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Analysis of Patients Applying to the Emergency Department with Subarachnoid Hemorrhage and Relationship Seasonal Variation

Acil Servise Başvuran Subaraknoid Kanamalı Hastaların Analizi ve Mevsimsel Değişimlerle İlişkisi

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Abstract

Objective: In this study, it was aimed to investigate epidemiological and clinical features and the seasonal changes in patients with subarachniod hemorrhage (SAH).

Material and Methods: The history of 67 patients applying to the emergency department with primary SAH for 2 yearswas investigated retrospectively. Symptoms causing application; hour, month and season of application; accompaying diseases, screening methods, and vital findings of each patient were recorded.

Results: Of 67 patients, 41 were men and 26 were female. The most frequent symptoms on admission were headache and confusion (41.1%). Among thedisorders accompanying SAH, hypertention ranked the first (35.81%). While 30 of all cases applied between 06 and 12 o'clock ($p<0.05$), the highest application rates were in Autumun with 24 cases ($p>0.05$). Brain CT was within normal limits in 6 patients, and cerebrospinal fluid readings were hemorrhagic in all patients on performing lumbar puncture.

Conclusion: We did not find any significant statistical relation between seasonal variation and SAH. We found a significant statistical relation between morning hours and SAH. SAH is a serious condition with high mortality. Early screening is signicant during the first 24-hour period. The regulation of BP, especially in patients with hypertension, is very important. In patients applying to emergency departments with the complaints of severe headache and confusion, SAH should be taken into cosideration. *(JAEM 2012; 11: 11-4)*

Key words: Subarachnoid hemorrhage, primary, epidemiologic, seasonal, clinical

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Özet

Amaç: Bu çalışmada subrakanoid kanama ile başvuran hastaların epidemiyolojik, klinik özellikleri ve kanamanın mevsimsel değişimi incelenmeye çalışıldı.

Gereç ve Yöntemler: Acil servise 2 yıllık süre içinde primer SAK ile başvuran 67 hastanın dosyaları retrospektif olarak incelendi. Her hastanın başvuru şikayeti, başvuru (saati, ayı, mevsimi) eşlik eden hastalıklar, görüntüleme yöntemi, hastanın vital bulguları kaydedildi.

Bulgular: Altmış Yedi hastanın 41'i erkek, 26'sı bayandı. Baş ağrısı ve bilinç bozukluğu başvuru anındaki en sık semptomlardı (%41.1). SAK ile birlikte bulunan patolojiler arasında hipertansiyon (%35.81) ilk sırada yer almaktaydı. Vakaların 30'u saat 06-12 arasında başvururken ($p<0.05$), 24 vaka ile en çok sonbaharda başvuru oldu ($p>0.05$). Altı hastanın beyin tomografisi normaldi, bu hastalara yapılan lomber ponksiyonda BOS hepsinde hemorajikti.

Sonuç: SAK ile mevsimsel ilişki arasında herhangi bir istatiksel anlamlılık bulunamadı.Kanamanın sirkadeyn özelik gösterdiği özellikle sabah ve öğle saatleri arasındaki sürede vakaların yüksek oranda olduğu istatiksel olarak saptandı. SAK yüksek mortalite seyreden ciddi bir hastalıktır. Erken görüntüleme ilk 24 saat içinde önemlidir. Özellikle hipertansif hastalığı olan hastaların tansiyon regülasyonu önemlidir. Acil servise şiddetli baş ağrısı ve bilinç bozukluğu ile başvuran hastalarda SAK akılda bulundurulmalıdır. *(JAEM 2012; 11: 11-4)*

Anahtar kelimeler: Subaraknoid kanama, primer, epidemiyolojik, mevsimsel, klinik

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Introduction

Subarachnoid hemorrhage (SAH) is a neurologic emergency and often a neurologic catastrophe. Spontaneous subarachnoid hemorrhage is characterized by the extravasation of blood into the spaces covering the central nervous system. The leading cause of SAH is rupture of an intracranial aneurysm, which accounts for about 80-85% of cases. Mortality and morbidity can be reduced if SAH is treated urgently. A sudden, explosive headache is a cardinal but nonspecific feature in the diagnosis of SAH. Computered tomography (CT) scanning is mandatory in all patients with symptoms that are suggestive of SAH (1). The case fatality after aneurysmal haemorrhage is 50%; one in eight patients with subarachnoid haemorrhage dies outside hospital (2). Interest in the relationship between SAH

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and meteorological conditions has been revived in recent years (3). No statistically significant seasonal variations were observed in some studies. A number of uncertain findings lead to the idea that the frequency of hemorrhage is higher in Spring and Autumn (4). We studied temporal variability in the occurrence of SAH, taking into account possible differences due to etiology, age, sex, and certain major risk factors.

Material and Methods

The clinical records of 67 consecutive patients with SAH admitted to our emergency department for 2 years were reviewed retrospectively. Subarachnoid haemorrhage refers to the spontaneous haemorrhage in the basal cisterns. We evaluated age, sex, admission time and admission season, clinical situation on admission, SAH with the other pathologies, Glasgow coma score, radiological data and diagnosis techniques.

