ORIGINAL ARTICLE

SEQUENTIAL DIAGNOSIS OF TWO CEREBRAL ARTERIOVENOUS MALFORMATIONS: CASE REPORT

DIAGNÓSTICO SEQUENCIAL DE DUAS MALFORMAÇÕES ARTERIOVENOSAS CEREBRAIS: ESTUDO DE CASO

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ABSTRACT

Cerebral arteriovenous malformations (AVM) are vascular lesions of the cerebral vascular system that occur during embryogenesis. A 19-year-old male patient was diagnosed and treated for the first AVM in the splenium of the corpus callosum. After a year and a half, he was diagnosed with a second AVM in the knee of the corpus callosum, receiving the second appropriate treatment. Although cerebral angiography is the gold standard for evaluating AVM angioarchitecture, its monitoring is essential after surgical, radiosurgical, or embolization treatment for a decisive diagnosis, especially in cases of micro malformations.

Keywords: Angiography; corpus callosum; intracranial arteriovenous malformations; neurosurgery

RESUMO

As malformações arteriovenosas cerebrais (MAV) são lesões vasculares do sistema vascular cerebral que ocorrem durante o período de embriogênese. Trata-se de um paciente do gênero masculino, com 19 anos, diagnosticado e tratado da primeira MAV no esplênio do corpo caloso. Após um ano e meio, foi diagnosticado com uma segunda MAV no joelho do corpo caloso, recebendo o segundo tratamento adequado. Embora a angiografia cerebral seja considerada padrão ouro para avaliar a angioarquitetura da MAV, torna-se indispensável o acompanhamento de sua evolução após o tratamento cirúrgico, radiocirúrgico ou por embolização, para um diagnóstico decisivo e expansivo, principalmente, em casos de micromalformações.

Palavras-chave: Angiografia; Corpo caloso; Malformações arteriovenosas intracranianas; Neurocirurgia

INTRODUCTION

Cerebral arteriovenous malformations (AVM) are vascular lesions arising from the embryogenesis of the cerebral vascular system. Its primary lesion is characterized by the absence of the normal capillary network between arteries and veins, resulting in a dilated structure with a skein appearance[1-3]. Intracranial hemorrhage, especially intraparenchymal hemorrhage, is the clinical manifestation present in most patients with AVM. Imaging studies, such as computed tomography, nuclear magnetic resonance (NMR), and cerebral angiography (CA) confirm the diagnosis of a vascular lesion[4].

The CA is the best imaging method to evaluate AVM angioarchitecture and the existence of risk factors that may aggravate its evolution, providing greater importance for the understanding and therapeutic guidance of AVM[5].

Evidence suggests that between 0.14% and 0.80% of the population may have cerebral AVM at some point in life. Several AVMs are diagnosed between 20 and 40 years, and only 18.0% to 20.0% are symptomatic among people aged below 15 years. Among the symptoms, convulsions, headaches, and progressive neurological alterations can be highlighted. The risk of hemorrhage in patients with cerebral AVM who present other initial symptoms is about 2.2% per year, and the mortality of these patients with an initial hemorrhage is 10.0% to 15.0%, with morbidity ranging from 20.0% to 30.0%. This report presents a peculiar prognosis of AVM, as the patient was diagnosed twice at different times due to a pathology in which its etiology is summarized during embryogenesis[6-7].

CASE REPORT

The study was approved by the research ethi-

cs committee for research involving human beings of the Faculdade de Medicina de Olinda (no. 43998421.0.0000.8033).

A 19-year-old male patient was referred to the Complexo Hospitalar de Mangabeira Governador Tarcísio de Miranda Burity (state of Paraíba, Brazil) due to persistent tension headaches for more than five days. A cranial computed tomography scan was performed, and hyperdense content within the right lateral ventricle was found. Cranial arterial and venous resonance imaging and NMR revealed discrete alterations of expansive effects with serpiginous and flow-void images located in the most posterior portion of the splenium of the corpus callosum with a Spetzler-Martin classification grade II (Figure 1).

