Case lesson 38/2025

Spontaneous regression of an incidental brain venous aneurysm in a child and literature review

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Introduction: Brain venous aneurysms (BVAs), also known as cerebral varices are rare vascular anomalies characterized by the focal dilatation of cerebral veins. They are often associated with Arteriovenous Malformations (AVMs) or Developmental Venous Anomalies (DVAs), while isolated BVAs are an extremely rare medical occurrence. In most cases they are asymptomatic and an incidental finding, but they can present with hemorrhage, seizures or focal deficits due to mass effect. [1] Surgery and endovascular treatment both stand as a treatment modality, however, very few cases are reported in the literature where no treatment was performed and observation was chosen.

Case report: We present a case of a 15-year-old boy who seven years before fell from a bike. He was immediately presented to Emergency Room Department for a minor cranial trauma. He was in good medical condition and normal neurological examination. A head and neck CT scan was performed which didn`t show any fracture but reveled a suspicious round lesion, iso-to-slightly hyperdense in the right sylvian fissure. A brain MRI was performed and revealed an extra-axial round lesion 18x 22x 18 mm in right sylvian fissure iso to hyperintense in T1, hyperintense in T2 and FLAIR (Figure 1), raising suspicion for a vascular lesion; cavernous hemangioma or middle cerebral artery aneurysm. DSA confirmed the diagnosis of a venous aneurysm (Figure 2). Regarding the young age and a non-ruptured incidental finding, it was decided not to treat but to observe with yearly follow-up MRIs. A spontaneous regression was evident one year later (Figure 3) and the following years (Figure 4, 5, 6) to only six mm in size in 2025 MRI (Figure 7). He was referred asymptomatic during the observation.

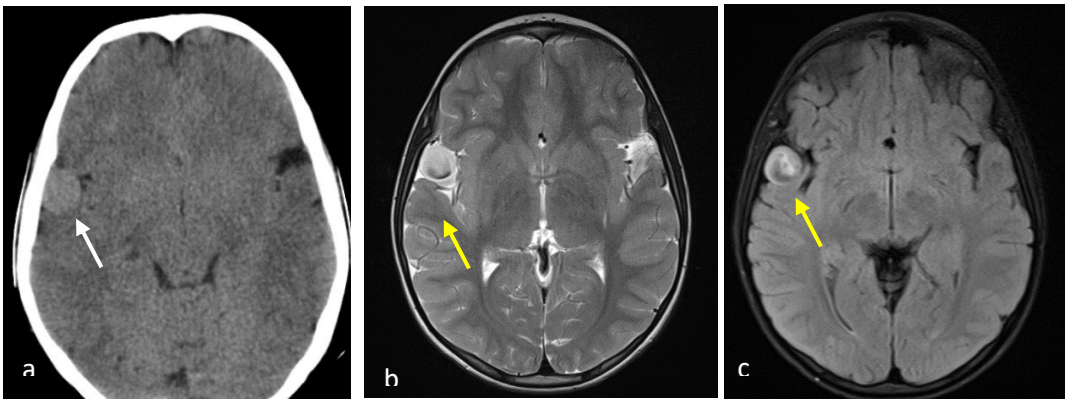

Figure 1: a) axial CT scan showing a round iso to hyperdense lesion in the right sylvian fissure (white arrow); b) first brain MRI showing the lesion hyperintense in axial T2 sequence and c) hyperintense in FLAIR