The diagnosis of SAH was based on computerised tomography (CT) and lumbar puncture (LP). Traumatic SAH was excluded.

Statistical analysis was performed to assess distributions of SAH occurrence by month, season and admisson hours using the chi-square test. Values of $p<0.05$ were considered significant.

Results

Sixty-seven patients with SAH were evaluated. 41 patients with SAH were male and 26 patients with SAH were female. The average age for males was 51.31 years (26-70) and the average age for females was 55.84 (23-80) and a the average overall patient age was 53.57 (23-80) (Table 1).

Symptoms for SAH were; headache 41.1% (37 patients), loss of consciousness 41.1% (37 patients), vomiting and nausea 24.4% (22 patients), speech disorders 4.4% (4 patients), hemiparesia 3.3% (3 patients). Average of GCS was 11,6. Other pathologies together with SAH were hypertension 35.82% (24 patients), diabetes mellitus (DM) 4.47% (3 patients), migraine 2.9% (2 patients), atherosclerotic heart disease (ASHD) 2.9% (2 patients), psychosis 2.9% (2 patients), pneumoconiosis 1.49% (1 patient), hyperlipidemia 1.49% (1 patient), epilepsy 1.49% (1 patient), operated aneurysm 1.49% (1 patients), operated tumor 1.49% (1 patient) (Table 2).

The occurrence of SAH according to month showed a peak in May and a decline in September-December for all cases (Figure 1). There was no significant monthly variation in admission of SAH ($p>0.05$).

Numbers of admitted patients with SAH at different seasons were Winter: 16 ($p>0.05$), Autumn: 24 ($p>0.05$), Summer: 13 ($p>0.05$), Spring 14 ($p>0.05$) (Figure 2). The peak ratio of SAH according to season was in Autumn and the nadir was in Summer. In this study period, on there was no significant seasonal variation in the admission of SAH.

The SAH patient admission times were 30 patients between 06:00-12:00 ($p<0.05$), 17 cases 12:00-18:00 ($p>0.05$), 13 cases 18:00-

Table 1. All patients' results

General results of our cases Our cases generrally results	value
PSAH with patients	67
Male patients with SAH	41
Female patients with SAH	26
Male/Female ratio SAH	1.57
Average age of all patients	53.27
Average age of male patients	51.31
Average age of female patients	55.84
Average of GCS	11.6
Diagnosis with CT	91.50%
Diagnosis with LP	8.50%
Angio Performed patients	38
Mortality rate	23.40%

Table 2. Percentage of SAH with other pathologies

SAH with other pathologies	%
Hypertension	35.82
Diabetes Mellitus	4.47
Migraine	2.9
ASHD	2.9
PsycosisPsychosis	2.9
Pneumoconiosis	1.49
Hyperlipidemia	1.49
Epilepsy	1.49
Operated aneurysm	1.49
Operated hypophsis tumor	1.49

ASHD: Atherosclerotic heart disease

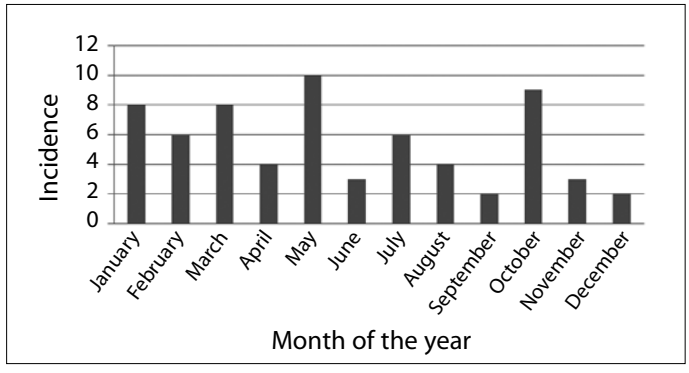

Figure 1. Number of patients with SAH in each month

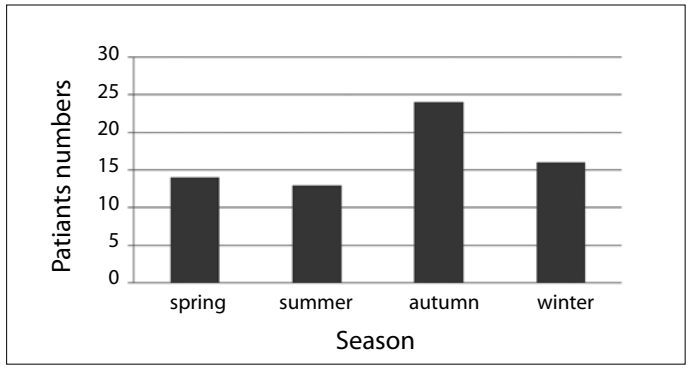

Figure 2. Seasonal variation of the incidence SAH

24:00 (p>0.05) and 7 cases 24:00-06:00 (p>0.05). The circadian distribution of onset of SAH in the total population showed maximal occurrence in the morning hours (06:00-12:00), a secondary peak in the evening (12:00-18:00), and minimal occurrence at night (24:00-06:00). There was a statistically significant peak in the morning hours.

