Research Article / Araştırma Makalesi

Evaluation of the Relationship between Total Vertebral Artery Flow and Quality of Life in Patients with Vertebrobasilar Insufficiency

Vertebrobaziler Yetmezliği Olan Hastalarda Toplam Vertebral Arter Debisi ile Yaşam Kalitesi Arasındaki İlişkinin Değerlendirilmesi

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Abstract

Background: Vertebrabasilar insufficiency is a common problem in the community and causes limitation in daily physical activities of patients. A questionnaire called the dizziness disability inventory is used to show the change in the quality of life of the patients. In our study, we wanted to show the change in quality of life indexes of patients with vertebrabasilar insufficiency depending on the degree of insufficiency.
Materials and Methods: Dizziness disability inventory was filled in patients diagnosed with vertebrabasilar insufficiency by Doppler ultrasonography and the relationship between the degree of vertebrabasilar insufficiency and the results of the questionnaire was investigated.
Results: A statistically significant difference was found between the groups according to the mean questionnaire results in patients classified as mild, moderate and severe according to their vertebrabasilar insufficiency. The mean questionnaire scores of those with severe vertebrabasilar impairment were significantly higher than those with moderate and mild impairment, but no significant difference was found between those with moderate and mild impairment. There was no significant difference in mean questionnaire scores between gender, treatment intake and duration of complaints. It was found that there was a significant decrease in total vertebral artery output depending on age.
Conclusions: In patients with vertebrabasilar insufficiency, restriction in activities of daily living, deterioration in quality of life are observed. It should be noted that the decrease in the quality of life index of the patients will be higher according to the severity of the vertebrabasilar insufficiency.

Key Words: Vertebrobasilar insuffiency, Dizzines, Patient Health Questionnaire

Öz

Amaç: Vertebrobaziler yetmezlik, toplumda sık karşılaşılan bir problem olup hastaların günlük fiziksel aktivitelerinde kısıtlanmaya yol açmaktadır. Hastaların hayat kalitesindeki değişimi göstermek için baş dönmesi engellik envanteri adlı anket kullanılmaktadır. Çalışmada vertebrobaziler yetmezliği olan hastaların yetmezlik derecesine bağlı olarak hayat kalite indekslerindeki değişimi göstermek istendi.
Materyal ve Metod: Dopler ultrasonografi ile vertebrobaziler yetmezlik tanısı alan hastalara baş dönmesi engellilik envanteri dolduruldu ve vertebrobaziler yetmezlik derecesi ile anket sonuçları arasındaki ilişki araştırıldı. Ankette baş dönmesi engellilik envanterinin yanı sıra cinsiyet, yaş, hastanın halihazırda şikayetleri ile ilgili bir tedavi alıp almadığı ve şikayetlerinin süresi soruldu.
Bulgular: Vertebrobaziler yetmezlik derecelerine göre hafif, orta ve ağır olarak sınıflandırılan hastalarda ortalama anket sonuçlarına göre gruplar arasında istatiksel olarak anlamlı fark saptanmıştır. Ağır vertebrobaziler yetmezliği olanların ortalama anket skorları, orta ve hafif olanlardan anlamlı olarak yüksek çıkmıştır; ancak orta ve hafif yetmezliği olanlar arasında anlamlı fark saptanmamıştır. Ortalama anket skorlarında cinsiyet, tedavi alımı ve şikâyet süresi arasında anlamlı fark saptanmamıştır. Yaşa bağlı olarak toplam vertebral arter debisinde anlamlı düşüş saptanmıştır.
Sonuç: Vertebrobaziler yetmezliği olan hastalarda günlük yaşam aktivitelerinde kısıtlanma, düşme korkusu, anksiyete ve depresyonda artış ve yaşam kalitesinde bozulma görülmektedir. Vertebrobaziler yetmezliğin şiddetine göre hastaların yaşam kalite indeksindeki düşüşün daha fazla olacağı unutulmamalıdır.

