http://www.banglajol.info/index.php/JNINB

Case Report

Journal of National Institute of Neurosciences Bangladesh, January 2017, Vol. 3, No. 1

ISSN (Online) 2518-6612
ISSN (Print) 2410-8030

Arteriovenous Malformation (AVM) of Left Frontal Lobe: A Case Report

SK. Sader Hossain[1], Md. Abdullah Alamgir[2], Ferdous Ara Islam[3], Misbahuddin Ahmed[4], Shafiul Alam[5], Amir Mohammad Khan[6]

[1]Professor & Head, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [2]Assistant Professor, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [3]Medical Officer, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [4]Assistant Professor, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [5]Assistant Professor, Gamma Knife Surgery, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [6]Assistant Professor, Clinical Neurosurgery, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh

[**Reviewed:** 21 February 2016; **Revised:** 6 March 2016; **Accepted:** 11 December 2016; **Published:** 1 January 2017]

Abstract

Arteriovenous malformation (AVM) is a rare congenital condition of the brain. In majority of cases AVMs remain asymptomatic and silent till it ruptures. But it can be a cause of cerebral haemorrhage, stroke, seizures, moderate to severe headache, loss of vision, aphasia, numbness or weakness of limbs. In current study, revealed a 25 years age patient of AVM admitted in Department of Neurosurgery at National Institute of Neurosciences (NINS) on December, 2013 with the complaints of loss of consciousness two times before admission, history of generalized seizure started over left side, headache for 2 years and vertigo for 1 year. Following admission the patient was evaluated clinically including all neurological examinations. All routine investigations were done. The patient was further evaluated by MRI, CT scan, CTA. Arteriovenous malformation was found in left frontal region. Under G/A nidus was excised totally in a single mass. Post MRI had shown the total removal of the AVM. Histopathological findings also revealed arteriovenous malformations. The post-operative period was uneventful and patient improved satisfactorily. He was found neurologically stable in follow up after 3 months. These researchers reported this case for its rarity and effective diagnosis and treatment by surgery. [Journal of National Institute of Neurosciences Bangladesh, 2017;3(1): 62-66]

Keywords: Arteriovenous malformation; AVM; AVM nidus; cerebral haemorrhage; seizures

Correspondence: Email: nins221@yahoo.com; Cell no.: +8801777403057

How to cite this article: Hossain S, Alamgir MA, Islam FA, Ahmed M, Harun K, Alam S, Khan AM. Arteriovenous Malformation (AVM) of Left Frontal Lobe: A Case Report. J Natl Inst Neurosci Bangladesh, 2017;3(1): 62-66

Introduction

A brain AVM (arteriovenous malformation) is a congenital abnormality where connection between arteries and veins can occur any part of brain[1]. Brain AVMs occur in about 0.1 percent of the population, one-tenth the incidence of intracranial aneurysms[2]. The anatomical absence of a capillary bed in the AVM nidus leads to high-flow arteriovenous shunting through one or more fistulats. Surrounding brain tissues can't easily absorb oxygen from the fast-flowing blood. Without enough oxygen, brain tissues weaken or may die off completely. This result in stroke-like symptoms, such as difficulty in speaking, weakness, numbness, vision loss or severe unsteadiness[3].

A brain AVM (arteriovenous malformation) may not cause any signs or symptoms until the AVM ruptures, resulting in bleeding in the brain (hemorrhage) which is the common complications. A person if diagnosed earlier with AVM for symptoms having more chance of bleeding. Like if a person is 40 years old and has an

AVM. The risk of him bleeding over the next 40 years is a little over 80%[4]. The other symptoms included Seizures, headache, progressive weakness or numbness, vision loss, difficulty in speech, severe unsteadiness. Pregnant women may have worsened symptoms. A bruit over skull can be heard with a stethoscope[5]. This case

