

# Tumefactive Perivascular Spaces: A Rare Lesion Mimicking Cystic Cerebral Mass

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## Abstract

The brain perivascular spaces are pial-lined, interstitial fluid-filled structures that accompany penetrating arteries. When enlarged, they may cause mass effect and can be mistaken for more ominous pathologic processes. Giant tumefactive PVSs most often appear as clusters of variably sized cysts that are isointense relative to CSF and do not enhance. They are most common in the mesencephalothalamic region and may cause hydrocephalus. Although they may have striking mass effect, giant PVSs should not be mistaken for neoplasm or other diseases.

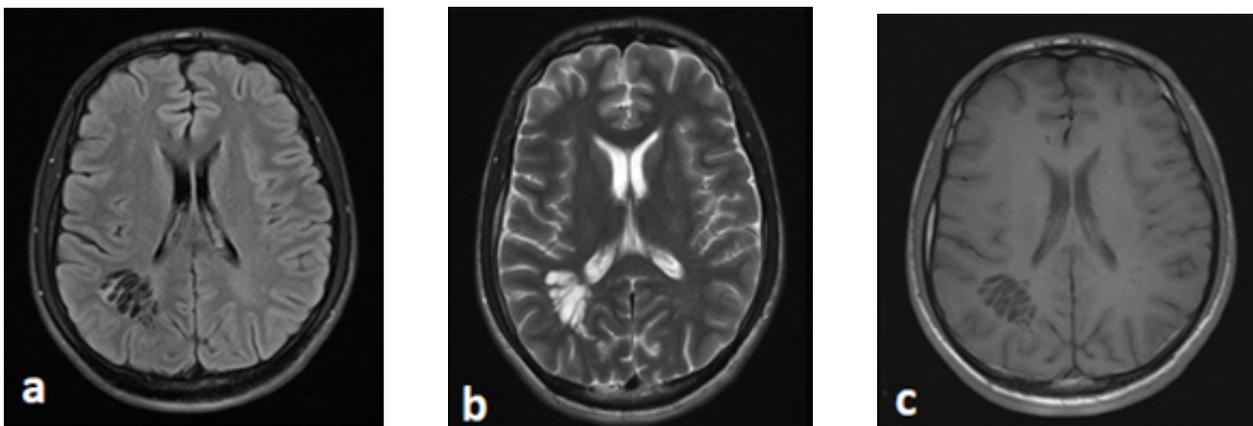
**Keywords:** Perivascular Space; Cystic Cerebral Mass; Magnetic Resonance Imaging

## Introduction

Also known as the Virchow Robin gaps, perivascular spaces are constricted by pia mater and are coincidentally surrounded by arterioles extending to the brain parenchyma [1]. These lesions are filled with the CSF. In rare cases, these structures may expand abnormally and cause mass effect, which is defined as 'tumefactive'. These lesions are usually localized in the thalamus, basal ganglia, subcortical white matter, mesencephalon, pons, and more rarely the cerebellum. A more specific type of this lesion may mimic peritumoral edema localized to the anterior temporal lobe, and these types of lesions are called the anterior temporal lobe perivascular space [2].

## Case Report

A 22-year-old male patient admitted to the emergency room due to headache several times in the past year had normal neurological physical examination and routine laboratory results. Axial T1, Axial T2, Axial FLAIR, Coronal T2, and Sagittal T2 sequences were used for imaging on 3 Tesla MR devices of the patient. MRI showed a cystic mass has grapevine-like multilocular appearance isointense with CSF in all sequences in right parietal lobe posterior to the lateral ventricle adjacent to occipital horn. Similar to this lesion, but not multiloculated, cystic lesions were occasionally observed in other parenchyma areas [3] (Figure1).



**Figure 1:** A 22-year-old male patient (a) Axial FLAIR (b) axial T2 and (c) axial T1 MRIs show posteriorly periventricular localized in the right parietal lobe multilocular, lobulated and isointense with CSF tumefactive perivascular spaces

## Discussion

When PVSs become markedly expanded, they can be misinterpreted as other pathologic processes, most often a cystic neoplasm. As most of these cysts border a ventricle or subarachnoid space, reports of such cases have offered an extensive differential diagnosis that includes cystic neoplasms, parasitic cysts, ventricular diverticula, cystic infarction, non-neoplastic neuroepithelial cysts, and deposition disorders such as mucopolysaccharidosis [4].

Giant PVSs are expanded PVSs that occur along the penetrating vessels, most commonly in the mesencephalothalamic region in the territory of the paramedial mesencephalothalamic artery and in the cerebral white matter [5]. They differ from typical PVSs in that they are larger in size and may have associated focal mass effect. In addition, white matter giant PVSs may have associated T2 and FLAIR signal intensity alteration in the adjacent white matter [6].

Giant PVSs with mass effect may occur as single or multiple clustered cysts that can be mistaken for more ominous disease [7]. When the lesions in question occur in a characteristic location along the path of a penetrating vessel, follow CSF signal intensity on all sequences, do not enhance with contrast material, and have normal adjacent brain parenchyma, their appearance is virtually pathognomonic of giant PVSs [8]. An extensive differential diagnosis is superfluous and biopsy unnecessary [9].

## Conclusion

Giant tumefactive PVSs are interstitial-fluid filled structures that accompany arteries and arterioles as they penetrate the brain. Although they have associated mass effect, they should not be mistaken for neoplasm or other disease.

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