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CASE REPORT

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Transcortical Mixed Aphasia Following Right Hemisphere Ischemic Stroke In A Left-Handed Patient

Sol El Baskın Olguda Sağ Hemisferik İskemik İnme Sonrası Transkortikal Mix Afazi

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ABSTRACT

While the majority of people use their right hand dominantly, 90-95% of these people also have language dominance in the left hemisphere. In people who use their left hand dominantly, 70% of them have language dominance in the left hemisphere, while the remaining 30% have language dominance in the right hemisphere. In this article, we aimed to present a case that we followed up with the diagnosis of left hand dominant and right hemisphere ischemic stroke and developed aphasia due to right hemisphere language dominance, which is rarely seen. A 42-year-old male patient applied to the external center emergency service in the morning with complaints of weakness in his left arm and speech disorder that started at night. He was intubated due to difficulty breathing and in the first evaluation, in his neurological examination, the consciousness level was stupor, the left nasolabial groove was slightly blurred and muscle strength was compatible with hemiparesis at the level of 1/5 with painful stimulation in the left upper and lower extremities. In the patient's brain computerized tomography (CT), the right middle cerebral artery (MCA) was observed as hyperdense. Diffusion magnetic resonance imaging (MRI) showed extensive diffusion restriction in the MCA irrigation area. In the neurological examination after extubation, the patient underwent GAT-2 aphasia test and was diagnosed with transcortical mixed aphasia. It is known that aphasia due to right hemisphere language dominance is very rare in left-handed individuals, but there are cases reported in the literature. The GAT-2 Aphasia Test, which we evaluated our case, is among the tests for which standardization studies have been conducted in Turkey. In this article, the case was diagnosed with aphasia with a language score of 34 and a motor score of 13. In this case, transcortical mixed aphasia was observed after right MCA ischemic stroke, and this rare clinical entity is presented in this article.

Keywords: Aphasia, hemisphere, stroke.

ÖZ

İnsanların büyük bir kısmı sağ elini dominant kullanırken, yine bu insanların %90-95'inde de dil hakimiyeti sol hemisferdedir. Sol elini dominant kullanan insanların ise dil hakimiyeti %70'inde sol hemisferdeyken, kalan %30'luk kesimde sağ hemisferdedir Biz burada, sol el dominant ve sağ hemisfer iskemik inme tanısı ile takip ettiğimiz ve ender görülen sağ hemisfer dil hâkimiyetine bağlı afazi gelişen olguyu sunmayı amaçladık. Kırk iki yaşında erkek hasta, geceden başlayan sol kolunda güçsüzlük ve konuşma bozukluğu şikayetleri ile sabah dış merkez acil servisine başvurmuş. Solunum zorluğu olması üzerine entübe edilmiş ve ilk değerlendirmede nörolojik muayenesinde bilinç düzeyi stupor, sol nazolabial oluk hafif silik ve kas gücü sol üst ve alt ekstremitede ağrılı uyaran ile 1/5 düzeyinde hemiparezi ile uyumluydu. Hastanın yapılan beyin bilgisayarlı tomografisinde (BT) sağ orta serebral arter (OSA) hiperdens olarak izlendi. Difüzyon manyetik rezonans görüntülemede (MRG) OSA sulama alanında geniş difüzyon kısıtlılığı izlendi. Ekstübasyon sonrası nörolojik muayenesinde GAT-2 afazi testi yapılan hastada transkortikal mix afazi saptandı. Sol elini kullanan bireylerde sağ hemisfer dil hâkimiyetine bağlı afazi çok nadir olduğu bilinmektedir ama literatürde bildirilmiş vakalar bulunmaktadır. Bizim olgumuzu değerlendirdiğimiz GAT-2 Afazi Testi Türkiye'de standardizasyon çalışması yapılmış testler arasında yer almaktadır. Bu yazıda olgu, dil puanı 34 ve motor puanı 13 puan alarak afazi tanısı aldı. Bizim olgumuzda sağ OSA iskemik inme sonrası transkortikal mix afazi izlenmiş olup bu yazıda nadir görülen bu klinik antite sunulmuştur.