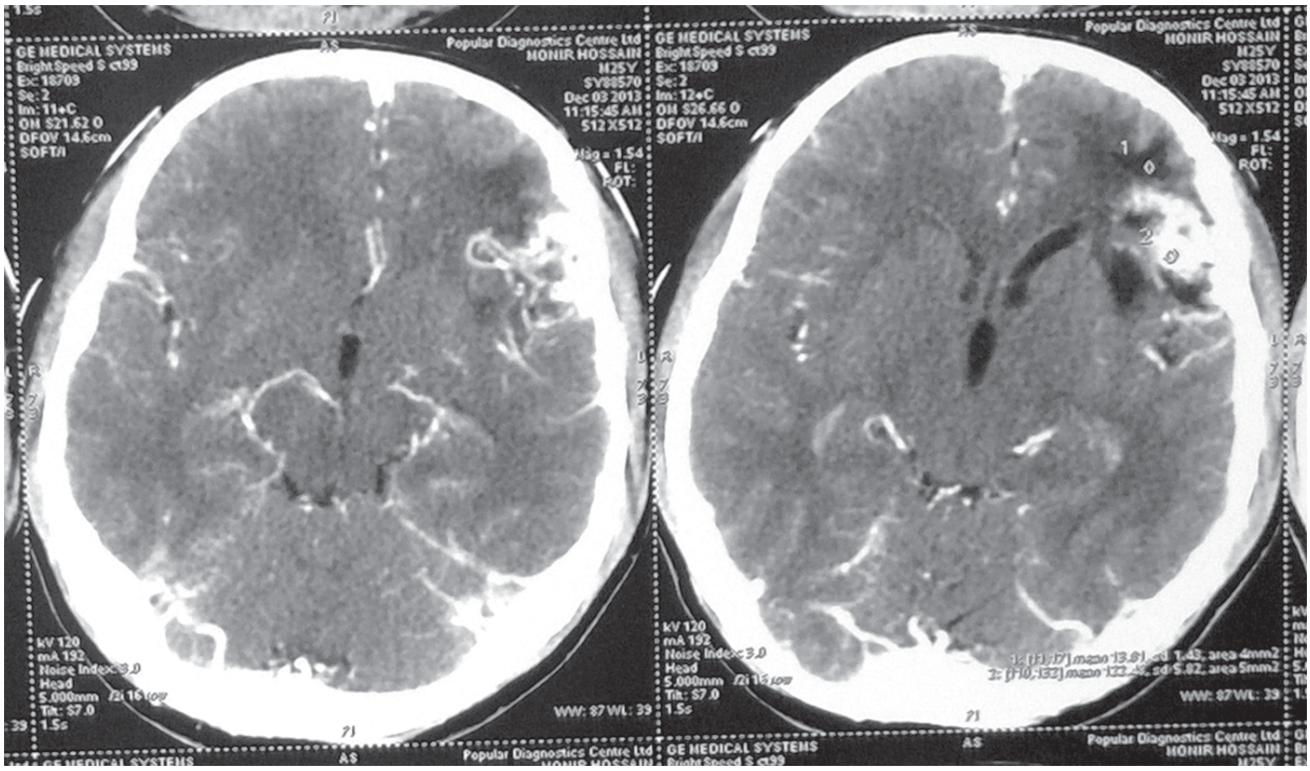

Figure I: CT scan of Brain showing AVM

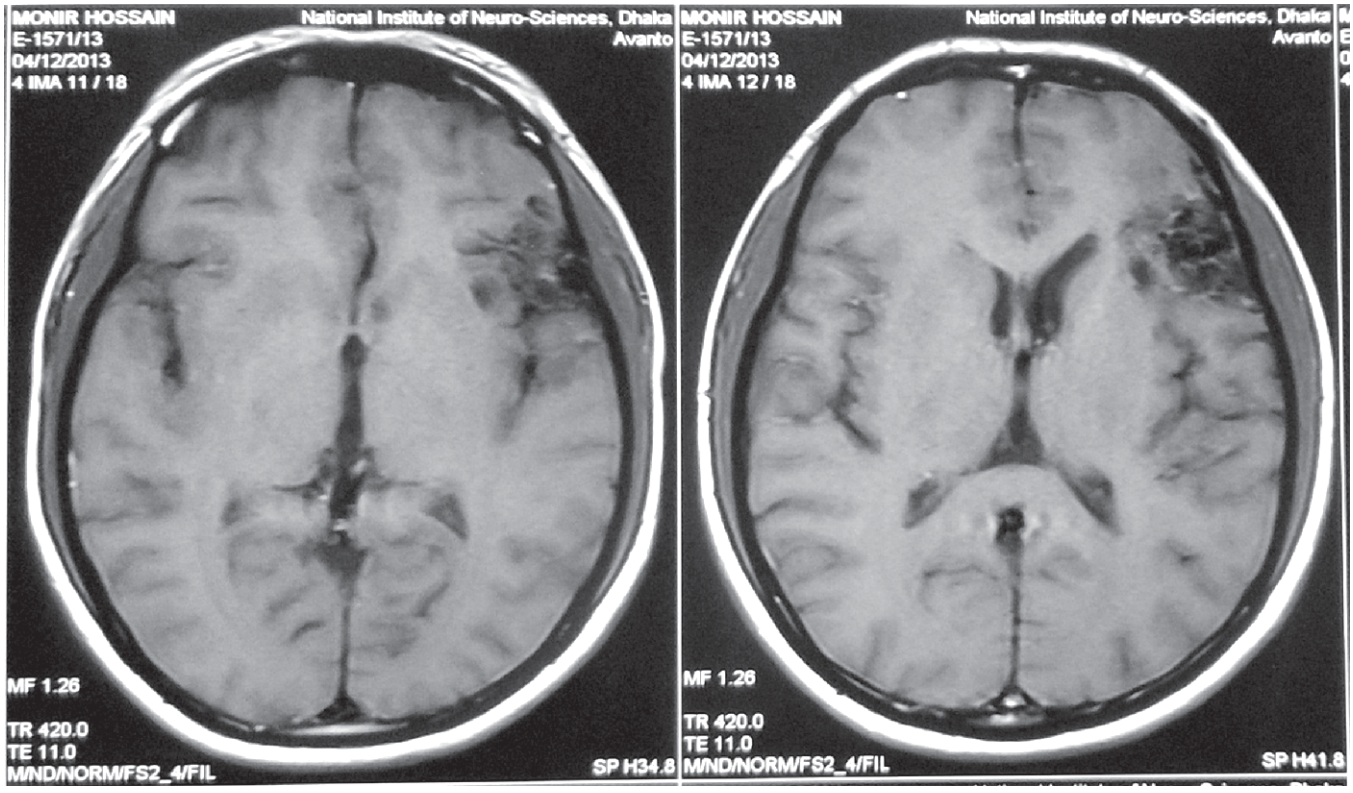

Figure II: MRI with contrast showing AVM

was followed to understand the AVM best of our knowledge with surgical treatment and follow up of the patient in future.

Case Presentation

A male patient, 25 years old, was admitted in the Department of neurosurgery, National Institute of Neurosciences (NINS) in December 23, 2013 with the complaints of loss of consciousness two times before admission. There was history of convulsion over left side. There was history of headache for 2 years and vertigo for 1 year. There were several vomiting episodes. The patient had no history of any traumatic injury. There was absence of other co-morbidities like Hypertension, Diabetes etc. On examination, GCS score was 15. There was no sensory loss. All cranial nerves were found intact. There were no abnormal changes in limbs. Magnetic resonance imaging (MRI) revealed mixed hypo and hyper dense areas in left frontal lobe with mild peri-focal oedema. There were cluster of serpentine flow was found in left fronto-temporal lobe involving cortical and sub cortical areas with surrounding gliottic changes. The serpiginious changes enhanced with IV contrast.

