# A Right Thalamo-Choroidal Arterio-Venous Malformation and Associated Vein of Galen Aneurysm in a Female Adult

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**Abstract-** Vein of Galen aneurysm (VGAM) is a rare vascular malformation accounting for less than 1% of all intracranial abnormalities. In this case report, we performed computed tomography (CT) and magnetic resonance imaging (MRI) examinations for a 26-year-old female patient who presented with a severe headache. On these images, a right thalamo-choroidal arterio-venous malformation (AVM) with secondary aneurysmal dilatation of the vein of Galen was suspected, and a CT angiography was performed for further evaluation, which confirmed the diagnosis. The patient refused digital subtraction angiography (DSA) and probable endovascular treatment. Although it is rarely seen in the adult population, CT and MRI have a tremendous impact on the diagnosis of these patients. We should also emphasize the role of CT angiography in the diagnosis and further evaluation of these vascular malformations. Endovascular therapy is regarded as an effective and safe technique in the treatment of these patients.

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**Keywords:** Choroidal malformation; Endovascular embolization; Vein of galen aneurysm (VGAM)

## Introduction

The vein of Galen aneurysm (VGAM) is a rarely seen entity and has an unknown etiology. Approximately 200 cases have been reported in the literature. The typical diagnostic features are of a midline irregular dilated vascular channel posterosuperior to the third ventricle and directed to the occipital region.

## Case Report

A 26-year-old female patient was admitted to the hospital complaining of a severe headache. She had no abnormality on physical examination, and laboratory findings were found within normal limits. Her past medical history was also unremarkable. She was referred to computed tomography (CT) examination for evaluation. Axial CT scan revealed hyperdense, round, suspicious vascular structures in the third ventricular and quadrigeminal plate cistern regions. A small calcified focus was also present. The patient then underwent to magnetic resonance imaging (MRI) examination for further evaluation. On fast spin-echo (FSE) T2 weighted images, huge, flow void dilated vessels were found in third ventricular and quadrigeminal plate cistern regions. Numerous subcentimeter flow void vascular structures were also present on the right basal ganglia and thalamic region. Based on CT and MRI findings, a thalamic-choroidal arterio-venous malformation (AVM) and an associated secondary aneurysmal dilatation of vein of Galen were considered in the differential diagnosis. Afterward, CT angiography was performed, and axial, sagittal, and coronal plane maximal intensity projection (MIP) images were generated. On these images, VGAM measuring 22x18 mm in diameter, which draining into straight and superior sagittal sinuses, was detected. A nearby thalamo-choroidal AVM with connecting vessels into the VGAM was also clearly visualized (Figure 1 and Figure 2). The patient was diagnosed as right thalamo-choroidal AVM with accompanying VGAM and referred to the cranial digital subtraction angiography (DSA) for further detailed evaluation and probable endovascular treatment, but refused these

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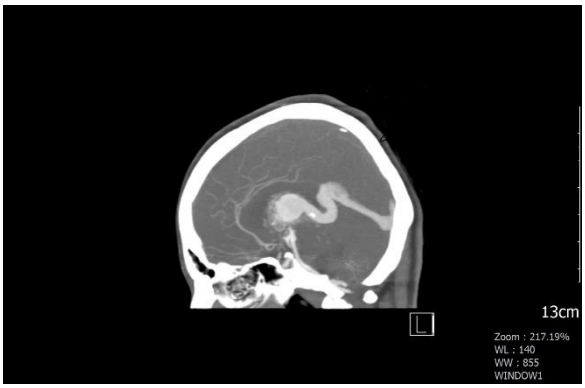


**Figure 1.** Sagittal MIP CT angiography demonstrates VGAM drains into the dilated straightsinus and a nearby AVM

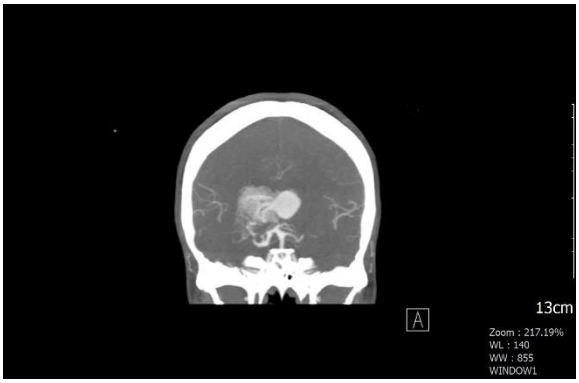


**Figure 2.** Coronal MIP CT angiography again shows VGAM and an associated rightthalamo-choroidal AVM with connecting vessels

## Discussion

Vein of Galen aneurysms (VGAMs) is rarely encountered anomalies of intracranial circulation and compromise 1% of all intracranial vascular malformations. However, they show a 30% incidence of vascular malformations occurring in the pediatric age group. These lesions are characterized by the presence of an aneurysmally dilated midline deep venous structure and fed by abnormal arteriovenous communications (1). Our case could be considered as a secondary type VGAM due to accompanying right thalamo-choroidal AVM. We could not perform further examinations for detailed vascular anatomical evaluation and endovascular treatment because the patient did not accept these procedures. Even though these vascular malformations are typically manifested during the neonatal period or in childhood with symptoms of heart failure signs, they can present with headache, seizures, slow-flow fistulas, hydrocephalus, and round calcified masses in the pineal region, in the adult population. Untreated VGAM can cause chronic venous ischemia, which results in subependymal atrophy and dystrophic subcortical white matter calcifications. Children and adults can present with subarachnoid hemorrhage and typically show smaller arteriovenous shunting. Cerebral angiography is the gold standard for the diagnosis of these vascular malformations due to its capability to demonstrate the dynamic aspect of the cerebral venous system and arterio-venous shunt (2). These once non-treatable conditions having very high mortality rates can now be considered potentially curable because of interventional neuroradiological techniques. If left untreated, it may lead to a poor clinical outcome with a reported mortality rate of 76.7 % (3). As in or case, although the diagnosis of VGAM in the adult population group is still considered unusual, late diagnosis of these asymptomatic patients may be provided with the increased use of cross-sectional imaging modalities. In this regard, we should emphasize the role of CT angiography with its tremendous potential in the diagnosis of cerebral vascular malformations affecting newborns and infants. Although rarely seen, it can also provide valuable information in adult population cases.

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