INTRACRANIAL VENOUS ANGIOMAS – CASE REPORT

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SUMMARY – Two cases of intracranial venous angiomas, one in a 42-year-old woman and another one in a 27-year-old-man, are presented. Intracranial venous angiomas, also known as developmental venous anomalies, represent one of four cerebral vascular malformations. Usually they are incidentally discovered on cerebral imaging. These lesions have a characteristic appearance in the venous phase of angiography, a starburst pattern or umbrella sign, described as caput medusae. Most of the lesions are clinically silent, however, they can be symptomatic with clinical presentation including seizures, headache, dizziness and focal neurologic deficits. They are sometimes associated with cerebral hemorrhage. In general, no treatment is required. Surgery is only indicated if seizures attributed to the lesion or hemorrhage occur.

Key words: Central Nervous System Venous Angiomas; Case Report

Introduction

Intracranial venous angiomas, also known as developmental venous anomalies (DVAs)¹,² are one of four cerebral vascular malformations¹,² usually expected in regions supplied by the middle cerebral artery or in the region of the vein of Galen. The cerebral venous angiomas are actually embryologic variants of venous drainage and form an alternative venous drainage of the surrounding nervous tissue, which is composed of anomalous veins separated by normal neural parenchyma in which embryologic medianullary venules persist and cluster in a central, large, draining venous trunk. This collector drains intracerebrally into the deep or superficial venous system.³–⁵ One third of these lesions are located in the cerebellum and in the brainstem; the remaining two thirds are supratentorially located. These lesions usually are incidentally discovered on cerebral imaging⁶,⁷ and have a characteristic appearance in the venous phase of angiography, a starburst pattern or umbrella sign⁸,⁹ that is described as caput medusae. Most venous angiomas are clinically silent, however, they can be symptomatic with clinical presentation including seizures, headache, dizziness and focal neurologic deficits.¹⁰ They are sometimes associated with cerebral hemorrhage. In general, they require no treatment. Surgery is only indicated if seizures attributed to the lesion or hemorrhage occur.

Case Reports

Case 1

A 42-year-old, previously healthy woman was admitted to the Hospital Department of Neurology for grand mal seizures. At the time of admission, she had no neurologic deficit. Computer tomography (CT) scan of the head performed immediately upon admission showed hyperdensities in the region of lenticular nucleus and internal capsule bilaterally, near the third ventricle and in the area of the splenium corporis callosi. Upon contrast application, there was enhancement in these areas as a radiologic sign of arteriovenous malformation (Fig. 1). Therefore, magnetic resonance imaging (MRI) and MR angiography were performed, which
Fig. 1. Contrast enhanced CT scan of the brain shows characteristic finding for arteriovenous malformation in the area of the lenticular nucleus and internal capsule on both sides near the third ventricle and the splenium corporis callosi.

A = axial scans; B = axial scans; C = sagittal reconstruction

Fig. 2. MR with MR angiography showed the same findings as contrast enhanced CT scan. Clearly visible arteriovenous malformation.

A = T2 weighted axial scan; B = MR angiograms; C = MR angiograms; D = MR angiograms
showed the same findings (Fig. 2). The patient was treated conservatively and transferred to Department of Neurosurgery. Cerebral angiography showed venous angiom involving both sides of the mid-brain region, with drainage into the superior sagittal sinus, straight sinus and sigmoid sinus (Figs. 3,4,5). There were no signs of intracerebral hemorrhage, so we decided to treat the patient conservatively for the low risk of hemorrhage.

Fig. 3. Digital subtraction angiography: left common carotid artery (CCA) catheterized. Arterial phase (A) without pathomorphologic changes. Late venous phase (B) and (C): extensive venous malformation in the mid-brain region.

Fig. 4. Digital subtraction angiography: right common carotid artery (CCA) catheterized. Arterial phase (A) without pathologic changes. Late venous phase (B) and magnified detail from previous figure (C): extensive venous angiom with characteristic drainage.

Fig. 5. Digital subtraction angiography: left vertebral artery (VA) catheterized. Arterial phase (A) without pathomorphologic changes. Late venous phase (B) shows venous drainage of the mid-brain as venous malformation.
malformation. Decompressive suboccipital craniectomy was performed. Venous angioma was treated conservatively.

Discussion

Two cases of intracranial venous angioma are reported. Venous angiomas, also called developmental venous anomalies\textsuperscript{2,3} are composed of anomalous veins separated by normal neural parenchyma and represent congenital anomalies of the intracranial venous drainage. The malformations may be composed of a single, greatly dilated, tortuous vein or a number of smaller veins coalescing at a single point without direct arterial input. Histologically, venous angiomas are characterized by a composition of sometimes thickened and hyalinized veins with interspersed normal neural parenchyma. Although once considered rare, they are now thought to be one of the most frequent cerebral vascular abnormalities\textsuperscript{1,13}. Very often these anomalies are incidentally discovered on cerebral imaging\textsuperscript{11}. On angiography they present typically as deep, medullary veins during the early or middle venous phase accompanied by a single large draining vein. On CT they are rarely detectable without contrast enhancement. After application of contrast medium the draining veins appear as a linear focus of enhancement\textsuperscript{16}. On MRI venous angiomas have a characteristic flow void on both T1 and T2 weighted images\textsuperscript{15}. Administration of MR contrast material considerably improves demonstration of the draining vein and often allows visualization of the medullary veins. However, they can also be symptomatic with clinical presentation including seizures, headache, dizziness and focal neurologic deficits\textsuperscript{12,13}. They may be associated with a cavernous malformation and are sometimes associated with
cerebral hemorrhage\textsuperscript{14}. The clinical importance of these lesions is as potential causes of cerebral hemorrhage and cause of obstructive hydrocephalus\textsuperscript{15}. The authors present two cases of venous angiomas, one in a 42-year-old woman with grand mal epilepsy. Since surgery is indicated if seizures are attributed to the lesion, in this case there was a relative indication for operative treatment. Yet, we did not indicate it due to the location of the lesion and probably massive postoperative neurologic deficit. The other patient was operated on for Arnold-Chiari I malformation, the probable cause of his symptoms. However, venous angioma was not treated operatively. There are opinions that there is no indication for surgery in patients with venous angioma unless they present with an extensive intracerebral hematoma, since venous angiomas drain normal cerebral tissue within a functionally normal arterial territory and resection may lead to venous infarction\textsuperscript{17}.

We think that there are many factors that should be considered, e.g., clinical symptomatology, patient age, localization and size of angioma. However, because of the low risk of new neurologic events, we propose conservative management in most cases. The risk associated with surgical intervention greatly exceeds the low risk of morbidity related to venous malformation hemorrhage. The other treatment option, radiosurgery, also remains contraindicated\textsuperscript{19}.

Although cerebral venous malformations have been reported to cause epilepsy, progressive neurologic deficits, and hemorrhage, their clinical significance still remains controversial\textsuperscript{13}.

References
Sažetak

INTRAKRANIJSKI VENSKI ANGIOMI – PRIKAZ SLUČAJA

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Ključne riječi: Venski angiom središnjeg živčanog sustava, Prikaz slučaja