Neurological Case Reports

Case Report
Published: 28 Nov, 2023

Diagnostic Difficulties in a Patient with a Cerebral Venous Thrombosis and Tentorial Arteriovenous Fistula

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Abstract

Tentorial dural arteriovenous fistulas – tentorial DAVFs are rare conditions presented with unspecific clinical symptoms. The clinical symptoms are unspecific but the correct diagnosis may pose a diagnostic challenge. We present a case of 49-year-old patient with pulsating sensation in his head and unpleasant constant noise locating behind his left ear. The initial diagnostic difficulties encountered in 2018 and 2019 were due to supposed radiologic images of old post-thrombotic changes in Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) examination. The diagnosis was finally made by Doppler Duplex ultrasonographic probe that showed disturbed blood flow in the left external carotid artery. The patient DAVF's was successfully embolized through meningeal branch of the left ascending pharyngeal artery that was a blood supplier. Intraoperative angiography revealed total closure of the fistula and a regular blood flow. Postoperative angio-MRI performed one year later showed total occlusion of the vascular malformation. The patient's disabling symptoms completely disappeared.

Introduction

Intracranial Dural Arteriovenous Fistula (DAVF) are an uncommon neurosurgical condition, a type of acquired intracranial vascular malformation consisting of a shunt within the dura matter. The severity of this pathological lesions depends on hypertension and congestion, that in some cases leads to hemorrhage. To correctly diagnose the patient, angiographic exploration must be undertaken, before other diseases may be considered [1].

Case Presentation

A 49-year-old patient with no previous medical history except appendectomy in 2013, reported in 2018 to our neurological clinic with chronic tinnitus in left ear, a pulsating sensation in left temporo-occipital area – as having a second heart as the patient described and mild periodical headache. Neurological examination didn't reveal any deficits, no vision disorders or dysarthria, no limb numbness or ataxia. Through 2018 to 2020 several follow-up visits occurred with ongoing conservative treatment. Initial diagnosis towards cerebral venous thrombosis was made after performing an magnetic resonance angiography in 2018 (Figure 1). Thereafter, the patient was diagnosed by conducting an angio-CT showing recanalized left transverse and sigmoid sinuses and widening of the outline of the adhering veins (Figure 2). A CT venography performed in 2019 showed small longitudinal contrast filling defects at the junction of the transverse and sigmoid sinuses that can indicate old post-thrombotic changes. Above mentioned examinations had been verified by performing a duplex ultrasound that display turbulences in the blond flow through left external carotid artery. These disturbances could indicate an arterial fistula along the course of the left external cerebral artery – ECA. The diagnosis was confirmed in 2020 by performing a Digital Subtraction Angiography that showed presence of tentorial arteriovenous fistula supplied with blood from the left middle meningeal artery (Figure 3). The patients were then referred to our neurosurgical clinic for possible consideration of endovascular treatment. The patient was qualified for surgery *via* trans-arterial route. The procedure was performed in 2020 in endovascular operating theater, *via* the puncture of the right femoral artery and catheterization of the left external carotid artery. Intraoperative angiography confirmed blood flow towards the fistula. Next stage was selectively inserting a microcatheter *via* a micro-guide into the perimeter of meningeal branch of left ascending pharyngeal artery, that was vascularizing the fistula. Then it was decided to begin a slow controlled injection of the Onyx liquid embolic system through microcatheter. The control angiography showed a complete closure of the fistula and no abnormalities in transcended blood vessels (Figure 4). Postoperatively the clinical status of the patient improved. Following the surgery,

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Received Date: *10 Nov 2023*
Accepted Date: *24 Nov 2023*
Published Date: *28 Nov 2023*

Citation:
Piwowarski K, Biliński P, Sobstyl M. Diagnostic Difficulties in a Patient with a Cerebral Venous Thrombosis and Tentorial Arteriovenous Fistula. Neurol Case Rep. 2023; 6(2): 1043.

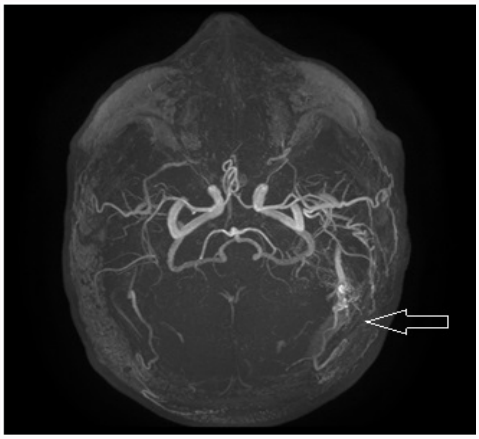

Figure 1: Magnetic resonance angiography showing old post-thrombotic changes in the left transverse and sigmoid sinuses marked with the white arrow.

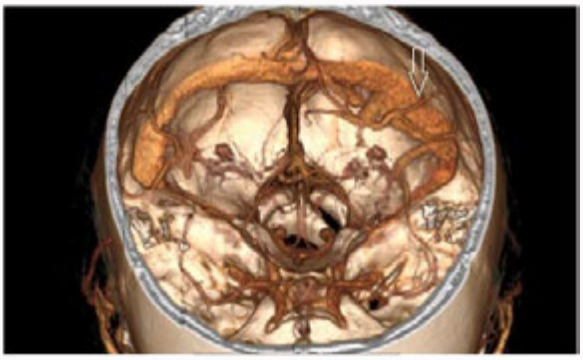

Figure 2: Angio-computed tomography showing recanalized left transverse and sigmoid sinuses and widening of the outline of the adhering veins. These abnormalities are pointed by the white arrow.