Anahtar Kelimeler: Afazi, hemisfer, inme.

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CASE PRESENTATION

The number of patients with disabilities and the long-term effects of stroke have risen, despite a decrease in stroke incidence in high-income countries, due to the emergence of stroke treatments and risk factor reduction in recent years.[1] Post-stroke aphasia is an acquired speech impairment that occurs following an ischemic or hemorrhagic stroke, resulting in damage to the essential language areas in the left hemisphere. Aphasia is reported in one-third of stroke patients.[2] Patients with aphasia experience impairments in speech comprehension, listening comprehension, reading comprehension, writing, and daily communication.[3] Most people are right-handed, and 90-95% of these individuals also exhibit speech dominance in the left hemisphere. Left-handed people have 70% of their speech control in the left hemisphere, while the remaining 30% is in the right hemisphere.[4] Aphasia prevents patients from successfully transitioning from hospital to home, work, and social life. Within one year of onset, 61% of stroke patients experience long-term speech impairment.[1] Here, we aim to present a case of rare aphasia due to right hemisphere speech dominance, which we followed with a diagnosis of left-handedness and right hemisphere ischemic stroke.

CASE REPORT

A 42-year-old male patient arrived at the emergency department with complaints of weakness in his left arm and a speech disorder that began during the night. The patient, with no characteristics in his medical history, was intubated and sedated after experiencing respiratory distress during follow-up in the emergency department. He was transferred to our hospital emergency room after intubation. The initial neurological examination revealed no stupor or neck stiffness. The pupils were isocoric, and the light reflex (LR) was +/+. The left nasolabial fossa was slightly blurred, and muscle strength was at a level of 1/5 with painful stimuli in the left upper and lower extremities, consistent with hemiparesis. The plantar reflex was sluggish bilaterally. Electrocardiography (ECG) was normal sinus rhythm and laboratory tests revealed no abnormalities. The patient's computed tomography (CT) scan revealed hyperdensity in the right middle cerebral artery (MCA) (Figure 1).

Figure 1. Hyperdense MCA observed in non-contrast brain CT axial section.

The right internal carotid artery (ICA) was occluded at the level of the bulb in the brain, and carotid CT angiography. Diffusion magnetic resonance imaging (MRI) showed extensive diffusion restriction within the MCA irrigation area (Figure 2).

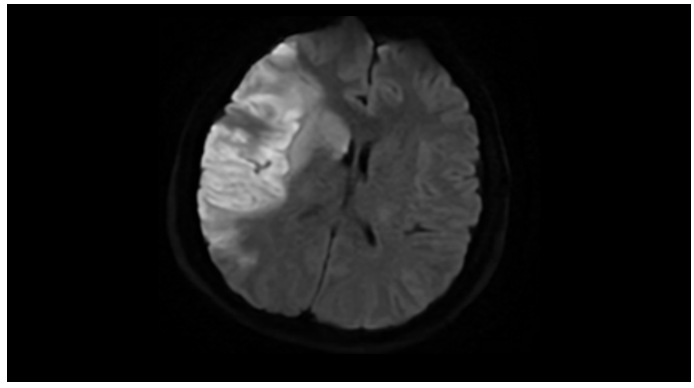

Figure 2. Diffusion MRI axial section showing diffusion restriction in the right MCA irrigation area.

Acetylsalicylic acid administration was started during intensive care monitoring. The patient was extubated on the second day of hospitalization. Control brain CT showed a large hypodense area in the right middle cerebral artery (MCA) irrigation area. During the neurological examination of the patient, who was extubated two days later, the general condition was good, consciousness was clear, and the patient cooperated with simple commands. Transcortical mixed aphasia was identified in the patient who underwent the GAT-2 aphasia test during the neurological examination following extubation (Table 1).

