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Case Study

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# CEREBRAL ARTERIOVENOUS MALFORMATION: A CASE REPORT

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## ABSTRACT

Cerebral arteriovenous malformations (AVMs) are defined as abnormal vascular connections that form between arteries and veins, which have been thought to be congenital. AVMs may present with hemorrhage, seizure, or headache. Here, we report a case of a 25-year-old patient with a stroke-like presentation, where a Digital Subtraction Angiogram (DSA) led to the confirmative diagnosis of a massive arteriovenous malformation (AVM) in the right frontal area of the brain. Therefore the patient has undergone a surgical resection of AVM followed by conservative management to alleviate the symptoms of seizure. Upon review, the patient was asymptomatic without medication. Thus our report contradicts the fact that all AVM are congenital. AVM can occur at any stage of life and DSA remains the gold standard test for diagnosis and microsurgery is the successful management of AVM along with the antiepileptic agent.

**KEYWORDS:** Cerebral arteriovenous malformation, Seizure, Digital Subtraction Angiogram, Surgical resection, Antiepileptic agent.

## INTRODUCTION

Cerebral arteriovenous malformations (AVMs) are defined as abnormal vascular connections that form between arteries and veins, without an interceding capillary bed or neuronal tissues.[1] The prevalence of AVMs is found to be 0.06 to 0.14% with an incidence of less than 1%.[2-4] Less commonly, AVMs may manifest initial symptomatic presentation of hemorrhage, which is typically intraparenchymal, subarachnoid, or intraventricular, but less frequently can be subdural.[5] Other common presentations may include seizures or headaches.[6] The pathogenesis of AVMs remains incompletely expounded and has traditionally been thought to be congenital.[7] AVMs are commonly diagnosed through angiographic studies (computed tomography angiography, magnetic resonance angiography, or conventional catheter angiography).[8] Conservative management and Surgeries such as Surgical removal (resection), Endovascular embolization, Stereotactic radiosurgery (SRS) are the most conventional management for Cerebral AVM.

## CASE REPORT

A 25-year-old male patient was admitted to a tertiary care hospital with complaints of recurrent episodes of seizure. He had the last episode of seizure on the previous day. There was no existence of any past history. Thus, he was recommended for MR Imaging and the report showed the presence of right base frontal AVM. The diagnosis was confirmed by a Digital subtraction cerebral angiogram (DSA) which revealed right frontal arteriovenous malformation, feeder from right M3 segment of MCA, and venous drainage into the superior sagittal sinus via a cortical vein. The patient was elected to have the AVM resected and resection of the AVM is done without complication. The postoperative condition of the patient was stable and was discharged home after three days. The discharge medication includes anti-epileptic drug T. LEVETIRACETAM 500 mg BD. After1 one month of follow-up, the patient was found to be seizure-free without any antiepileptic medication.

## DISCUSSION

AVM is defined as congenital vascular lesions, characterized by an atypical aggregation of dilated arteries and veins.[9] The study conducted by Hofmeister *et al*., revealed the symptoms that lead to further testing for AVM are most commonly epileptic seizures, focal-neurologic deficits, or headaches.[10] Similarly, in this study, the only symptom in the patient was the occurrence of recurrent episodes of seizure.

The exact diagnosis of a Brain Arteriovenous Malformation (bAVM) is currently delivered by digital subtraction angiography (DSA), although many bAVMs can be reliably identified by computed tomography (CT) and MR imaging (MRI), including angiographic imaging (CTA and MRA).DSA is the reference standard for the diagnosis of bAVMs.

DSA has the highest degree of resolution of all diagnostic imaging modalities.[11]A study was carried by Chowdhury *et al*., to correlate MRA and DSA in the diagnosis of cerebral AVM. MRA could not be assessed flow status of AVM, distal feeding arteries, intranidal aneurysm, and angiopathic AVM which could be detected by DSA. So, DSA is superior to MRA in the diagnosis of cerebral AVM.[12] Another study Vella *et al*., showed DSA is typically performed on patients who have a suspicious finding on MR imaging or MRA.[13] Similarly in this study, as the patient was found suspicious on MR Imaging, which showed the presence of right frontal AVM, the physicians made the confirmation of further diagnosis through DSA report.

A vital factor that must be deemed during the treatment decision-making process is to compare the risks of all treatment modalities against the natural history risks of AVMs. Management of cerebral AVMs includes monitoring with medical management, microsurgical resection, stereotactic radiotherapy, and endovascular embolization.

Microsurgery is the gold standard classical treatment of AVMs. Microsurgical excision of the AVM involves a craniotomy, dural opening with circumambient nidus dissection until complete AVM resection is achieved.[14] Similarly, here the patient underwent the standard treatment of successful resection of AVM. And finally, the patient got discharged with an antiepileptic agent. On review the patient had found to be no seizure and medication-free

## CONCLUSION

In fact, the exact pathogenesis of AVM is unknown. However, our case reports the existence of asymptomatic AVM in an adult male with no history of previous vascular cerebral pathology, proving that not all cerebral AVMs are congenital. Henceforth, the reasons behind the episodes of seizures must be ruled out properly so as to reduce the morbidity and mortality rate. Although numerous techniques are available to rule out AVM, DSA remains the gold standard test. In addition, microsurgery is the successful management of AVM followed by the administration of antiepileptic agents.

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## CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

## ABBREVIATIONS

AVM-Arteriovenous Malformation, DSA-Digital Subtraction Angiogram, CT-Computed Tomography, MR-Magnetic Resonance, SRS Stereotactic radiosurgery.

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