Case Report

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Deep Temporal Lobe Arterio Venous malformation (AVM): A Case Report

Umesh Phalke*, Prashant Punia, Sarang Gotecha**, Aditya Ashok**, Akshay Chand****

Abstract

Arteriovenous malformation (AVM) is a defect of the circulatory system consisting of an abnormal connection between the arterial system, which normally has a higher intravascular pressure and the lower pressure venous pathways.

Arteriovenous malformation presents later in childhood or, more frequently, in adults in the second to third decade of life. These abnormal communications are divided into two types, plexiform and fistulous.

Cerebral arterio-venous malformations are one of the challenges for neuro surgeons. Medial temporal AVM are a special group in the medial hemispheric AVM and may be successfully resected using a direct microsurgical approach with limited morbidity and excellent prognosis for recovery.

Keywords: Arteriovenous Malformation; Arterial Channels; Craniotomy.

Introduction

Arteriovenous malformation (AVM) is a defect of the circulatory system consisting of an abnormal connection between the arterial system, which normally has a higher intravascular pressure and the lower pressure venous pathways. It consists of a blood vessel "nidus" (nest) through which arteries connect directly to veins, instead of through the elaborate collection of capillaries. Incidence is 1 in 100000 populations and CNS is most commonly involved organ system.[1] Medial temporal AVMs constitute a special group. AVMs of the medial temporal lobe frequently involve the basal ganglia and the thalamus. Treatment of temporal lobe AVMs is demanding due to their close spatio-anatomical relationship with important neurovascular structures and the optic radiation.[2]

Author's Affiliation: *Professor, **Resident, Dept. of Neurosurgery, Padmashree Dr. D.Y. Patil Medical College Hospital & Research Centre, Pimpri, Pune - 411018, Maharashtra, India.

Reprint Request: Dr. Aditya Ashok, A1/1002 Manik Baug Orchid, Udhyam Nagar, Pimpri, Pune, Maharashtra, India, Postal Code- 411018.