There were no other focal lesions. In CT Angiogram scan of brain revealed cluster of vessels in the region of left M3 segment with early filling of cortical veins. Other vascular systems were found normal. All were suggestive features of arteriovenous malformation (AVM) of left frontal lobe. Under G/A, left fronto-temporal craniotomy with excision of left frontal AVM was done. A bicoronal skin flap and left unilateral bone flap was made. Dural hitches were given. Sphenoid wings roungered out. After dural opening Sylvian fissure was opened. With very careful microsurgical dissection the AVM nidus was found and the feeder vessels were identified. The AVM was excised by cauterization of the vessels. One large feeder vessel was clipped with straight mini permanent clip. Following perfect haemostasis wound was closed in layers. In the post-operative period no pre-operative symptoms were observed. The results of histopathological examination confirmed Arteriovenous malformation which had shown section of cluster of vessels with some dilated hyalinized thick wall vascular spaces, haemosiderine laden macrophages, infiltration of inflammatory cells and fibro collagenous tissue and there was no evidence of malignant tissue. The patient condition was further improved in follow up after three months. Patient is now able to work all regular activities.

Discussion

Arteriovenous malformation (AVM) of brain is a rare condition of the brain. The prevalence of AVM varies in different study reports. In USA, one study revealed life time risk of detection of AVM in general population 1.34/100,000 per year[6]. Only 12.0% exhibit symptoms about 36,000 of the estimated 300,000 Americans with AVMs in varying severity[7]. The study subject was male, 25 years old. The pathogenesis of AVMs is not completely understood and has largely been theorized.