Anahtar Kelimeler: Vertebrobaziler Yetmezlik, Baş dönmesi, Hasta Sağlığı Anketi

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Received / Geliş tarihi: 11.02.2024

Accepted / Kabul tarihi: 03.04.2024

DOI: 10.35440/hutfd.1435128

Introduction

Vertebrobasilar insufficiency (VBI) is a common problem in society (1). It is seen in approximately 30% of the elderly living in the community and its prevalence increases with age (2). In patients with vertebrobasilar insufficiency, restriction in activities of daily living, fear of falling, increase in anxiety and depression, and deterioration in quality of life increase the risk of falling (3,4). Vertebrobasilar arteries supply the cerebellum, medulla, midbrain, and occipital cortex. VBI may occur due to intrinsic causes such as embolism, atherosclerosis, arterial dissection, or extrinsic causes such as osteophyte compression and tendinous bands, resulting in changes in vertebral artery hemodynamics (5). However, the findings and neurological symptoms vary according to the brain region caused by the ischemic changes. In the diagnosis of patients with VBI, diagnostic tests and imaging methods are needed together with the symptoms and physical examination of the patients (6).

Conventional angiography is the main diagnostic method in detecting pathologies in the vertebrobasilar system, but the information it provides on vascular hemodynamics is insufficient. It is also a difficult and invasive examination (7). Color Doppler US (RDUS) is preferred in the examination of vertebral arteries (VA) due to its easy application, short examination time, non-invasiveness and valuable information about vascular hemodynamics. However, it has a disadvantage that it is user-dependent (8). MR angiography (MRA) has become an important alternative in the evaluation of vascular pathologies in recent years (9,10). It is stated that it provides valuable information as conventional angiography, especially in examining neck vessel (10).

The Dizziness Disability Inventory (DDI) was used to determine the change in the quality of life of patients diagnosed with VBI. DDI was developed by Jacobson in 1990. DDI consists of 25 questions in total, and the questions determine the factors that aggravate balance disorder and dizziness, as well as the sensory and functional consequences of vestibular system diseases (11). The Turkish validity and reliability study of the inventory was performed by Canbal et al. made by (12).

In this study, the relationship between DDI questionnaire score and vertebral artery volume of patients with VBI was tried to be determined.

Materials and Methods

Patients who filled out the Informed Consent Statement were included in the study. Between 01.09.2023 and 15.12.2023, 78 patients, 36 male (46%), 42 female (54%), who applied for vertebral Doppler US examination from the Neurology and otorhinolaryngology polyclinic to the Radiology Clinic with a preliminary diagnosis of VBI, were prospectively evaluated. The age of the patients was between 18 and 68 years. RDUS examination was performed from the C4 and C5 intertransverse segment at an angle of less than 60 degrees using a Voluson 8 Doppler US device (General Electric Yokogawa Medical, Tokyo-Japan) and a standard 10-MHz linear transducer, in the supine position after the patient had rested for 15 minutes. Vessel volume measurements were calculated automatically by the device after vessel diameter measurements were made (Figure 1).

