ORIGINAL RESEARCH PAPER

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KEY WORDS: epistaxis, atmospheric parameters, season, correlation, temperature, humidity, pressure, climate

INFLUENCE OF ATMOSPHERIC TEMPERATURE, HUMIDITY AND PRESSURE ON THE INCIDENCES OF IDIOPATHIC EPISTAXIS

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ABSTRACT

Background: Epistaxis or nose bleed is one of the most common Otorhinological emergencies we face today during our clinical practice which becomes life threatening in cases of severe bleeding. With this study we have determined the relationship between the occurrence of idiopathic epistaxis and the 3 atmospheric parameters i.e. atmospheric temperature, humidity and pressure.

Materials and methods: A one year (August 2017 to July 2018) prospective observational study was done correlating atmospheric temperature, humidity and pressure and the incidences of idiopathic epistaxis in patients visiting Department of Otorhinolaryngology, Silchar Medical College and Hospital, Assam, India. We obtained data regarding sex, age, location during presentation and associated factors. Only those patients without any known cause of epistaxis were included in this study. The exclusion criteria were patients with obvious causes for epistaxis, patients with trauma, coagulopathies, tumours and systemic causes. The climate data were obtained from the Indian Meteorological Department (IMD). The statistical analysis of the correlation between atmospheric parameter values and incidences of epistaxis was obtained through the Pearson's correlation coefficient, by establishing a value of "r".

Results: Idiopathic epistaxis is common in the fourth decade of life. There is slight male preponderance. The frequency of idiopathic epistaxis is higher during the colder months.

Conclusion: Meteorological factors play an important role in the etiopathogenesis of idiopathic epistaxis and should be considered a risk factor. Improved protection and proper humidification during the colder season could lead to a reduction in the incidence of idiopathic epistaxis.

INTRODUCTION

Epistaxis or nasal bleed is the most common Otorhinolaryngological emergency[1] that we encounter today in our clinical practice which becomes life threatening in cases of severe bleeding. It has been estimated that up to 60% of the population has had at least 1 episode of epistaxis throughout their lifetime[2]. Although a variety of factors are responsible for epistaxis, the climatic conditions are regarded as one of the important factors that influence its frequency. Previously, various studies have been done correlating atmospheric temperature, humidity and pressure with the incidences of epistaxis but the opinions are divided.[3-5] With this study we have determined the relationship between the occurrence of idiopathic epistaxis and the 3 atmospheric parameters.

Epistaxis is clinically classified as primary or idiopathic if there is no proven cause and secondary if there is a definite identifiable cause[4]. It can also be classified as

1. Childhood and adult epistaxis on the basis of age of onset.
2. Anterior or posterior[4] on the basis of site of bleeding.

Etiology of epistaxis can be broadly classified as idiopathic, local and systemic. Thorough history, physical examination and laboratory investigations are necessary for proper diagnosis.[6]

The primary aim of this study is to assess the influence of atmospheric parameters on the incidence of idiopathic epistaxis in Northeast Indian climate, particularly in the Cachar district of Assam. Secondary aims include assessing the effect of age and sex on the incidence of idiopathic epistaxis and risk stratification of our patient population that might benefit from more aggressive preventive interventions.

MATERIALS AND METHODS

Total 54 patients attending department of Otorhinolaryngology, Silchar Medical College and Hospital (SMCH) with nose bleeds were included in the study. The study period was from August 2017 to July 2018. We obtained data regarding sex, age, location during presentation and associated factors. Thorough history was taken and complete ENT examination done in the department. Only those patients without any known cause of epistaxis were included in this study. The exclusion criteria were patients with obvious causes for epistaxis, patients with trauma, coagulopathies, tumours and systemic causes. The climate data including atmospheric temperature, pressure and humidity were obtained from the Indian Meteorological Department (IMD) in the same period of the epistaxis. The daily temperature, pressure and humidity averages were recorded from which the mean monthly temperature, pressure and humidity was calculated. The patients were grouped according to their month of presentation and monthly variation of the incidence of idiopathic epistaxis was observed. The statistical analysis of the correlation between atmospheric parameter values and incidences of epistaxis was obtained through the Pearson's correlation coefficient, by establishing a value of "r" using Graphpad prism 8.0.2 software for windows.

RESULTS

A total of 54 patients qualified for our inclusion criteria and were included in our study. Out of the 54 patients, 32 patients were male (59%) and 22 were female (41%).(Figure 1) The male female ratio was 1.4:1. The age ranged from 17 to 63 years, with the highest number of cases between 40-49 years of age group.(Figure 2)

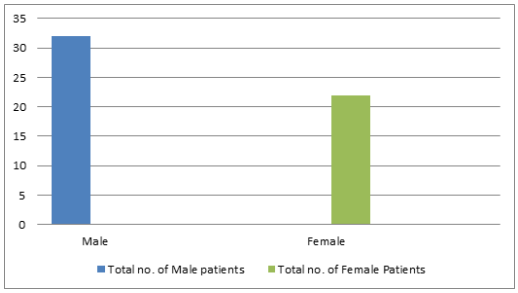

Figure 1 : Male vs female incidence. Out of the total 54 patients, 32 patients were male and 22 were female. The male: female ratio was 1.4 : 1.