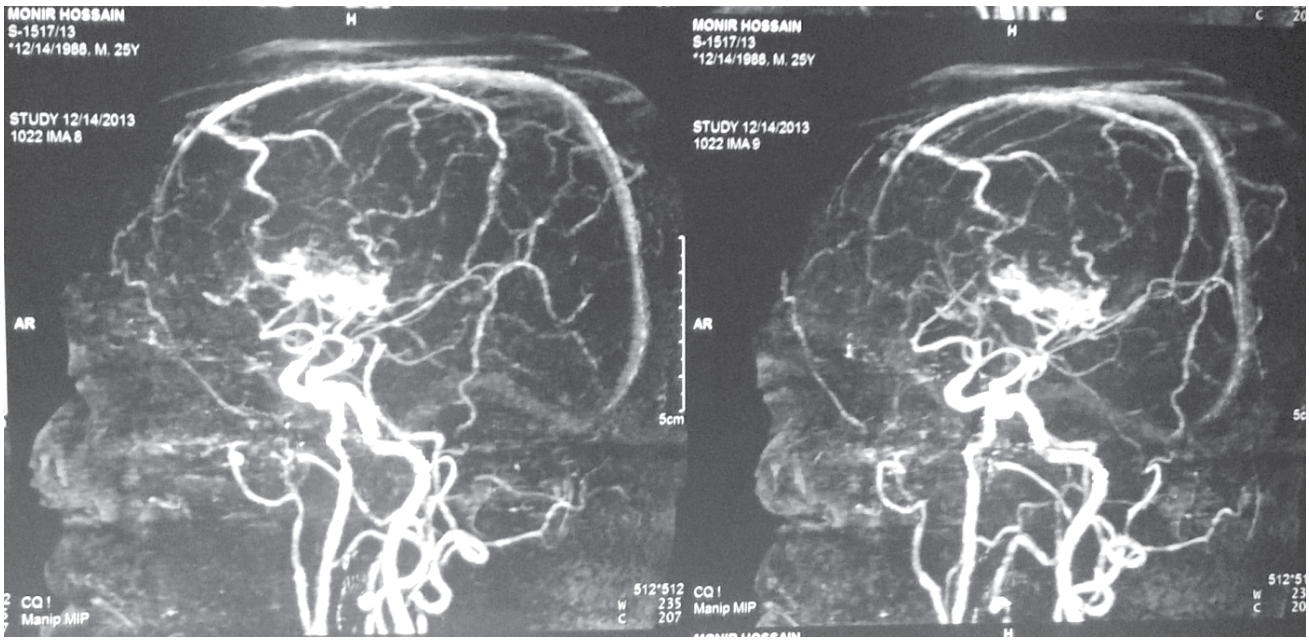

Figure III: CTA of Brain showing AVM nidus

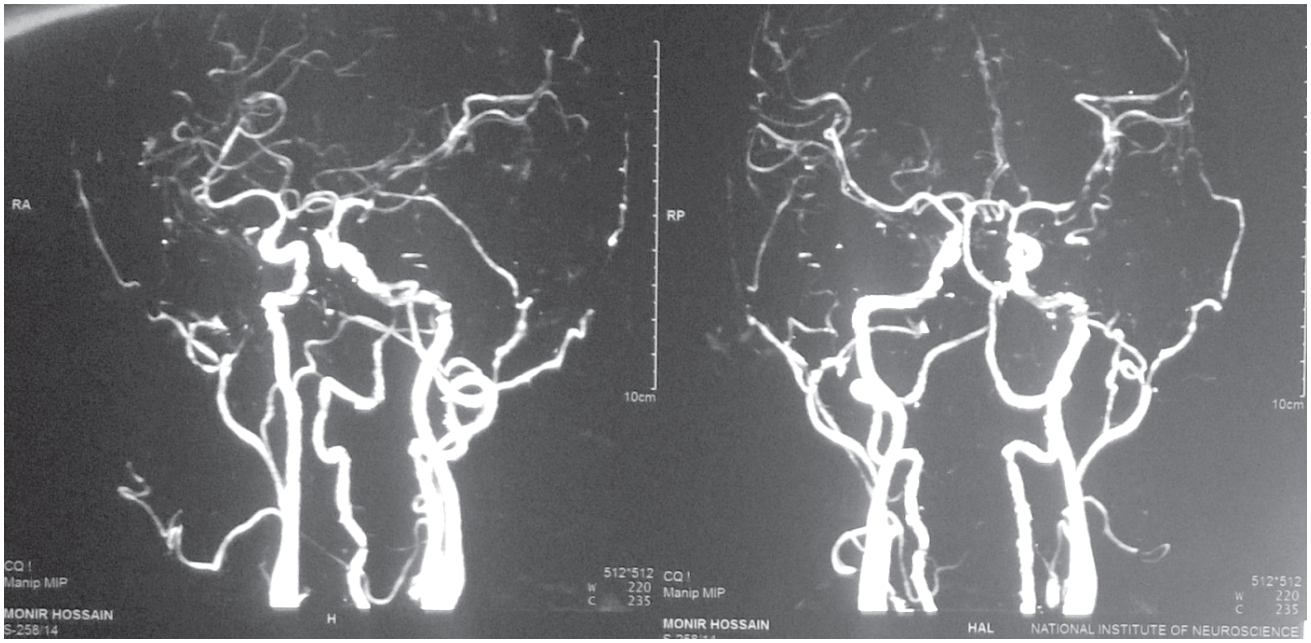

Figure IV: CTA of Brain showing absence of AVM nidus following surgery

It has been suggested that cerebral AVMs are primarily congenital, originating at or before the 40- to 80-mm embryo length stage and may be related to a primary abnormality of primordial capillary or venous formation[8]. AVM is common in males and who have positive family history[3].

