Mesencephalic Developmental Venous Anomaly Causing Obstructive Hydrocephalus Due to Aqueductal Stenosis

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A 29-year-old man presented with complaints of persistent headaches for the past six months. He did not experience any accompanying symptoms, such as nausea, vomiting, or visual disturbance.

A magnetic resonance imaging revealed dilatation of both the lateral ventricles and the third ventricle. However, the fourth ventricle appeared normal in size (Figure 1a, b). A vascular structure was observed to originate from the interpeduncular fossa of the mesencephalon, extend to the aqueductus cerebri, and obstruct it. This vascular structure then progressed towards the right lateral ventricle and extended within the sinus rectus (Figure 1c, d). Phase-contrast images in the sagittal plane showed no flow signal at the aqueductus cerebri level, and the flow was consistent with spontaneous third ventriculostomy (Figure 1e-g). Conservative management was chosen for the patient, who did not exhibit nausea, vomiting, or visual impairment attributable to hydrocephalus. No additional symptoms developed during the six-month follow-up.

Hydrocephalus is a condition characterized by excessive accumulation of cerebrospinal fluid (CSF) in the ventricular system, accompanied by CSF physiology alterations. It can manifest as non-communicating hydrocephalus due to obstructive factors, or as communicating hydrocephalus due to impaired CSF absorption.[1] The aqueductus cerebri is the most frequently obstructed segment in obstructive hydrocephalus, and its etiologies include congenital narrowing, midbrain masses, and post-hemorrhagic or post-infectious membranes.[2]

Developmental venous anomalies (DVA) are generally benign and asymptomatic, observed in 2.6% of autopsy series, and they rarely present with bleeding or infarction secondary to collecting vein thrombosis.[3,4] In very rare cases, DVAs may cause hydrocephalus due to obstruction at the aqueductus cerebri level.[5]

DVAs are typically detected incidentally. In symptomatic cases, treatment should focus on relieving the symptoms associated with the underlying pathophysiological process. Treatment options for obstructive hydrocephalus secondary to DVA include shunt placement and endoscopic third ventriculostomy.[6]

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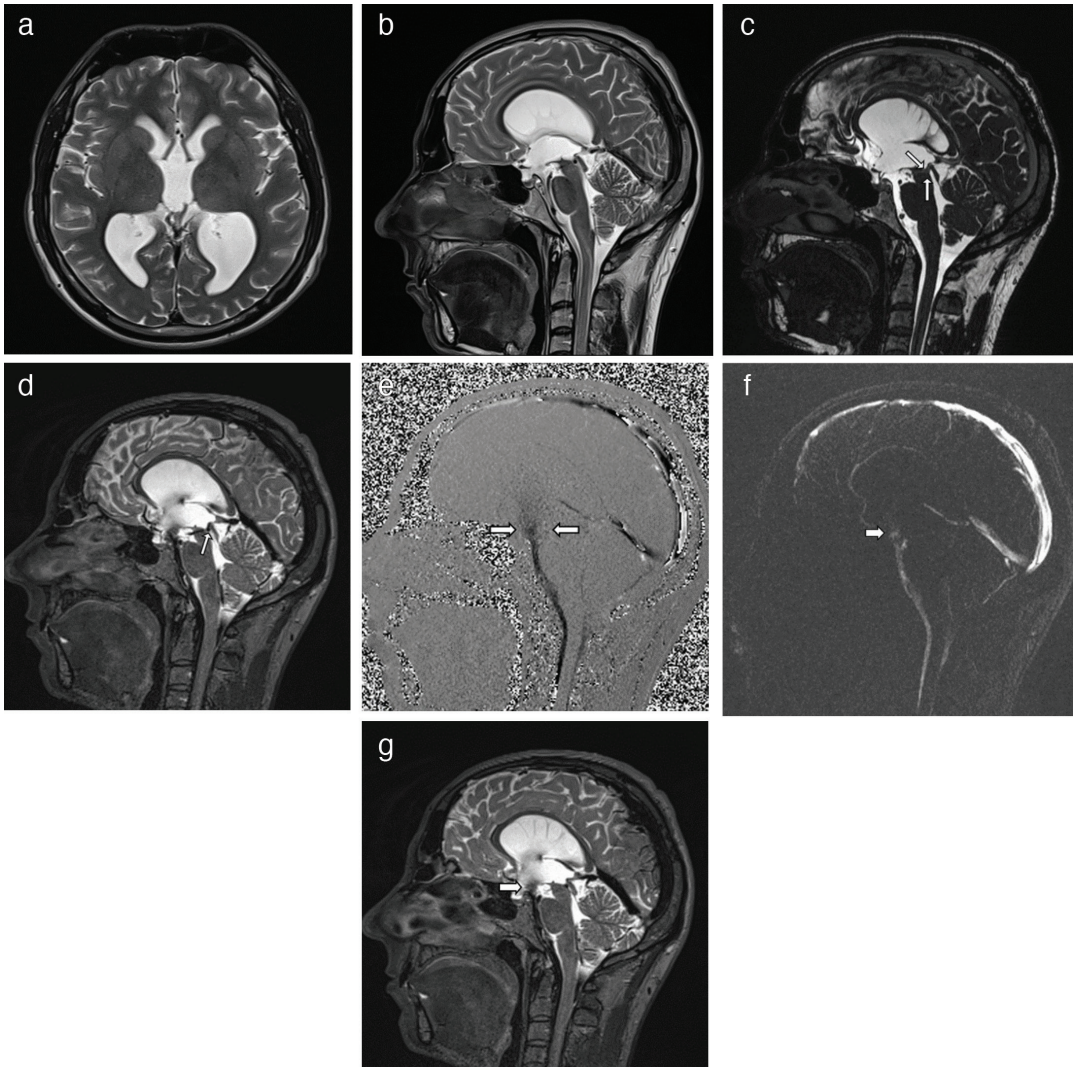

FIG. 1. (a) Axial (b) Sagittal T2-weighted magnetic resonance image demonstrating dilated lateral ventricles and the third ventricle. (c) Sagittal three-dimensional (3D) constructive interference in steady state (d) Sagittal three-dimensional driven equilibrium (3D-DRIVE) sequence demonstrating aqueductal stenosis with a dilated ventricular system. The vascular structure causing aqueductal stenosis is indicated by an arrow. (e) Sagittal phase-contrast image (f) Sagittal magnitude image (g) Sagittal 3D-DRIVE revealed a defect at the base of the third ventricle, and a significant flow signal consistent with spontaneous third ventriculostomy was observed. Note that no flow signal was detected at the aqueduct cerebri level.

Informed Consent: Written informed consent was obtained from the patient.

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