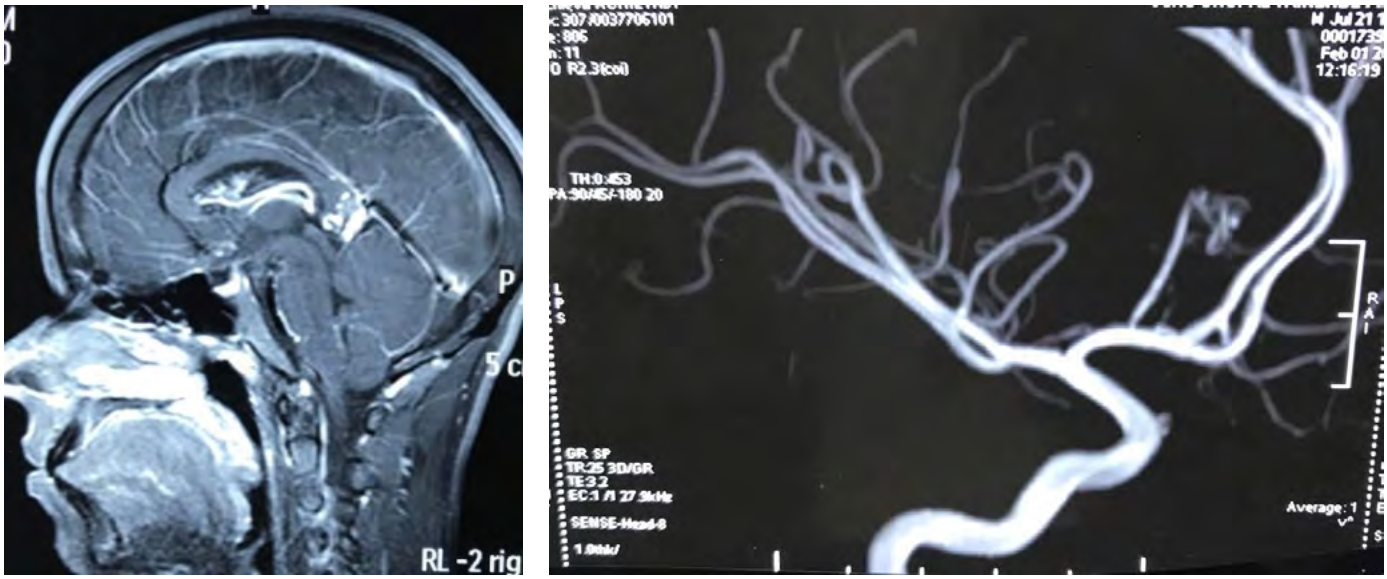

Figure 1. Contrast-enhanced NMR angioresonance.

The CA confirmed the first AVM in the splenium of the corpus callosum; thus, radiosurgery treatment was chosen. The patient was reassessed by NMR three and nine months after the first radiosurgery. After a year and a half, a CA confirmed satisfactory healing of the first AVM; however, a second AVM was observed posteriorly at the knee of the corpus callosum.