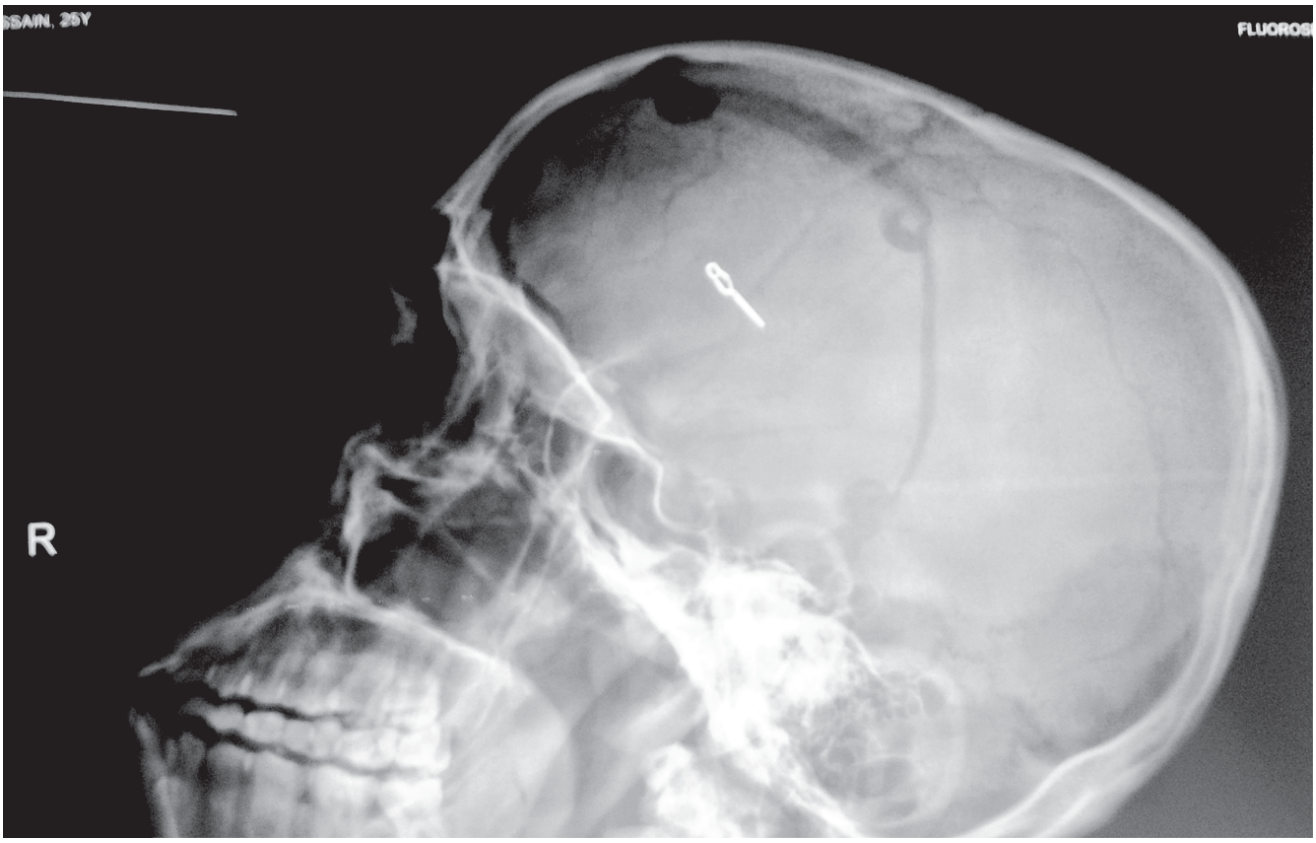

Figure V: X-ray skull (lateral view) showing clip

The patient was admitted with complaints of loss of consciousness, seizures, history of headache for 2 years and vertigo for 1 year. There were also several vomiting episodes. The commonest symptoms of AVMs of the brain included haemorrhage (45.0% cases) associated with acute onset of severe headache, seizures (46.0% cases), and progressive neurological deficit (21%), with or without vision loss[9-10].

