Giant Virchow-Robin Spaces in a Patient with Migraine: Case Report

Dev Virchow-Robin Aralıkları Saptanan Bir Migren Olgusu

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ABSTRACT Virchow-Robin spaces are enlarged perivascular spaces located at the entrance of small arteries and veins into the brain parenchyma from the subarachnoid space. They may be seen in all age groups. Their numbers and dimensions may increase with increasing age. These generally do not cause symptoms and are incidentally detected. The most frequent symptom is headache. Those that are in clusters seem like cysts and may cause misdiagnosis. They are generally located in the white matter along with the paramedial mesencephalo-thalamic artery in this area. Dilated Virchow-Robin spaces should be considered in the presence of multiple cavities which follow penetrating arteries, isointense with cerebro spinal fluid in a patient without neurological deficits. If characteristic magnetic resonance imaging findings are recognized, the patients may elude unnecessary examinations. We present here a case with migraine attacks and giant Virchow-Robin spaces co-existed.

Key Words: Migraine disorders; vascular headaches

ÖZET Virchow-Robin aralıkları küçük arter ve venlerin subaraknoid aralıktan beyin parenkimine girdikleri yerde lokalize olan genişlemiş perivasküler boşluklardır. Tüm yaş gruplarında görülebilirler. Sayı ve boyutları ilerleyen yaşla birlikte artabilir. Genellikle semptom vermezler ve insidental olarak saptanırlar. En sık semptom baş ağrısıdır. Kümelenmiş olanları kistik görünümdedir ve yanlış tanıya neden olabilir. Genellikle ak maddede paramedial mezensefalo-talamik arter boyunca lokalize olurlar. Patolojik nörolojik muayene bulgusu olmayan bir hastada manyetik rezonans görüntüleme (MRG)'de penetran arterler boyunca uzanan, BOS ile izointens multipl kaviter görünümler varlığında dilate Virchow-Robin aralıkları akla gelmelidir. Karakteristik MRG bulguları tespit edilirse hastalar gereksiz tetkiklerden kurtulabilir. Burada migren hastalığına eşlik eden dev Virchow-Robin aralıkları olan bir olguyu sunduk.

Anahtar Kelimeler: Migren hastalıkları; vasküler başağrıları

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The term "Virchow-Robin space (VRS)" defines elongations of the subarachnoid space while accompanying blood vessels that penetrate the brain parenchyma. When these spaces enlarge, they are seen as cystic lesions isointense with cerebrospinal fluid (CSF), with smooth contours and definite borders in magnetic resonance imaging (MRI). Their etiology is not known. They usually do not cause a mass-effect or neurologic deficit. Large and atypical forms are rare.[1] We present here a 35-year-old female patient with her clinical and radiological findings, who had attacks of migraine and giant Virchow-Robin spaces in MRI.

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CASE REPORT

A 35-year-old female patient was admitted with a complaint of a half or complete headache having a throbbing character, which she experienced 1-2 times a month for 6 years, continuing 1-2 days, accompanied by nausea and photophobia. Her headache fulfilled the International Headache Society criteria for migraine without aura.[2] She reported that migraine was diagnosed before, for which she used eletriptan in the attacks, with only an inadequate therapeutic response. Her personal medical history was uneventful, and she did not use alcohol or tobacco. In neurologic examination, she was alert, oriented, and cooperative. Her cranial area was intact. The fundoscopic examination was normal. There were no signs of meningeal irritation, and no motor or sensory deficits. The deep tendon reflexes were normal bilaterally and plantar reflexes were flexor. Cerebellar tests and gait were also normal.

Multiple cystic lesions, localized at the basal ganglia, which were hypointense at T1-weighted images and hyperintense at T2-weighted images were detected at cranial MRI. The lesions were predominantly located at the thalamus, and extended to the mesencephalon. The 3rd ventricle was slightly compressed due to the space occupying effect of the cystic lesions (Figure 1,2).

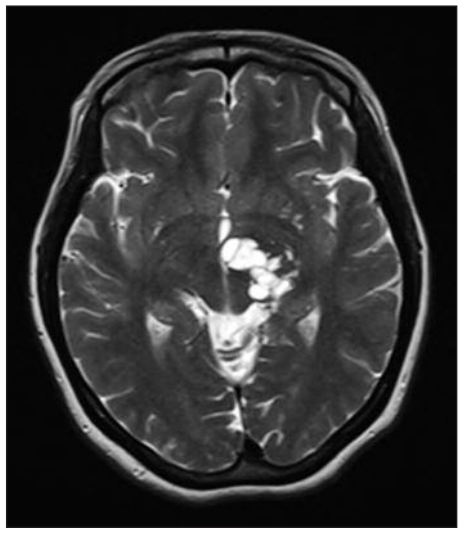

FIGURE 1: Multiple hyperintense cystic lesions in T2 weighted axial section.

