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Climatic variations and benign paroxysmal positional vertigo

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Abstract

Benign paroxysmal positional vertigo (BPPV) is probably the most common diagnosis at vertigo clinics. Seasonal cycles of several human illnesses could be attributed variously to changes in atmospheric or weather conditions. In this retrospective study, patients with BPPV from January 2010 to December 2012 were studied, and their charts were reviewed. Statistical analysis revealed a statistically significant difference in patients' numbers among different months of the year. Also there is a significant statistical correlation between the numbers of patients with climatic variations especially the temperature. The present paper discusses the possible explanations for these results which confirms the seasonal variations in BPPV, together with a review of literature to view the possible associations with other disorders that causes such seasonality.
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Keywords: Benign paroxysmal positional vertigo; Climate; Temperature; Atmospheric pressure; Humidity

1. Introduction

Benign paroxysmal positional vertigo (BPPV) is probably the most common diagnosis at vertigo clinics. It is characterized by rotational vertigo induced by head position changes. The diagnosis is confirmed by Dix–Hallpike positioning testing, or the roll test in cases of the horizontal canal variant BPPV (Furman and Cass, 1999). In 1969 Schucknecht proposed the theory of cupulolithiasis, and Hall in1979 proposed the concept of canalolithiasis to explain its pathogenesis (Schuknecht, 1969; Hall et al., 1979). Disorders affecting the peripheral vestibular system, such as vestibular neuritis or head trauma, may precede the onset of BPPV (Brandt and Steddin, 1993). However, BPPV is most commonly idiopathic and its prevalence increases with age (Bloom and Katsarkas, 1989). Seasonal cycles of several human illnesses, such as infectious diseases, stroke, and cardiovascular and respiratory diseases, could be attributed variously to changes in atmospheric or weather conditions (Bilecki et al., 2005). The clinical observation of seasonal variation in BPPV cases lead us to conduct this retrospective study to determine if it exists in our geographic locality which is a subtropical one with marked seasonal climatic variations.

2. Patients and methods

It is a retrospective study in which patients consulting the ENT clinic in the Consultation Center of Nineveh Medical College from January/2010 to December/2012 were studied and their charts were reviewed. They were all complaining of positional vertigo with the following inclusion criteria:

1 Patients with posterior canal BPPV with history of episodes of short lived positional vertigo, and positive Dix–Hallpike test.

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2 Patients with horizontal canal vertigo were also included, and these cases were diagnosed by supine roll test (Lee and Kim, 2010).

The chart review included the date of presentation, the clinical presentation, the treatment modality and the recurrence of the disease. Atypical cases of positional vertigo, when central cause cannot be ruled out or cases of positional vertigo with other vestibular problems like Meniere disease or vestibular neuritis were excluded from the study.

To decrease the bias which may result from a single clinic consultation, patients who consulted the clinic over three years period were included, and they were allocated according to the date, i.e. the month of the presentation. There were 207 patients with BPPV in whom the above criteria were fulfilled.

The climate parameters including the temperature, the atmospheric pressure and average humidity of the study period were retrieved from the calendar of the province through internet (Google) search (Climate Mosul). They were documented to correlate these events with disease occurrence.

3. Results

There were 207 patients with BPPV who consulted the Consultation ENT Clinic over 3 year's period. There were 83, 58, and 66 patients in the years 2010, 2011, and 2012 respectively. The age range was from 20 to 78 with a mean of 49.5 years. There were 67 (32.3%) males and 140 females (67.7%). Table 1 demonstrates the distribution of patients both number and percentage, presented monthly in the years of the study.

The climatic parameters that were studied in relation to BPPV were the temperature, the atmospheric pressure and the relative humidity.

Table 2 demonstrates the mean values of these parameters, the temperature in degree Celsius, the atmospheric pressure in hectopascal (hPa) and the average relative humidity as percentage in each month throughout the study period and those parameters represented the geographic area in which the study was conducted which was the patients' resident locality.

Table 1
The overall monthly patients' distribution with percentage.

Months	Overall number of patients in the years 2010, 2011& 2012 N = 207
January	21 (10.14%)
February	18 (8.69%)
March	35 (16.9%)
April	15 (7.24%)
May	18 (8.69%)
June	8 (3.86%)
July	4 (1.93%)
August	13 (6.28%)
September	25 (12%)
October	20 (9.66%)
November	13 (6.28%)
December	17 (8.21%)
p-value	0.03

Table 2
Mean values of the climate parameters during the study period (2010, 2011 & 2012).

Months	Temperature in degree Celsius (°C)	Atmospheric pressure in hectapascal (hpa)	Average relative humidity as percentage
January	9.1	1019.7	76.3%
February	9.6	1016.6	71.3%
March	13.6	1016.5	60.9%
April	19.6	1011.8	54.9%
May	25.9	1008.6	42.5%
June	32.8	1002.5	28.4%
July	36	999.2	24.4%
August	35.1	1000.7	22.4%
September	30.2	1006.4	30.3%
October	22.8	1013.6	44.7%
November	14	1018.3	60.8%
December	9.1	1020.7	72.3%

As shown in Table 2, the lowest temperatures were in December, January and February, and the highest were in June, July and August. The atmospheric pressure values were high in the cold months (January, February, November and December). These values were less in the hot months with the least value being in July. Similarly, the relative humidity was highest in the cold months with low values in the summer season.

4. Statistical analysis

To evaluate whether patients' numbers were significantly different among different months of the year, the number of patients presented monthly was compared with the assumption of equal number of patients diagnosed monthly. The comparison was analyzed by the χ^2 goodness of fit test.

A Pearson correlation test was used to study the correlation between overall numbers of patients diagnosed monthly with each climate parameter (temperature, atmospheric pressure and humidity) of each month of the year pooled from the years 2010–2012 (Table 3).

All the data had been processed by the use of statistical package SPSS ver 18 (Chicago Inc, ILL). A p-value <0.05 was considered statistically significant.

As shown in Table 1, the distribution of patients is not equal in various months of the years. The overall monthly numbers

Table 3
The statistical results of the environmental factors in relation to BPPV.

Year	Environmental condition					
	Temperature		Atmospheric pressure		Humidity	
	r	p-value	r	p-value	r	p-value
Overall	−0.495	0.01	0.52	0.01	0.42	0.06

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