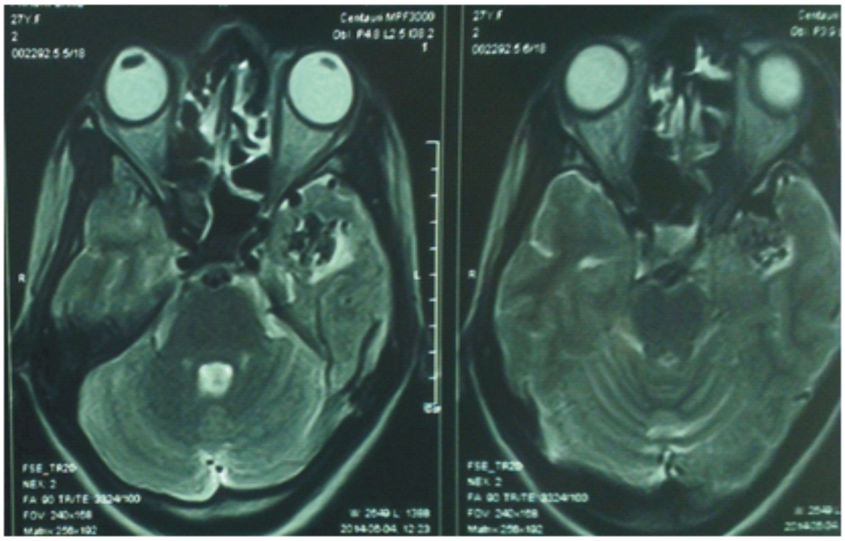
E-mail: dradityaashok@gmail.com

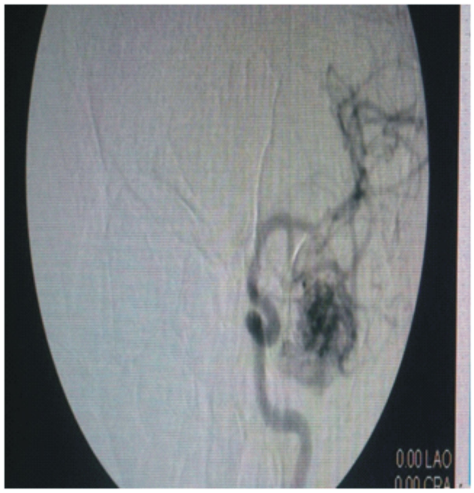
Case Rport

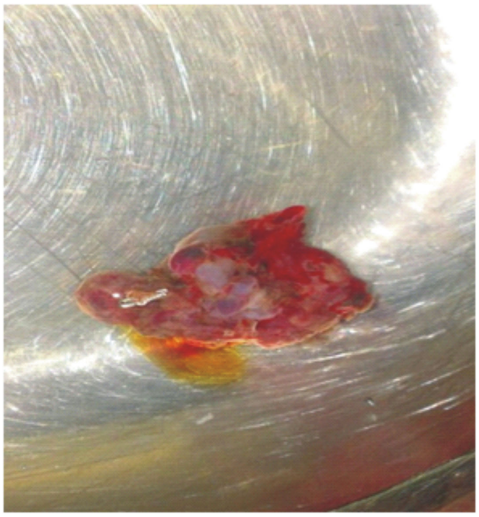
A 27 years old female patient was brought by relatives with h/o one episode of Status Epilepticus with frothing from mouth and left eye complete Ptosis since 3 days. She had taken primary treatment for epilepsy and headache in multiple clinics and shifted to our centre for further management. She was a known Epileptic on treatment for 16 years. There was no history of any major surgery, no known drug allergies and no past history of Hyprtension, Diabetes Mellitus, Asthma, Koch's or AIDS.

Clinical Examination and Investigations

Patient was conscious, oriented, obeyed commands, was moving all 4 limbs and no weakness. Left eye ptosis was present with diatation of pupil. Other pupil was reactive to light. There was no neck stiffness and all







except third cranial nerve were intact. Vitals, haematological, hepatic and renal profiles were within normal limits.

Special Investigations

MRI Brain was suggestive of arterio-venous malformation in the left medial temporal region measuring 2.8x1.5 cm causing mass effect.

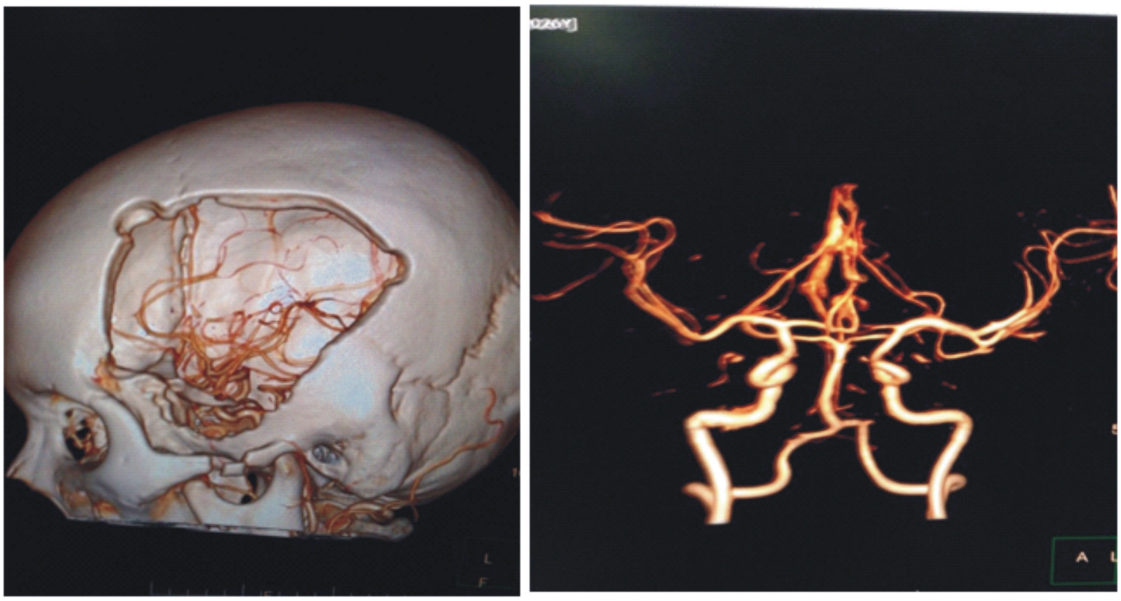
Patient was further investigated and a Digital Substraction Angiography DSA was done which revealed an arterio-venous malformation measuring 2.8 x 1.4 cm in the Left Temporal lobe fed by multiple branches of Left Middle Cerebral Artery and draining into the Deep Cortical Veins.