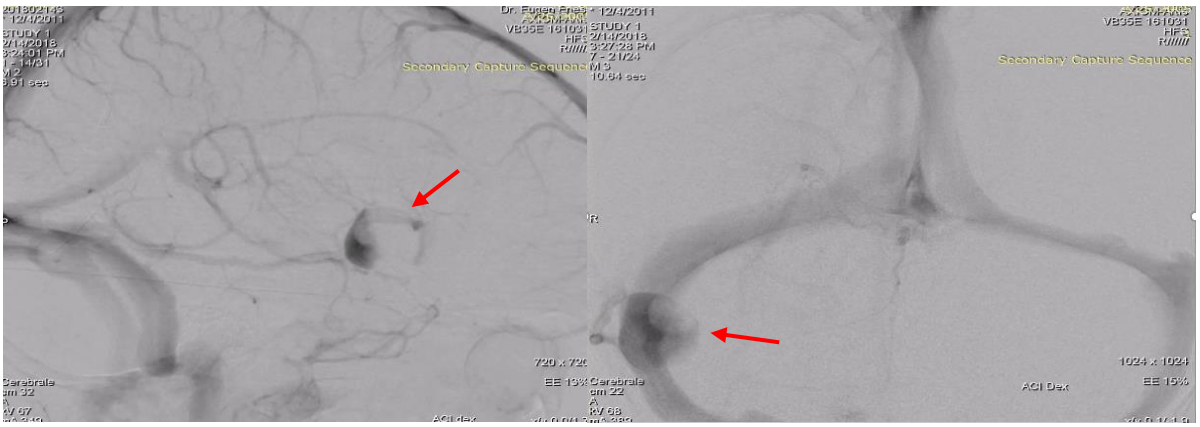

Figure 2: Cerebral Angiography showing the lesion filling with contrast in venous phase (red arrow)

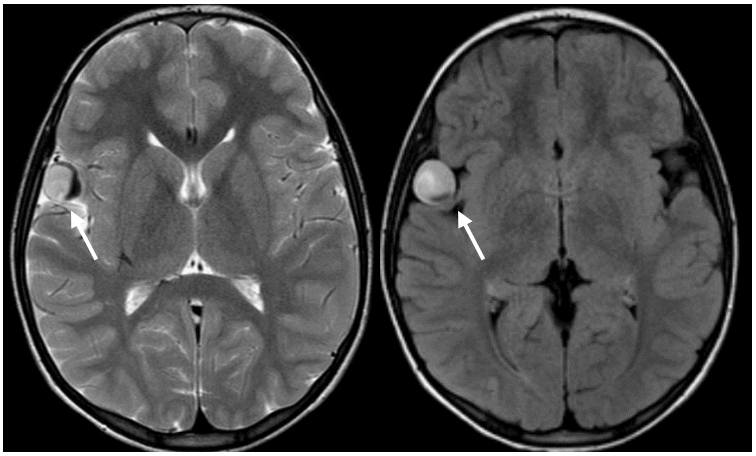

Figure 3: MRI in 2019, regression of the venous aneurysm is noted 17mm x 18mm.

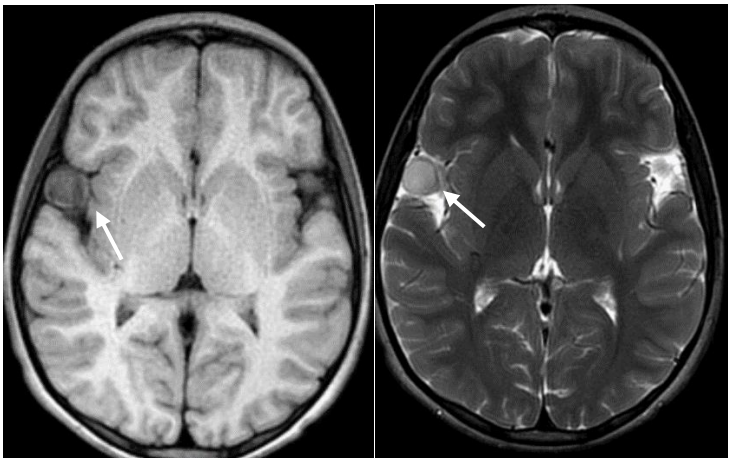

Figure 4: MRI in 2021 showing the regression of the venous aneurysm 17mm x 17mm, hypointense in T1 sequence (left) and hyperintense in T2 (right)