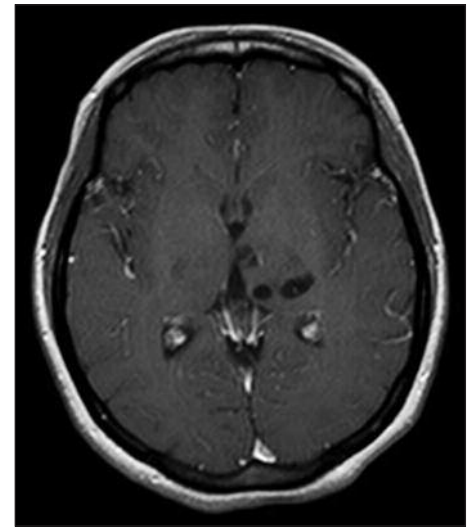

FIGURE 2: Cystic lesions not showing contrast enhancement.

The lesions were diagnosed as giant perivascular spaces (Virchow-Robin spaces), in consideration of their typical appearance. The detailed laboratory test results of this patient were uneventful. The electroencephalogram (EEG) was normal. A spinal tap was done, and a clear, acellular CSF was obtained, which contained 37 mg/dL protein, 59 mg/dL glucose, and 148 mEq/L Na. Direct microscopic examination with Indian ink for cryptococci yielded negative results, and also cultures were negative.

DISCUSSION

Dilated Virchow-Robin spaces should be considered in the presence of multiple cavities which follow penetrating arteries, isointense with CSF in a patient without neurological deficits. These are cystic formations observed at close proximity with the penetrating arteries, which have smooth contours, isointense with CSF in all sequences of MRI (T1, T2 and FLAIR), without contrast enhancement. They may be seen in all age groups. Their numbers and dimensions may increase with increasing age. Age, hypertension, male gender, cerebral infarction, and presence of dementia were reported among risk factors. They may be associated with multiple sclerosis or traumatic brain damage. They do not cause clinical symptoms and signs even when their dimensions are large. Headache and epileptic fits may occur.[1]

Virchow-Robin spaces are sub-pial spaces between the brain parenchyma and pia, and they are filled with interstitial fluid. They are in communication with the subarachnoid space and thus CSF. Contrast material injected into the cerebral ventricles was reported to appear in the perivascular spaces in minutes.[3]

The interstitial fluid in the perivascular spaces and drainage of CSF in the subarachnoid space to the lymphatic system allow phagocytosis of antigens by perivascular and leptomeningeal macrophages. Antigens are either processed locally after phagocytosis, or they are carried to the lymph nodes by MHC class II molecules to be presented to the B or T cells. B and T cells accumulate at the perivascular space and may cause an immune reaction at the brain. This immunological response suggests that perivascular space may play a role in autoimmune diseases such as encephalitis and multiple sclerosis.[3]

The most important characteristics of giant VRSs are their localization along penetrating blood vessels, their isointense density with CSF in all MRI sequences, absence of contrast enhancement, absence of calcifications, and a normal neighboring brain parenchyma.[3] They are typically seen at 3 localizations: Type 1; at the entrance of basal ganglia, along with lenticulostriate artery, Type 2; at the entrance of perforating medullary arteries into the cortical grey matter; and Type 3; at the mesencephalon.[1]

A giant VRS which develops at the mesencephalo-thalamic area may cause hydrocephalus due to compression of aquaductus sylvii and third ventricle and may require surgical intervention. Giant VRSs are generally located in the white matter along with the paramedial mesencephalo-thalamic artery in this area.[3] The VRS was at this location in our patient, too, but she was followed-up with sequential MRI examinations without any development of hydrocephalus, and she did not report an increase in the frequency or intensity of headaches.

Cystic neoplasms, parasitic cysts, cystic infarcts, HIV encephalopathy, neurosarcoidosis, non-neoplastic neuroepithelial cysts, and storage diseases such as mucopolysaccaridosis may be considered in the differential diagnosis of dilated VR Spaces.[1,3]

The most frequent symptom is headache according to the study by Salzman et al. Other frequent symptoms include imbalance, dementia, visual defects, seizures, stroke, memory defects, and concentration problems.[3]

In a study on patients of childhood age group, dilated VRSs were more frequently diagnosed in patients with a diagnosis of migraine, in comparison with those with tension-type headache and those without headache.[4] In another study investigating the association of migraine and dilated VRS, VRS was detected at MRI in 40% of patients while only 7.1% of the control group (equal in numbers with the patients) had VRS.[5]

In conclusion, images of round or ovoid, large or clustered lesions seen along a penetrating blood vessel, which have a smooth contour, do not have inner calcifications, do not show contrast enhancement, and do not affect the neighboring brain parenchyma, isointense with CSF in all sequences in MRI are pathognomonic for giant VRS. If these characteristic MRI findings are recognized, the patients may elude unnecessary examinations. On the other hand, the option of surgical intervention should be kept in mind in the presence of a mass effect or obstructive hydrocephalus.

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