



The Effect of the Phases of the Moon on Blood Pressure in Non-Hypertensive Individuals

Hipertansiyonu Olmayan Bireylerde Ay Fazlarının Kan Basıncı Üzerine Etkisi Hipertansiyon ve Ay Fazları

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Abstract / Özet

Objective: The purpose of this study was to examine the influence of lunar phases on blood pressure in non-hypertensive individuals.

Methods: A total of 158 non-hypertensive individuals were included in the study: 158 consecutive patients (72 males and 86 females, mean age 33.74±7.1). All patients underwent 24-hour ambulatory blood pressure monitoring (ABPM). The average, day, and night systolic and diastolic blood pressures were compared between groups.

Results: Ambulatory blood pressure monitoring (ABPM) was performed during four phases of the moon in non-hypertensive individuals. (New moon "38 patients," first quarter "41 patients," full moon "42 patients," last quarter "37 patients," p=nonsignificant (NS)). However, there were no significant differences in average systolic and diastolic blood pressures between groups.

Conclusion: We could not find any relationship between the phases of the moon and blood pressure.

Key Words: Hypertension, ambulatory blood pressure monitoring, lunar phases

Amaç: Bu çalışmanın amacı, hipertansiyonu olmayan bireylerde ayın fazlarının kan basıncı üzerine olan etkisini araştırmaktır.

Yöntemler: Toplam 158 hipertansiyonu olmayan birey çalışmaya dahil edildi (72 erkek and 86 kadın, ortalama yaş 33,74±7,1). Tüm hastalara 24 saatlik ambulator tansiyon holter takıldı. Gruplar arası ortalama gündüz ve gece sistolik ve diastolik kan basınçları karşılaştırıldı.

Bulgular: Kan basıncı yüksek olmayan bireylerde ayın dört fazında 24 saatlik ambulator tansiyon holter planlandı (Yeni ay "38 hasta", ilk dördün "41 hasta", dolunay "42 hasta", son dördün "37 hasta"). Fakat, gruplar arası ortalama sistolik ve diastolik kan basınçları karşılaştırıldığında anlamlı farklılık saptanmadı.

Sonuç: Çalışmamızda kan basıncı yüksek olmayan bireylerde ayın fazları ile kan basıncı arasında anlamlı bir ilişki bulamadık.

Anahtar Kelimeler: Hipertansiyon, ambulator kan basıncı monitorizasyonu, ayın fazları

Introduction

Hypertension remains the world's leading public health problem due to its risks, cardiovascular and renal complications, and medical costs. Hypertension management includes lifestyle changes, medications, and non-drug therapeutic approaches (1). Also, it has been suggested that chronic exposure to psychological stress can lead to hypertension development, and the efficacy of behavioral treatments for hypertension has been reported (2). The lunar cycle's influence on human behavior has been investigated with scientific studies. Among those studies that have found a relationship between lunar cycle and human behavior (3, 4). Also, it has been reported that there is increased incidence of acute coronary events associated with new moon days (5). Several reports have been published that focus on the moon's influence on suicide, psychiatric crises, birth rates, survival of breast cancer patients, and abdominal aortic aneurysm rupture (6-8).

Seasonal influence on blood pressure in elderly normotensive subjects has been investigated (9), but the lunar effect on blood pressure has not been investigated in non-hypertensive individuals previously. The purpose of this study was to examine the influence of lunar phases on blood pressure in non-hypertensive individuals.

Methods

A retrospective cohort analysis of 711 consecutive 24-hour ambulatory blood pressure monitoring (ABPM) reports was evaluated between June 2011 to February 2012. The study was conducted in Istanbul, Türkiye. Healthy subjects under 40 years old were included in the study. A total of 158 non-hypertensive individuals were included in the study: 72 males and 86 females, mean age 33.74±7.1 (Figure 1). All patients underwent 24-hour ABPM. In the analyses, 4 groups according to phases of the moon were composed as first quarter, new moon, full moon, and last quarter. The average, day, and night systolic and diastolic blood pressures were compared between groups. The study was conducted in accordance with the Declaration of Helsinki and approved by local institutional ethics committee. All patients signed the informed consent form.