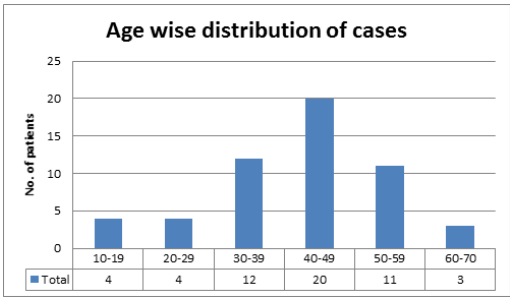

Figure 2 : Age wise distribution of cases.

Figure 3 shows that the frequency of epistaxis started rising from August 17 till January 18, and then the cases started decreasing. The maximum numbers of cases were seen during the month of January (N= 15, 27.7 %).

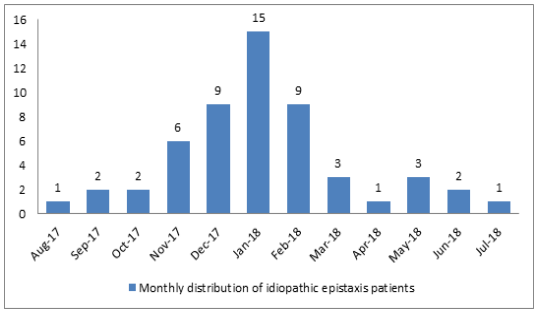

Figure 3 : Monthly distribution of cases.

Pearson's coefficient correlation (r) between idiopathic epistaxis and mean monthly temperature was found as linear correlation (r = -0.849), which shows significant negative correlation (Figure 4 & Figure 5).

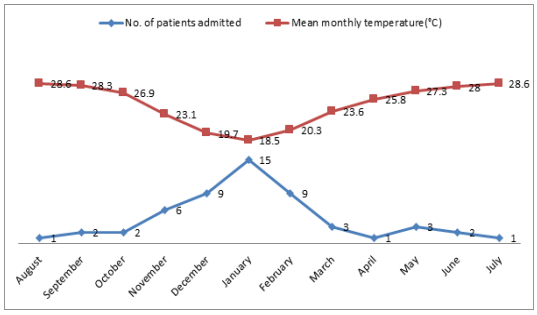

Figure 4 : Correlataion between no. of patients admitted per month and mean monthly temperature.

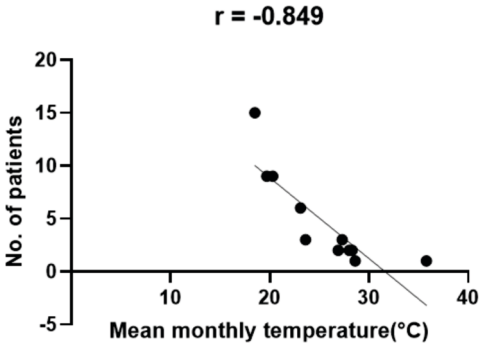

Figure 5 : Pearson coefficient r = -0.849

Similarly Pearson correlation coefficient between the idiopathic epistaxis and relative humidity was found to be r = -0.889 ; denoting near perfect negative correlation between the primary epistaxis and the relative humidity (Figure 6 & Figure 7).

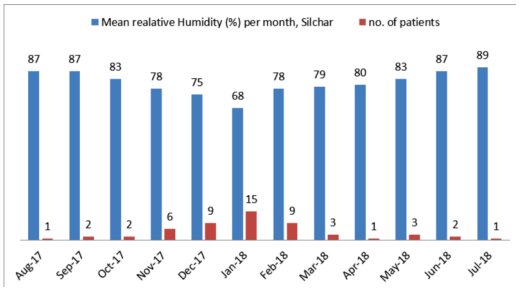

Figure 6 : Correlation between Mean relative Humidity (%) per month and number of idiopathic epistaxis cases.