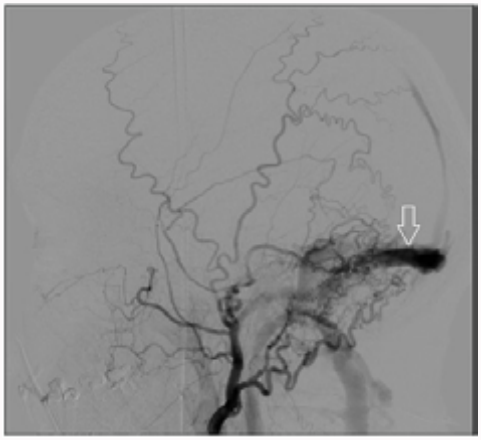

Figure 3: Digital Subtraction Angiography showed presence of tentorialarterio-venous fistula supplied with blood from the left middle meningeal artery with blood outflow to the left transverse sinus (white arrow).

the patient reported remission of tinnitus and nearly total headache reduction and after few days the patient was discharged home. Scheduled follow-up visit (Routine checkup) was done one year – with controlled angio-MR which showed no signs of revascularization of the tentorial arteriovenous fistula (Figure 5). The neurological status

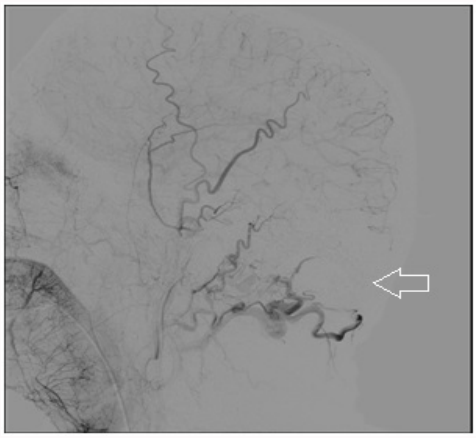

Figure 4: The intraoperative angiography showed a complete closure of the fistula and no abnormalities in transcended blood vessels. The normalization of the blood flow in the left transverse and sigmoid sinuses is visible (white arrow).

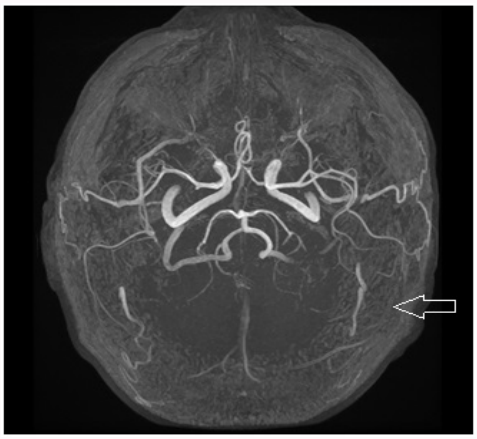

Figure 5: Postoperative angio-MR performed one year later showed no signs of revascularization of the tentorial arterio-venous fistula. The place of the closure of tentorial AVF is marked with white arrow.

of the patient is unremarkable. The patient is active professionally as a farmer.

Discussion

Most intracranial DAVFs are idiopathic or due to the opening of arteriovenous dural connections and aftermaths of arterial dilatation with autoregulation failures that causes thrombosis, with is then base for meningeal fistulas. Tentorial DAVFs constitute around 4% of all intracranial DAVFs, for which middle meningeal and occipital artery are main feeders. Rare and complex vascular anatomy of the venous drainage direction depend heavily on location of fistula. Typically, the fistulas drain into cortical and leptomeningeal veins. The most common symptoms of DAVFs include hemorrhage more common in tentorial location of a DAVF. The others symptoms of DAVFs may include urinary incontinence, paresis and paresthesia. These symptoms are caused by the brain edema – due to venous hypertension caused by leptomeningeal, pontine and spinal drainage. Neurological deficits are usually caused by brain edema or spinal cord blood circulation dysfunction. Usually in cases of DAVFs the neurological deficits have the tendency to progress. Mild neurological deficits are usually being misinterpreted and rarely advance

neurological examinations are indicated. In most reported cases of DAVFs with relatively silent and stable clinical symptoms, the final diagnosis has been achieved after several months or even years [2]. Venous drainage patterns allowed the classification of five types of dural AVFs: Type I (with a benign course) located in the main sinus with antegrade flow, type II with reflux into the sinus and intracranial hypertension in 20% of cases, type III causing direct cortical venous drainage excluding venous ectasia, type IV with straight cortical venous drainage and venous ectasia and type V with spinal venous drainage [3]. Hemorrhage occurs in 40% of cases of type III and 65% of type IV. Type V induce progressive myelopathy in 50% of cases [4,5]. Endovascular intervention for tentorial DAVFs include identification of fistula and occlusion of blood flow in veins that are causing pathological leakage [6]. It proved to be safe and effective therapy that achieved complete occlusion in majority of cases and should by the first option [7]. In our patient we chose to inject glue substance deliver *via* microcatheter through careful navigation. With high-quality angiography that can facilitate comprehending vessels complex anatomy of extensive arterial supply of tentorial DAVFs, the operator has higher chance to avoid small arteries dissection depending on the approach route. The safest is through meningeal branches of external carotid artery. In case of endovascular failure, the surgical ligation may be considered [2,8].

Conclusion

Tentorial DAVFs represent a difficult vascular malformation for the right interpretation of radiological examinations, especially when patients disclose nonspecific symptoms and mild course of the illness. Broad-spectrum of diagnostic examinations may be relevant for the patient upcoming treatment. The endovascular procedure remains a challenging but successful treatment of choice in tentorial DAVFs as in the presented case [9].

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