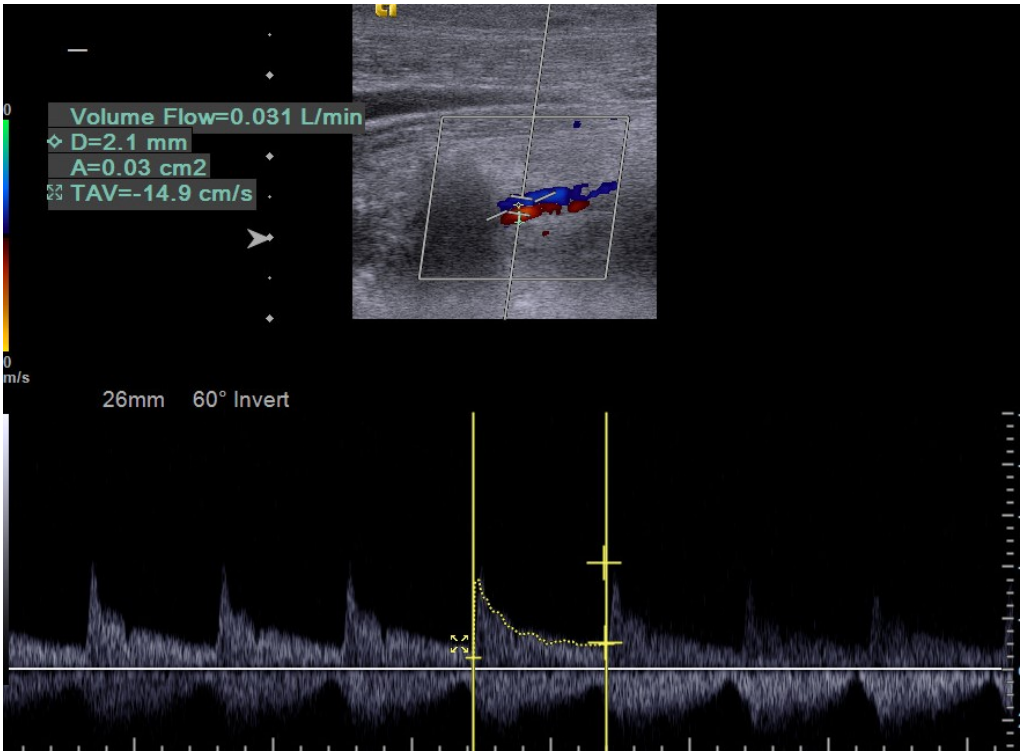

Figure 1. Colour doppler ultrasound examination image of the vertebral artery. The right vertebral artery was hypoplasic with a diameter of 2.1 mm and a flow rate of 0.031 lt/min, which was less than normal.

Obtaining 3 consecutive similar waveforms was considered as the correct spectrum. Peak systolic flow velocity, end-diastolic flow velocity, blood flow volume (ml/min) and vessel diameter of each vessel were calculated automatically. Net VA flow volume was calculated by summing the right and left VA flow volumes. Patients were divided into three groups according to VA flow volume. Group 1; Of the patients with severe decrease in VA flow volume (<120 mL/min), group 2; Among the patients with moderate decrease in VA flow volume (120–150 mL/min), group 3; It consists of patients with a slight decrease in VA flow volume (150-200 mL/min).

Ethics committee approval with numbered 23.15.35 was obtained from Harran University Ethics Committee for our study. In our study, the principles of the Declaration of Helsinki were complied with. The criteria of not having any accompanying mental health problems were sought in the patients. In addition, those who could understand and speak Turkish and were able to do daily living activities independently were included in the study. Before the inventory was given to the patients who applied with the complaint of dizziness, they were informed about the study and their consent was obtained. It took about ten minutes to fill the inventory.

Data Collection Tools

Semi-Structured Interview Form

It includes information about the sociodemographic characteristics of the patients, the reason for admission and the medical diagnosis. The patient was asked about his age, gender, duration of the complaint and whether he received any treatment for his disease.

Dizziness Disability Inventory

The DDI consists of 25 items that determine the factors that aggravate the dizziness and balance disorder of the patients, as well as the sensory and functional results in vestibular system diseases. Sub-inventories are intended to determine the physical, sensory and functional effects of vestibular system diseases. Each question consists of yes (4 points), no (0 points), and sometimes (2) answers. In the scoring of the subunits of the inventory, 28 points were suggested as the limit for determining physical disability and 36 points as functional and sensory disability. High scores are interpreted as the patient's complaint of vertigo prevents her further life.

Statistical analysis

Data are given as mean, standard deviation, or numbers and percentages. Normality test was done with Kolmogorov Smirnov Z test. One-way analysis of variance was used to compare the groups. Multiple comparisons were made with the Bonferroni test. P values < 0.05 were considered statistically significant.

Results

Our study included 36 male (46%) and 42 female (54%) patients. The age range of the patients is 18-68.

When patients were classified according to total vertebral artery flow; Group 1 (total flow 120 ml/sn and below) a total of 22 people and the average of the questionnaire 63.45, Group 2 (total vertebral artery flow between 120 ml/sn and 150 ml/sn) a total of 29 people and the average of the questionnaire 54 and Group 3 (total vertebral artery flow 150 ml/sn and above) a total of 27 people and the average of the questionnaire was found to be 52.1 (Table 1). There was a significant statistical difference between the questionnaire scores between group 1 and group 2 and between group 1 and group 3 (Respectively; *p=0.025*, *p=0.006*). There was no statistically significant difference between group 2 and group 3 (*p=0.7*).

Table 1. Questionnaire score averages in groups separated according to total vertebral artery flow.

	n	Median score	Sd±	Mann-Whitney U test
Group 1	22	63.45	10.925	Group 1: *p=0.025*
Group 2	29	54.1	11.767	Group 2: *p=0.025*
Group 3	27	52.15	13.586	Group 3: *p=0.006*
Total	78	56.06	12.948	

n: Count; Sd : Standart Deviation

When the relationship between mean questionnaire scores and genders was evaluated, no statistically significant difference was found (59;58) (*p=0.78*).