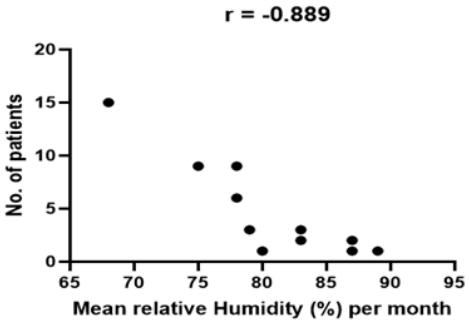

Figure 7 : Pearson coefficient r = -0.889

Lastly, Pearson correlation coefficient between the idiopathic epistaxis and mean atmospheric pressure (mbar) was found to be r = 0.741 ; denoting average positive correlation between the idiopathic epistaxis and the relative humidity (%) (Figure 8 & Figure 9)

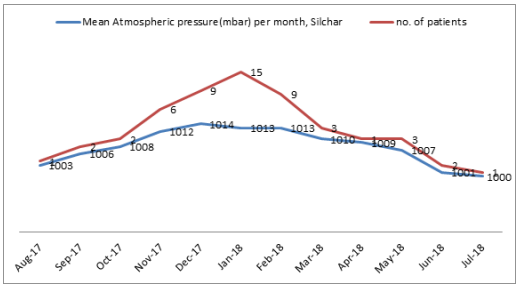

Figure 8 : Correlation between Mean Atmospheric pressure (mbar) per month and number of idiopathic epistaxis cases.

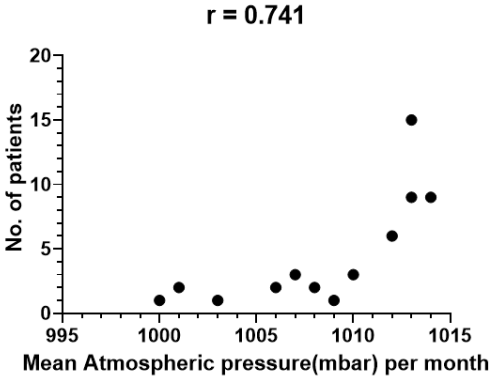

Figure 9 : Pearson coefficient r = 0.741

DISCUSSION

Epistaxis remains the most common ENT emergency[7,8]. Most cases of epistaxis have identifiable causes (secondary) but some do not (primary). Fortunately, most of the cases are of secondary epistaxis.[4] Climatic conditions seem to play a major role in the etiopathogenesis and hospital admission rate of epistaxis.[9]

In our study of 54 patients, male to female ratio of idiopathic epistaxis was 1.4:1 comprising of 32 male (59%) and 22 female (41%) patients denoting slightly higher male preponderance of idiopathic epistaxis which is consistent with other studies.[4,5,10,11]

Similar to other studies, idiopathic epistaxis in our study was more common during the 4th decade of life.[3,4]

In our study the incidence of idiopathic epistaxis was found to be more during the colder temperature which is similar to the findings of Muhammad *et al* and rijal *et al*.[3,4] The reason for this may be due to low humidity leading to dry air in cold weather. Apart from this, humans also face a difference of the temperature and humidity outside and inside of houses during winter season. This may lead to drying of the nasal mucosa, making it fragile and hyperaemic leading to crusting and nasal bleeding.[12] Some studies have also suggested that the increased frequency of epistaxis in colder temperatures may be due to forced air heating and potential increase in the frequency of URTIs (upper respiratory tract infections) during colder times [13] and decrease in coagulation in colder temperatures.[14] Adding to that Eccles suggested that colder temperatures impair nasal mucosal defences by hindering mucocilliary clearance and reducing cellular immunity.[13]

Pearson correlation coefficient was calculated between mean atmospheric temperature and the monthly incidences of idiopathic epistaxis with value of r = - 0.849 signifying strong negative correlation between temperature and the incidences of idiopathic epistaxis. Our study showed increased incidences of epistaxis in the winter months, highest during the month of January (N= 15 , 27.7%) supporting this finding. This is almost similar to previous studies where Muhammed *et al* and found value of r = -0.948.[3]

Similarly, Pearson correlation coefficient between the idiopathic epistaxis and mean atmospheric pressure (mbar) was found to be ***r*** = 0.741 ; denoting average positive correlation between the idiopathic epistaxis and the atmospheric pressure which is similar to the findings of Danielides *et al*.[5]

In our study, Pearson coefficient value of r between mean relative humidity (%) and the incidences of idiopathic epistaxis was -0.889 suggesting a stronger inverse correlation which is consistent with the findings of other studies.[3,4,15]

This might be an explanation to very less incidences (N= 3, 5.5 %) of idiopathic epistaxis during the monsoon season i.e from june 2017 to September 2018 in our study when relative humidity(%) was the highest, thus decreasing the epistaxis rates. However, in a study done by Sowerby *et al* no correlation was found for humidity when evaluating both case presentation and admission rates of epistaxis [16]

CONCLUSION

In our study idiopathic epistaxis was common in the fourth decade of life. There is slight male preponderance with male to female ratio of 1.4:1. The frequency of idiopathic epistaxis was higher during the colder months, with highest number of incidence in the month of January (N=15, 27.7 %). A very strong negative correlation was found between idiopathic epistaxis and humidity while a relatively strong negative correlation with temperature and average positive correlation was found with atmospheric pressure.

Hence, it is very much evident from this study that Meteorological factors play an important role in the etiopathogenesis of idiopathic epistaxis and should be considered a risk factor.

Improved protection and proper humidification specially during the colder season could lead to a reduction in the incidence of idiopathic epistaxis.

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