	Eosinophilia Present Scanty	Moderate	Cluster
Seasonal	15	33%	10	67%	4	1	0
Perennial	30	66%	8	27%	10	7	5

DISCUSSION

Rhinitis, defined as inflammation of the lining of the nose, characterized by one or more of the following symptoms: itching, sneezing, rhinorrhoea and nasal congestion [6]. This preliminary report highlights features of non-infectious chronic rhinitis seen at a tertiary hospital in a developing economy in sub Saharan Africa. We do not have access to skin prick test as well as CAP RAST test, hence we rely on personal or family history of allergy, as well as rhinoscopic findings to separate non-allergic from allergic NCR. This might be of advantage to our study as the few centers in the country where skin-prick tests are being done rely on reagents imported from the UK, and allergens seen in Nigeria are not same as those seen in the UK or the USA due to ecological and geographical reasons.

.However, failure to carry out skin-prick test or CAP RAST test and relying on clinical features alone may also have biased the proportion of allergic to non-allergic grouping of subjects in this study. This is because many patients with non-allergic rhinitis have no demonstrable allergy, [7, 8] and many individuals who are atopic do not present with rhinitic symptoms [9, 10]. But it has not influenced the objective of the study, which is to correlate individual symptoms with eosinophilia and with each other.

The age range of subjects in our study ranged between 13 and 71 years with majority of subjects in the 3rd and 4th decades. This is because our study focused on those older children and adults who could respond to structured questions with respect to symptom score and provocative factors. As such younger children are excluded and this might also have biased the proportion of allergic cases seen.

The distribution of subjects into vocational groups revealed that the Homemaker group has the highest average group score for all symptoms except sneezing, while the medical group has the highest group score for sneezing. The differences in average symptom score recorded in our study among these groups might be due to factors other than occupational exposure to allergens. Homemakers, who spend more time indoors, are expected to have higher exposure to house dust mites and other household allergens, while the Medical group's highest scoring of sneezing, in the absence of positive occupational history of exposure to allergens remains largely a puzzle.

About half of the subjects in our study have nasal smear eosinophils. This is similar to the figures of Lans *et al* [11] and Chanda *et al* [12]. Both of these studies were carried out on patients with allergic rhinitis. Our study however involved patients with clinical features of both allergic and non-allergic chronic non-infectious rhinitis.

Our study showed a trend towards increasing incidence of eosinophilia with severity of nasal itching and inversely as rhinorrhoea and nasal obstruction. This is in contrast with the finding of Chanda et al [12] that showed direct proportional relationship between eosinophilia and severity of nasal obstruction in allergic rhinitis subjects. In our series, the allergy group has higher severity of score for all symptoms except nasal obstruction.

We also noted eosinophilia to be more prevalent in individuals with perennial than with seasonal non-infectious chronic rhinitis. Though there is a recent trend to classify patients with allergic rhinitis into intermittent and persistent [13], Khana and Shah recently reported that patients classified as having seasonal allergic rhinitis (SAR) had intermittent disease, and those with perennial allergic rhinitis (PAR) had persistent disease [14]. In the subjects studied by Khana and Shah however, the PAR group had more significant nasal obstruction, while the SAR group had more rhinorrhoea and sneezing. Our study in contrast, demonstrated poor correlation of nasal obstruction with ITS score, but positive correlation of itchy nose with ITS score. ITS score in our study is positively correlated with the nasal smear Eosinophils.

The positive correlation of severity of sneezing with severity of rhinorrhoea in our study, however is in support of the grouping of these two symptoms together in the recent Allergic Rhinitis and Its Impact on Asthma (ARIA) workshop report which classified patients into "sneezers and runners" and "blockers" [14].

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