Statistical analysis

The statistical analyses were performed using software (SPSS 15.0, SPSS Inc, Chicago, USA). The Kolmogorov-Smirnov test was used to evaluate whether the variables were normally distributed. The

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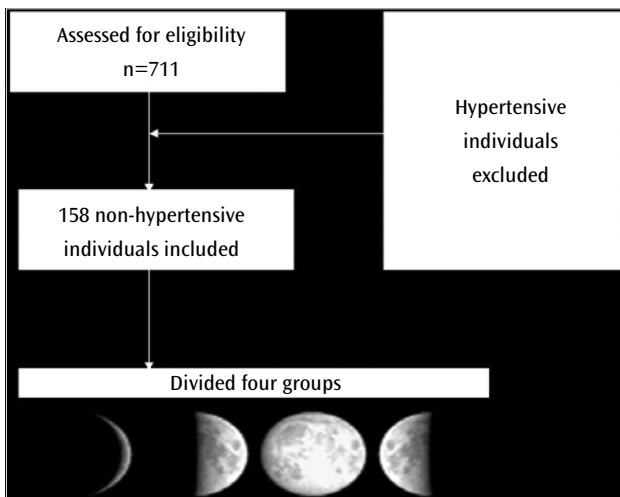
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Table 1. The 24 h average, day and night systolic and diastolic blood pressures between groups

	First quarter (n=41)	New moon (n=38)	Full moon (n=42)	Last quarter (n=37)	p
24 h average systolic BP	131.68±12.70	131.93±14.05	127.18±15.27	127.20±15.29	NS
24 h average diastolic BP	84.38±11.31	84.75±12.73	80.68±12.56	81.51±11.92	NS
Average systolic BP during day	133.84±12.72	134.37±13.65	129.44±16.26	129.92±16.26	NS
Average diastolic BP during day	86.75±11.13	87.36±12.57	83.07±12.74	84.30±13.16	NS
Average systolic BP during night	123.82±14.32	124.72±16.99	120.28±14.92	119.22±15.91	NS
Average diastolic BP during night	75.57±12.43	76.89±14.62	73.24±12.55	73.55±12.22	NS

BP: blood pressure, h: hour, NS: nonsignificant

**Figure 1.** Algorithm for patient inclusion and exclusion

continuous variables were presented as mean±SD. The student t-test and chi-square test were used for comparisons of normally distributed continuous variables and categorical variables in two groups. A p value <0.05 was considered statistically significant.

Results

Ambulatory blood pressure monitoring was performed during four phases of the moon in non-hypertensive individuals (New moon "38 patients," first quarter "41 patients," full moon "42 patients," last quarter "37 patients," p=NS). Average systolic blood pressure values during the new moon, first quarter, full moon, and last quarter were 131.93±14.05, 131.68±12.70, 127.18±15.27, and 127.20±15.29, respectively (p=0.258). Average diastolic blood pressure values during the new moon, first quarter, full moon, and last quarter were 84.75±12.73, 84.38±11.31, 80.68±12.56, and 81.51±11.92, respectively (p=0.342). However, there were no significant differences in average day and night blood pressures between groups. Some of the results are shown in Table 1.

Discussion

Circadian variations in the incidence of coronary events and hypertension are well known (10). The association between systolic blood pressure and season and indoor and outdoor temperature has also been investigated (11). Effects of lunar cycles on various medical illnesses, like psychiatric disturbances and seizures, are

documented (12). However, the effect of lunar cycles on blood pressure has not been documented yet.

The sun and the moon may control our biological clock. It has been shown that the circadian variation of acute myocardial infarction is the result of an increase in the incidence of plaque rupture during the morning hours (13). It has even been suggested that the gravitation of the moon may have an influence on the occurrence of acute myocardial infarction (14). But, the potential effects of lunar phases on the occurrence of myocardial infarction are still controversial. A recent study did not reveal any apparent association of moon phases with acute myocardial infarction occurrence (15). Environmental conditions are thought to be related to the risk of developing cardiac diseases, but the underlying mechanisms have not been very well understood. Seasonal variation, temperature, and air pollution have been associated with changes in blood pressure and emergency department visits for hypertension (16-18).

The purpose of this study was to examine the influence of the lunar phases on blood pressure in non-hypertensive individuals. To our knowledge, this is the first study to estimate the effects of lunar phases on blood pressure in non-hypertensive individuals. The present study fails to find a significant association between lunar phases and blood pressure. There were no significant differences in average diastolic and systolic blood pressures between groups during the day and night. However, we did not include patients with high blood pressure in our study, and this study was performed in middle-aged patients. The lunar phases on blood pressure in non-hypertensive elderly individuals have not been investigated.

The moon does have a gravitational effect upon the ocean tides; the idea that it might also affect the human body is unlikely. We could not find any relationship between the phases of the moon and blood pressure in non-hypertensive individuals.

Changes in blood pressure should be compared within the same subjects. We have compared different subjects. The comparatively low number of individuals included in the study might not allow such a detailed analysis.

Conclusion

We could not find any relationship between blood pressure and lunar phases; however, a comparison among the same subjects is needed.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bezmialem Vakıf University (2012).

Informed Consent: Written informed consent was not obtained due to the retrospective nature of this study.

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