The numbers of SAH with hypertension patients were 58.9% (10 patients) male and 57.5% (14 patients) female.

Diagnosis of SAH; CT was used for all of the patients. However, the CTs os 6 patients were negative. The diagnosis of CT negative patients was made with lumbar puncture. Lumbar puncture was hemorrhagic in all patients.

Angiography was performed in 38 patients. 57.39% aneurysm, 2.6% AVM and 39.4% nonvascular pathology were observed.

The overall mortality rate in this study was 23.40%, but there was no mortality in the first 24 hours.

Discussion

The estimated incidence of SAH is 8-10 cases per 100 000 persons per year. SAH occurs most frequently in individuals between the ages of 55 and 60 yrs. Although the risk of a cerebro-vascular disease increases depending on the age increase, its effect in SAH appears at younger ages (5). It has been found that SAH might appear in every sex, male or female. However, it has also been observed in a number of epidemiological studies that the rate of incidence in female patients is higher than in male patients (6, 7). In this study, the age and sex distribution of our cases is consistent with the literature SAH is usually accompanied by a combination of characteristic symptoms i.e. sudden onset of severe headache, meningism, transient or persistent loss of consciousness, epileptic seizures, and focal neurological deficits (8). In a study conducted by Strinska-Kusiowa et al. (9) the symptom which most frequently appears is reported to be headache along with such symptoms as dizziness, focal neurological deficit and blurred vision. In the results of this study, ratio of headache and consciousness were revealed to be the same (41.7%).

Subarachnoid haemorrhage is diagnosed by demonstrating blood in the cerebrospinal fluid by means of a CT brain scan or lumbar puncture. All patients with suspected subarachnoid haemorrhage should be referred for an immediate CT brain scan.On day 1, CT scanning detects subarachnoid haemorrhage in 93-98% of patients (10). In this study, the CT findings of our patients at the time of admission were consistent with SAH 91.5%.

Lumbar puncture has been advocated in approximately 5% of patients with suspected SAH but normal CT (8). In a study of 70 patients retrospectively carried out by Berstad et al. (11) it was reported that BT in 64 out of 70 patients was positive (91%) and hemorrhage was found in the LP of the six patients whose CT was negative. While SAH finding was observed in BT of 91.5% of our patients, six patients with negative CT were subjected to LP with a hemorrhage observation in all of them.

Ruptured intracranial aneurysms may account for 5-15% of strokes. Approximately three quarters of spontaneous episodes of SAH are caused by ruptured cerebral aneurysms. The cause of another 20% of those episodes is unknown, with roughly half of these being idiopathic or non-aneurysmal, perimesencephalic SAH. The remaining episodes are caused by various rare disorders such as arterio-venous malformations of the brain and spine, arterial dissections, vasculitis, and tumor (8).

In a study of 95 patients with SAH by Biller et al, it was reported that aneurysm was present in 75 patients, 2 patients AVM, one patient amphetamine arteritis, 1 patient leptomeningial melanoma and the etiology in 16 patients was not found (6). In this study, it was found that out of 38 patients with angiography reports, aneurysm was found in 22, AVM in 1 and the etiology of the disease in 15 patients was not found

Previous studies have yielded inconsistent results for seasonal variations in the occurrence in SAH in various countries. No statistically significant seasonal variations were observed in some studies (4). A number of uncertain findings lead to the the idea that the frequency of hemorrhage is higher in Spring and Autumn (12). In a study by Cowperthwaite et al. (13), it is reported that neither season nor weather significantly influences the incidence of SAH. In our study, there was no seasoneal pattern in the admission pattern of SAH.

Vermeer et al. (14) reported that in their series, the risk of aneurysm rupture was lower at night. These investigators showed that the onset actually peaked in the morning between 8 am and 12 noon. The morning peak was further confirmed by studies in Düsseldorf and Tokyo (15). In our study, we obtained similar results, with a high incidence in the morning between 6 am and 12 noon. SAH occurence between 06:00 and 12:00 hours was significantly higher than in the other periods (p<0.005). Altogether, it seems possible to speculate that the circadian pattern of SAH onset results from a variable combination of temporal patterns of various pathophysiological mechanisms. Usually, the morning and evening hours coincide with peak activation of these mechanisms, whereas the nocturnal hours are times of lowest risk (16).

There were several limitations to the study. We only included hospitalised patients with acute SAH, as they yielded more reliable data for our analysis. Our sample size was limited as this was a single-centre local study.

Conclusion

Diagnosis and management of SAH can be challenging in the emergency department. Emergency Physcians should be involved early in the management of SAH. When an unenhanced computed tomogram of the brain is normal, specialist advice should be sought about subsequent lumbar puncture. We did not find any significant statistical relation between seasonal variation and SAH. We found a significant statistical relation between morning hours and SAH.

The risk of SAH is high during the morning and low during the night. This circadian fluctuation can be parallel to blood pressure and various pathophysiological mechanisms.

Conflict of Interest

No conflict of interest was declared by the authors.

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