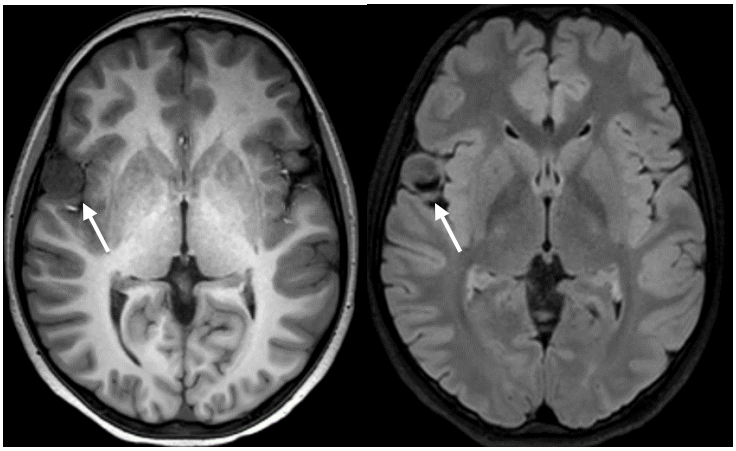

Figure 5: MRI in 2022

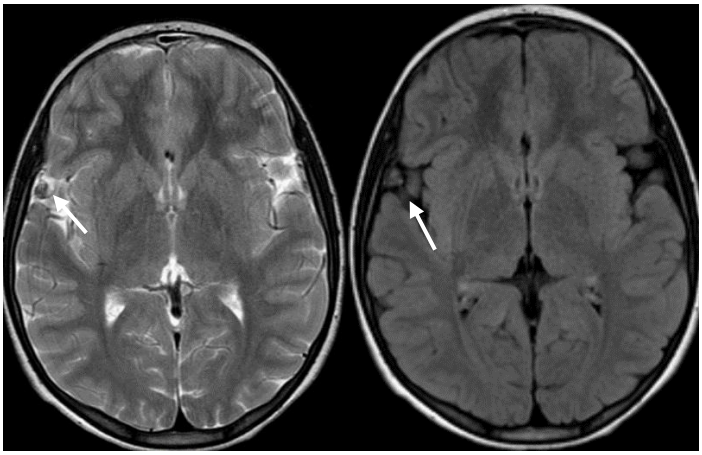

Figure 6: MRI in 2023 showing significant regression of the venous aneurysm 7mm x 7mm

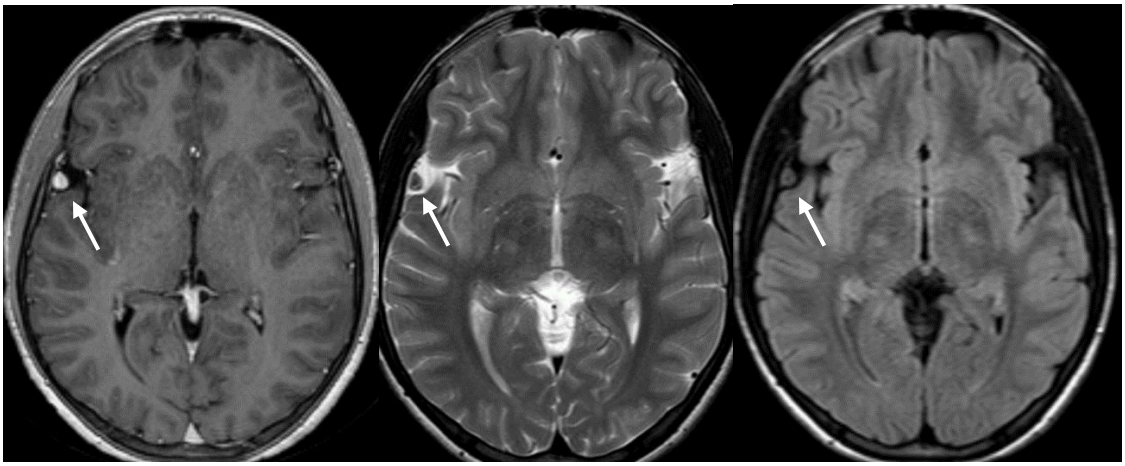

Figure 7: Last MRI in 2025 showing the right sylvian millimetric vascular lesion naturally regressed at 6mm