Table 1: GAT-2 aphasia test scoring

	Patient's score/Total score
Spontaneous Speech	2/5
Speech Comprehension	5/14
Reading Comprehension	3/22
Automatic Speech	1/4
Repetition	14/14
Naming	9/22
Oral-Motor Assessment	7/13

MAIN POINTS

- PTA is the most common permanent carotid-vertebrobasilar anastomosis.
- Although PTA has been linked to cerebrovascular diseases, its role as a risk factor for stroke remains unclear
- PTA may be associated with a better prognosis in ischemic stroke, as it can support collateral circulation in cases of severe carotid artery stenosis or hypoplasia

The left nasolabial fossa was slightly blurred. Muscle strength was 1/5 in the left upper extremity and 2/5 in the left lower extremity, with hemiparesis. The patient was discharged with speech therapy, physical therapy, and rehabilitation support.

According to the National Institutes of Health Stroke Scale (NIHSS) speech section, the patient was unable to describe what was happening in the picture and could not name the objects in the picture. He couldn't read the sentences himself, but was able to repeat them when they were read to him. While he could repeat short sentences once, he was instructed more than twice so that he could repeat longer sentences. It was assessed as mild to moderate aphasia based on the NIHSS.

DISCUSSION

Each year, around 100,000 stroke patients are diagnosed with aphasia, which is often observed in older stroke patients. Broca's aphasia is the most common type of aphasia that develops after a stroke in younger patients.[6,7] Aphasia is reported in 20-38% of patients after stroke. Broca's aphasia is the most prevalent type of aphasia, followed by anomic and global aphasia. Other types of aphasia include Wernicke's aphasia, conduction aphasia, and transcortical aphasia.[8] Aphasia, depending on right-hemisphere speech dominance, is known to be very rare in left-handed individuals; however, cases have been reported in the literature. James et al. reported a case of left-handed transcortical motor aphasia following a right OSA infarction in their 2022 article.[9] Transcortical mixed aphasia was also observed in this case after right MCA infarction. Aphasia caused by hemispheric lesions on the same side as the dominant hand is referred to as cross aphasia. Kim et al. reported a patient who utilized his right hand and developed crossed aphasia due to a right MCA infarction.[10] While the literature notes instances of Wernicke's and global aphasia resulting from right hemisphere damage in left-handed individuals, cases of transcortical aphasia are relatively uncommon. Furthermore, the naming ability of these patients is also reported to be affected.[9] In our case, the naming ability was also impaired. The studies in the literature on acute ischemic stroke have demonstrated that cerebral blood flow is impaired or reduced in areas surrounding the damaged areas of the brain. Hypoperfusion of the perilesional tissue has been linked to cognitive and language disorders in some studies, while others have found no relationship. Ivanova et al. reported in their 2024 study that cerebral blood flow in chronic stroke was significantly reduced even beyond the lesion site and was markedly lower in the aphasia group compared to age-matched controls. This hypoperfusion in stroke patients within the aphasia group has been shown to result in delays in tissue healing, particularly in the temporoparietal tongue areas, and to contribute to permanent language disorders.[11]

Some of the frequently used tests in international aphasia assessment are the Western Aphasia Battery (WAB), the Boston Diagnostic Aphasia Assessment (BDAE), and the Minnesota Differential Aphasia Diagnostic Test (MDTDA). The GAT-2 Aphasia Test, used to evaluate our case, is one of the standardized tests in Turkey.[5] In this article, the case was diagnosed with aphasia, focusing on a speech score of 34 points and a motor score of 7 points (Table 1). The recovery process for language disorders in stroke patients is divided into three phases. The recovery of aphasia patients is most noticeable between 2-6 weeks after a stroke. However, around 60% of patients continue to experience aphasia in the chronic phase, even with treatment.[12] Treatment approaches for aphasia are categorized into three main types: speech and language therapy, pharmacotherapy, and brain stimulation techniques. However, there is limited evidence regarding when treatment should begin or how long it should last.[13,14] In our case, transcortical mixed aphasia was observed following a right MCA ischemic stroke, and this rare clinical entity is discussed in this article.

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