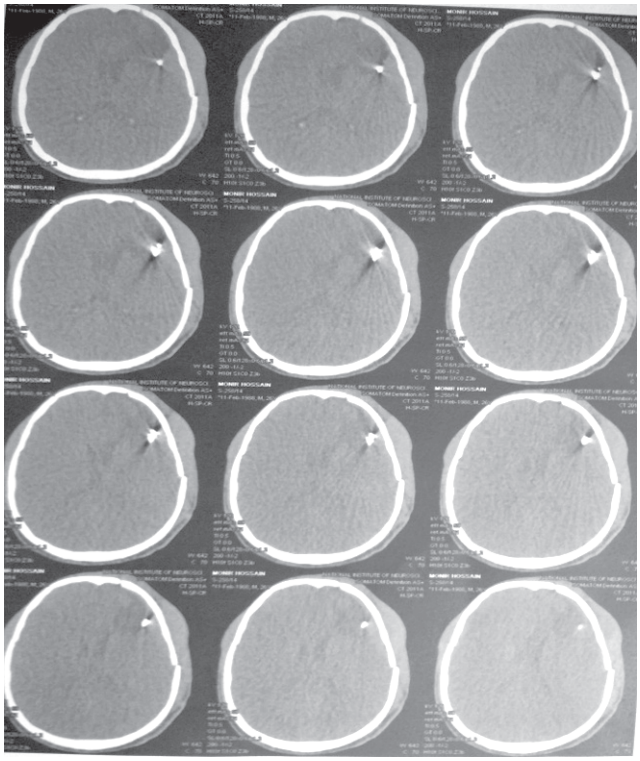

Figure VI: CT scan of brain showing clip

Current study diagnosed the AVM by Magnetic resonance imaging (MRI), Computed Tomography (CT) scan, Computed tomography angiogram (CTA) of brain. MRI is more sensitive to diagnose AVM and able to determine the location well than CT scan. CTA can diagnose the AVM well. Simple CT can scan able to detect haemorrhage easily. Magnetic resonance Angiogram (MRA) revealed best features of AVM[11-12]. Several methods used to treat AVM. In this study, simple excision and cauterization of nidus and clipping of large feeder vessel with straight mini permanent clip was found effective and successful treatment of AVM.

Conclusions

AVM of brain can be treated surgically with no neurological deficit of the patient. Further follow up is required to understand the recovery process well.

References

1. Laakso A, Hernesniemi J. Arteriovenous malformations: epidemiology and clinical presentation. Neurosurg Clin N Am. 2012;23(1):1-6
2. Mohr JP, Kejda-Scharler J, Pile-Spellman J. Diagnosis and treatment of arteriovenous malformations. Curr Neuro lNeurosci Rep 2013; 13:324
3. Mayo clinic staff. Diseases and condition. Arteriovenous malformation. Available at:http://www.mayoclinic.org/diseases-conditions/brain-avm/basics/risk-factors/con-20034230
4. The Toronto brain vascular study group. Brain Arteriovenous malformations. Risk factors. Available at: http://brainavm.oci.utoronto.ca/malformations/brain_avm_index.htm
5. Arteriovenous malformations of Brain. Available at: http://www.-mayoclinic.org/diseases-conditions/brain-avm/symptoms/con-20034230.
6. Stapf C, Mast H, Sciacca RR, et al. The New York islands AVM study: design, study progress and initial results. Stroke 2003;34 (5): e29–33.
7. NINDS Arteriovenous Malformation Information Page. Available at: http://www.ninds.nih.gov/disorders/avms/avms.htm
8. Mullan S, Mojtahedi S, Johnson DL, et al. Embryological basis of some aspects of cerebral fistulas and malformations. J Neurosurg 1996: 85; 1-8
9. Stapf C, Mast H, Sciacca RR, et al. Predictors of haemorrhage in patients with untreated brain arteriovenous malformations.Neurology 2006;66 (9): 1350–5
10. Choi JH, Mast H, Hartmann A, et al. Clinical and morphological determinants of focal neurological deficits in patients with unruptured brain Arteriovenous malformations. J Neurol Sci 2009;287(1-2):126–30
11. Al-Shahi R, Warlow C. A systemic review of the frequency and prognosis of arteriovenous malformations of the brain in adults. Brain 2001;124 (10): 1900–26
12. Mayo Clinic staff. Brain AVM (Arteriovenous malformation)-Tests and diagnosis. Mayo Foundation for Medical Education and Research.