In our study, patients were asked whether they were currently receiving any treatment for their existing complaints. The total number of people who received treatment was 43 and the total number of people who did not receive treatment was 35. No statistically significant difference was found between the questionnaire scores of the patients who received and did not receive treatment (55.2; 57) (*p=0.7*).In our questionnaire, the patients were asked about the duration of their complaints, and the patients were divided into four groups according to the duration of their complaints as days, weeks, months and years. There was no statistically significant result between survey scores and duration of complaints. The average survey score of 22 people who stated the duration of the complaint in days was 55; The average survey score of 15 people who stated that as weeks was 57.2; The mean survey score of 23 people who stated months was 53.2, and the mean survey score of 18 people who stated years was 58.79, and no statistically significant difference was found (*p=0.45*).

Discussion

Symptoms of vertebrobasilar insufficiency are nonspecific and subjective. They are more vague than symptoms resulting from pathologies in the carotid artery system and it is difficult to establish a reliable connection between the findings and the lesion present (6). Clinically, symptoms such as vertigo, dysarthria and sometimes ataxia and hemiparesis are frequently present. However, neurological symptoms and signs vary according to the brain region where ischemic changes occur. The methods used to diagnose vertebrobasilar insufficiency also have various limitations. For these reasons, the diagnosis of 'vertebrobasilar insufficiency' is difficult for the clinician. The development of the Doppler ultrasonography method and the information provided by this method are useful in terms of determining the limits of vertebrobasilar system diseases (13-14).

Due to dizziness, patients need medical treatment, and they lose their daily activities and work (14). Different etiologies that may cause dizziness need to be distinguished. Diagnosis, treatment and follow-up of patients with dizziness require special care and information. When dizziness is seen together with many diseases, the effect of the disease on the patient may differ (15). Patients with vertigo present in four different ways: drowsiness, presyncope, vertigo and imbalance complaints. Regardless of its etiology and characteristics, its effect on the daily lives of patients is very important (16).

VBI is a common problem especially in the elderly population (17). Doppler US plays an important role in the diagnosis of patients presenting with nonspecific symptoms of transient cerebral ischemia such as blurred vision, vertigo, syncope or weakness in the extremities. In our study, it was concluded that the questionnaire scores increased as the age increased. Yazici et al. they observed a decrease in VA flow volume with advancing age (18). Seidel et al. on the other hand, while a decrease was observed in the carotid artery flow volume with increasing age, they did not observe a decrease in the vertebral artery volume (19). Ozdemir et al. determined that there was a decrease in peak systolic flow velocity and flow volume as age progressed in the population (20).

In our study, it was found that as the total vertebral artery flow rate decreased, there was an increase in complaints and the questionnaire scores increased. Acar et al. observed that VBI symptoms occur in patients with a vertebral artery flow volume below 200 ml/min (21). Bendick et al. they stated that the vertebral artery flow volumes in patients with VBI were below 200 ml/min (22). Acar et al. observed that mean vertebral artery flow velocity and flow volumes were significantly lower in severely suppressed patients than in moderately suppressed patients (23).

No statistically significant difference was found between the mean questionnaire scores of the patients participating in our study, including gender, duration of complaints, and whether they received treatment. When we look at the literature, although there are sources stating that VBI is more common in males, the relationship between the results of the dizziness disability inventory and gender has not been reported (11,24).

Objectively measuring how dizziness is perceived by patients is important in patient follow-ups in all age groups, especially in elderly individuals. The Dizziness Disability Inventory can be used to determine the effects of dizziness on quality of life. The inability to completely eliminate other factors in the etiology of dizziness and the presence of personal factors are the limitations of our study. In the future, studies in which other factors are questioned with more patient participation may yield more objective results.

Conclusion

Doppler US is an important tool in the diagnosis of vertebrobasilar insufficiency and should be used to guide correct treatment. If there are symptoms suggestive of vertebrobasilar ischaemia, posterior system ischaemia should be considered even with these vague findings. In patients with a history of dizziness, there is an increased risk of falling with fear of falling, limitation in activities of daily living, increase in anxiety and depression, deterioration in quality of life. The Dizziness Disability Inventory is a fast and easy inventory that can be used to determine the effectiveness of the treatment received by the patients, to monitor the patient and to monitor the improvements in the quality of life.

Ethical Approval: Ethics committee approval with numbered HRÜ/23.15.35 was obtained from Harran University Ethics Committee for our study. In our study, the principles of the Declaration of Helsinki were complied with.

Author Contributions:
Concept: M.D.
Literature Review: M.D., F.D.
Design : F.D.
Data acquisition: M.D., F.D.
Analysis and interpretation: F.D.
Writing manuscript: M.D., F.D.
Critical revision of manuscript: M.D., F.D.
Conflict of Interest: *The authors have no conflicts of interest to declare.*
Financial Disclosure: *Authors declared no financial support.*

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