Discussion: Isolated cerebral varices, first reported in 1987, remain exceptionally uncommon.[2] Although the majority are asymptomatic and detected incidentally, they may occasionally manifest with seizures, intracranial hemorrhage, venous thrombosis, or focal neurological deficits when rupture occurs or when the dilated vein compresses adjacent brain structures. These lesions consist of a localized enlargement of a single cerebral vein, without involvement of neural tissue or other vascular abnormalities.[3] Their underlying pathogenesis is not fully understood; however, histopathological analyses indicate a structurally vulnerable venous wall characterized by diminished smooth muscle content, scarce or absent elastic fibers, and an expanded endothelial surface predisposed to dilation. Because of their appearance, venous aneurysms may be mistaken for cystic or neoplastic intracranial lesions. The presence of a perfectly round, smoothly marginated mass on CT or MRI should raise suspicion for a vascular etiology. [4]

While MRI angiography (MRA) and CT angiography (CTA), particularly with three-dimensional reconstructions, can provide excellent visualization of the varix, digital subtraction angiography (DSA) remains the gold standard for comprehensive assessment. DSA allows precise evaluation of the venous anatomy and identification of any associated arteriovenous malformations, arterial aneurysms, developmental venous anomalies, or dural arteriovenous fistulas (DAVFs).[5]

Isolated cerebral varices can present in varied ways and may lead to significant complications. Treatment strategies should differentiate between extra-axial and intra-axial lesions and take into account factors such as symptoms, lesion dimensions, and anatomical relationships. Although endovascular therapy is an available option, it is generally not used as first-line treatment for isolated venous aneurysms. Instead, it is most often employed when venous dilatations occur secondary to high-flow arteriovenous lesions, including pial AVFs, dural fistulas, or complex DVAs with arteriovenous components. For truly isolated varices, management remains controversial. Due to the rarity of this condition, some authors advocate early intervention, others favor conservative care with outpatient monitoring and periodic imaging.[1,4]

Only 13 cases in the literature review chose observation, just four[8,9,10,16] are reported with spontaneous regression over the years [Table 1]. Headache was the main complain in these reported cases. Although rare, spontaneous regression (or thrombosis) of cerebral venous aneurysms (isolated varices) has been reported, mainly in non-fistulous, low-flow lesions and pediatric patients. The possible mechanisms include spontaneous thrombosis within the varix, endothelial remodeling and fibrosis and normalization of venous outflow after hemodynamic stabilization.

Author name	Place and year	Location	Presentation
Numaguchi Y et al. [9]	Japan 1986	Right parietal region	Headache
Tanohata et al. [15]	Japan 1986	Right parietal	Incidental
Meyer FB et al. [12]	USA 1989	Right basal ganglia	Headache
Nishioka T et al. [11]	Japan 1990	Left insular	Seizures
Shibata Y et al. [3]	Japan 1991	Left deep sylvian vein	Incidental
Saigal et al. [14]	USA 2003	Left frontotemporal	Incidental
Vattoth S et al. [7]	India 2004	Right frontotemporal	Generalized seizures
Kondo T et al. [16]	Japan 2004	Parietal region	Seizure
Tanju et al. [13]	Turkey 2006	Left postcentral sulcus	Headache

Sirin S et al. [6]	Turkey 2008	Left temporal	Absence seizure
Gomez DF et al. [5]	Columbia 2016	Right temporal lobe	Headache
Ozturk M et al. [8]	Turkey 2017	Right parietal convexity	Spontaneous thrombosis
Kim HS et al. [10]	Korea 2018	22 patients mixed	Various

Table 1*: summary of reported cases of brain venous aneurysms that were left in observation*

Conclusion: Cerebral venous aneurysms are important vascular anomalies that should be considered in the differential diagnosis of the intracranial mass lesions. Size, location, symptoms, association with other arteriovenous malformations and risk of hemorrhage should be evaluated carefully before taking any decision to treat them. Although rare, spontaneous regression can occur, so observation is preferred for these asymptomatic vascular lesions that can naturally stay silent or regress.

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