Operative Procedure

Left Fronto Temporo Parietal Craniotomy with Basal Craniectomy and removal of Zygoma with Microvascular Excision of Deep Temporal Arterio-venous Malformation.

Course in the Hospital

Patient was shifted to ICU and postoperative course was uneventful. Her general condition was better so patient was discharged on 7th post op day. Presently, the patient is Neurologically stable with no episodes of seizures since surgery and does not have any gross neurological deficits except 3rd Cranial Nerve Palsy (Left Eye Ptosis).



Follow Up

Patient was followed up at one month and a CT angiograph with 3D reconstruction was done which revealed the craniotomy defect with total excision of the AVM and no evidence of residual lesion

Discussion

- Arteriovenous malformation presents later in childhood or, more frequently, in adults in the second to third decade of life. These abnormal communications are divided into two types, plexiform and fistulous. In plexiform type, one or more arterial channels feed a core of tightly venously loop or a nidus, while in the fistulous type, an arterial channel empties directly into a venous channel or the lesion is diffuse with anomalous vessels dispersed among normal brain parenchyma without a nidus.[3]

  Cerebral arterio-venous malformations are one of the most difficult challenges for neurosurgeons either from the decision-making process or the techniques and surgical skills for this surgery. The natural history of these lesions in not fully known yet. Moreover, available evidences indicate that patients with AVM, who are left untreated frequently, die prematurely or are left incapacitated.[4]
- The Spetzler-Martin AVM grading system allocates points for various features of intracranial AVM's to give a score between 1 and 5. Grade 6 is used to describe inoperable lesions. The score correlates with operative outcome[5].

The grading system

- *size of nidus*
  - small (<3cm) = 1
  - medium (3-6cm) = 2
  - large (> 6cm) = 3
- *eloquence of adjacent brain*
  - non-eloquent = 0
  - eloquent = 1
- *venous drainage*
  - superficial only = 0
  - deep = 1

Risk of surgery is quite well estimated by the Spetzler-Martin grading system, with a favorable outcome in

- 92%–100% grade I
- 95% grade II
- 88% grade III
- 73% grade IV

- 57% grade V

Treatment planning for AVMs depends on the risk of subsequent hemorrhage, which is related to prior hemorrhage, smaller AVM size, deep venous drainage, and relatively high arterial feeding pressures.[6] Regarding the size of critical located malformations, stereotactic radiosurgery, microsurgical resection or embolization (if multiple hemorrhages) are the options for small (< 3 cm diameter) AVMs. Radiation therapy does not represent a first line approach of the AVMs, especially of the ruptured ones. Arterio-venous malformations of the medial temporal lobe are usually resected through subtemporal-transcortical approaches that provide a trajectory that is perpendicular to the plane of the AVM.[7] The pterional approach and orbitozygomatic approach are also recommended for these lesions. Based on our experience we performed the resection of AVM via pterional approach with microsurgical splitting of the anterior part of the sylvian fissure. This approach allows the visualization of the supraclinoid carotid artery and its branches that lead back to the malformation on the medial side of the temporal lobe.[8]

Conclusion

Cerebral arterio-venous malformations are one of the challenges for neuro surgeons. Medial temporal AVM are a special group in the medial hemispheric AVM and may be successfully resected using a direct microsurgical approach with limited morbidity and excellent prognosis for recovery. The advantages of surgery are the immediate elimination of the hemorrhage and of the risk for rebleeding. Also, the improvement in seizure control if the AVM is generating seizures as in our patient. In our experience pterional approach represents the best way in order to treat these lesions because allows the visualization of the feeding vessels and the lesion itself. Microsurgical treatment of Grades I to III AVMs is superior to stereotactic radiosurgery and is a calculable risk for most patients that renders a justifiable option, even in light of other treatment modalities.

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