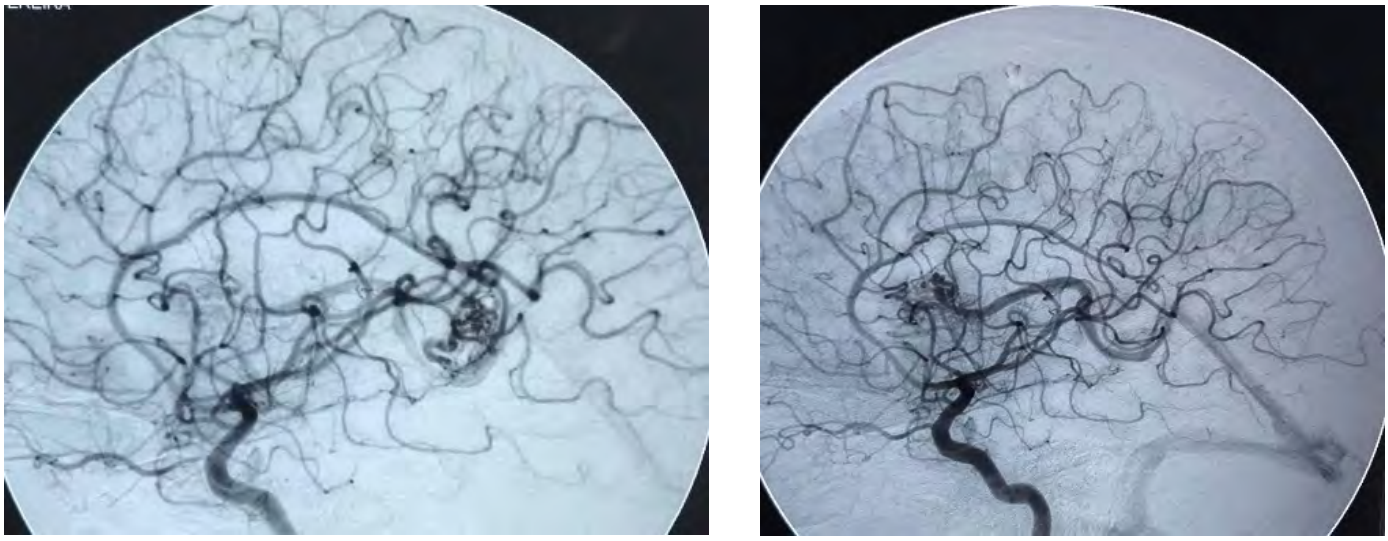

Figure 2. Cerebral arteriography. First and second arteriovenous malformation.

A second radiosurgery was performed, and the patient was reassessed by NMR three and nine months after the second radiosurgery; no alteration was evidenced.

COMMENTS

Several attempts at classification were presented by Dandy and Cushing-Bailey in 1928, Bergstrand-Olivecrona-Tönnis in 1936, Manuelidis in 1950, Pluvinage in 1954, Olivecrona-Landenheim in 1957, Russel-Rubinstein in 1963, Merland et al. in 1983, and Huang in 1984[4-7]. In 1985, McCormick, considering anatomopathological aspects, classified AVM as capillary telangiectasia, cavernous malformation, venous angioma, or arteriovenous malformation. Afterward, the latter was described macroscopically as an aspect of "worm folding". Yaşargil, in 1987, proposed a new classification[8,9].

The wide variation in tables and names reflected the lack of understanding about the pathogenesis of AVM. The classifications were simple and of limited practical use or very complex with difficult clinical applications. In this context, Spetzler and Martin, in 1986, published the classification of AVM to estimate the risk of surgical morbidity and mortality, which was widely accepted due to its simplicity and practicality. The classification was based on surgical difficulty, considering size, venous drainage pattern, and eloquence of the adjacent brain[9].

The size of the AVM nidus was considered small (< 3 cm), medium (3 - 6 cm), or large (> 6 cm), accounting for a large part of the technical difficulty during the surgery. The extent of brain tissue exposed during AVM resection and the time required for anesthesia increases the risk of postoperative complications. Size is also related to the number of afferents and blood flow[9,10].

Surgical AVM access is closely related to venous drainage since the veins must be connected last in the resection. Deep veins require most AVM to be detached for viewing. These veins are friable and difficult to coagulate and are prone to rupture and hemorrhage when retracted[8]. The venous drainage pattern is considered superficial or deep, being superficial if all AVM drainage is done through cortical veins. If any efferents drain through deep veins, such as the great vein, the internal cerebral vein, and the basal vein, the pattern is considered deep. In the posterior fossa, only veins in the cerebellar hemispheres that drain directly into the transverse sinuses or rectum are considered superficial[11].

The eloquence of the adjacent brain corresponds to the area that causes neurological alterations or sequelae if injured[3-6]. Eloquent areas include the sensory-motor area, visual and language cortex, hypothalamus, thalamus, internal capsule, brainstem, cerebellar peduncles, and deep cerebellar nuclei[3-6]. The degree is determined by imaging tests, and a value is given for each criterion. The points are summed up, with the total corresponding to a grade ranging from I to V. Grade I AVM are small, superficial, and located in the non-eloquent cortex, while grade V AVM is large, deep, and located in neurologically critical areas. The latter has a high risk of morbidity and mortality associated with surgery. AVM grades II to IV constitute a heterogeneous group with variable risk, and subdivisions of grade III were proposed by Oliveira et al. and Lawton[10,11].

Although CA is the gold standard for evaluating AVM angioarchitecture, its monitoring is essential after surgical, radiosurgical, or embolization treatment, with sequential angiographic examinations performed annually, appropriate views, and 3D digital radiographic images for an early and decisive diagnosis, especially in case of micro malformations. This monitoring avoids the repetitive need for radiosurgery and physical and emotional damage to the patient[6,8-9].

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