Case Report

Giant Virchow-Robin Spaces as an Incidental finding in a Patient with Parkinsonism

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Abstract

Virchow-Robin spaces are perivascular spaces that surround small arteries and arterioles as they enter the brain parenchyma. They are usually normal findings on MRI of healthy people. Rarely, Virchow-Robin spaces look strikingly enlarged, causing mass effect and unusual cystic conformations that may be misinterpreted as other pathologic processes, such as a cystic neoplasm. Here, we describe a 52-year-old woman in whom brain magnetic resonance imaging (MRI), performed to evaluate Parkinsonism, incidentally found giant Virchow-Robins space or Swiss cheese brain syndrome. In our patient, it seems that the giant Virchow-Robin spaces have been found incidentally and are not associated with the patient's Parkinsonism symptoms.

Keywords: Brain magnetic resonance imaging, incidental findings, Parkinsonism, Virchow Robin spaces

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Introduction

Virchow-Robin spaces are perivascular spaces that surround small arteries and arterioles as they enter the brain parenchyma. The inner layer of leptomeninges thoroughly invests the adventitia of the vessel wall and the outer layer is continuous with the pia mater on the surface of the brain at the anterior perforated substance.[1,2] It has been suggested that Virchow-Robin spaces are essential for maintenance of homogenous intracranial pressure by means of providing drainage routes for cerebral metabolites.[3]

They are usually normal findings on magnetic resonance imaging (MRI) of healthy people.[1] Rarely, Virchow-Robin spaces look strikingly enlarged, causing mass effect and unusual cystic conformations that may be misinterpreted as other pathologic processes, such as a cystic neoplasm.[4]

Here, we describe a middle-aged woman in whom brain magnetic resonance imaging (MRI), performed to evaluate Parkinsonism, incidentally revealed giant Virchow-Robins space or Swiss cheese brain syndrome.

Case Report

A 52-year-old woman presented with slowness in daily activities and walking since several years ago. She had no limb weakness, tremor, sensory problems or incontinency and did not take any medications. Her physical examination only revealed mild bradykinesia and mild rigidity in all four limbs; otherwise, the examination, including the cranial nerves, motor system, cerebellar system, sensory system and deep tendon reflexes, was within normal limits. To exclude secondary causes of Parkinsonism, brain MRI was performed. The brain MRI revealed multiple cystic-like lesions in the periventricular and juxtacortical areas of hemispheres, being hyperintense on T2-weighted, hyposignal on Fluid Attenuated Inversion Recovery (FLAIR), and T1-weighted sequences with signal intensity similar to that of CSF (Figure 1). In all sequences, the signal of the lesions was the same as that of the CSF. According to the brain MRI findings, a diagnosis of giant Virchow-Robin spaces or Swiss cheese brain syndrome was made.

Discussion

In our patient, it seems that the giant Virchow-Robin spaces have been found incidentally and are not associated with the patient's Parkinsonism symptoms. Due to the porous appearance of brain as a result of the pores created by the widened Virchow-Robin space and its resemblance to Swiss cheese, it is termed as Swiss cheese brain syndrome.

Dilatation of Virchow-Robin spaces was described by Durant-Fardel in the 19th century.[4] Virchow Robin spaces up to 2 centimeters have been considered normal.[5] These dilatations are regular cavities that always comprise a patent artery. The mechanisms underlying expanding Virchow-Robin spaces are still unknown and various theories have been proposed, such as disruption of the drainage route of interstitial fluid, segmental necrotizing angiitis of the arteries leading to increased permeability of the arterial wall, and fibrosis and obstruction of Virchow-Robin spaces along the length of arteries and subsequent increased resistance of fluid flow.[4] Abnormal visualizations of Virchow-Robin spaces are sometimes encountered in rare progressive disorders such as occurs in Hurler disease.[6]

On MR imaging, perivascular spaces are described as follows: (a) are round, oval, or curvilinear with a well-defined, smooth margin; (b) are isointense relative to CSF in the subarachnoid space on all pulse sequences; (c) conform to the path of penetrating arteries; and (d) have no mass effect. The lenticulostriate

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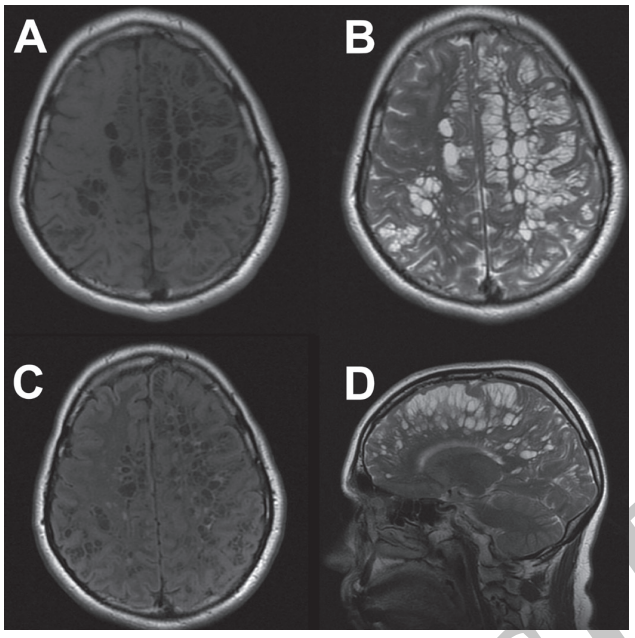

Figure 1. T1-weighted axial MR image showing a group of smooth walled, well-defined, round and oval, hyperintense signal intensity lesions in bilateral fronto-parietal lobes **(A)**. T2-weighted axial MR image **(B)** and FLAIR-weighted axial MR **(C)** demonstrating the same sections; in all sequences, the signal of the lesions is same as that of the CSF. The same hyperintense signals in T2-weighted sagittal MR image in fronto-parietal and occipital lobes **(D)**.

spaces are found in the lower third of the basal ganglia.[5] FLAIR weighted MR images should not show any signal intensity abnormality in the neighboring white matter.[7]

The top differential diagnoses include: multiple lacunar infarctions, cystic periventricular leukomalacia, multiple sclerosis, cryptococcosis, mucopolysaccharidoses, neurocysticercosis, cystic neoplasms, neuroepithelial cysts, and arachnoid cyst; however, awareness of their signal intensity appearances and localization helps distinguish them from various pathologic conditions.[4] Dilated perivascular spaces, even giant and extensive ones, rarely compromise the brain function[7] and further work-up is seldom required in asymptomatic patients.

In conclusion the giant Virchow spaces could be an incidental finding on brain imaging without any pertinent clinical manifestations. Being aware of signal changes on different sequences of brain MRI could discriminate between this rare imaging finding and other possible pathologies.

Conflict of interest disclosures

Authors declare no conflict of interest.

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