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**Research Article**

# Rare case of a ruptured distal middle cerebral artery fusiform aneurysm: a neurosurgical challenge.

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**ABSTRACT: Distal ruptured fusiform middle cerebral artery (MCA) M4 segment aneurysms are rare and their management is a challenge to the neurosurgeon. Fusiform aneurysm of M4 part of is even rarer. Patient usually presents with headache or neurological deficit. Computed tomographic angiography helps to confirm diagnosis. Treatment involves micro-neurosurgical clipping or trapping and excision of aneurysm. Early surgical intervention of distal middle cerebral artery aneurysms favours better outcome. We report a case of 20 year old female patient who presented with complaint of severe headache. Neuroimaging was suggestive of right M4 middle cerebral artery fusiform aneurysm with intracerebral haemorrhage. Patient was managed by trapping and excision of aneurysm and recovered well.**

## INTRODUCTION

Aneurysms of the distal middle cerebral artery (MCA) are rare, constituting 1.1–5% of MCA lesions.[1, 2] The mean age at symptom onset is 38 years, and the male/female ratio is 1.4:1. Most lesions originate from the M1 or M2 segments, and most (80%) presented with nonhemorrhagic symptoms or were discovered incidentally.[3] Fusiform aneurysms represent 3-13% of all intracranial aneurysms.[4] The most common site is vertebra-basilar system.[5] We report a patient with ruptured fusiform aneurysm in right distal MCA that originated from the fourth segment of MCA (M4).

## CASE HISTORY

A 20 year old female patient presented to emergency with history of sudden onset severe headache. On admission her Glasgow Coma Scale (GCS) was E3V2M5 with bilateral pupils equal in size (two mm) and reacting to light. Non contrast computed tomography (Fig.1) was done and it revealed right parietal lobe intracerebral haemorrhage (ICH) with subarachnoid haemorrhage (SAH) with mass effect in the form of effacement of overlying cortical sulci and chinking of ipsilateral lateral ventricle with midline shift of 0.6 cm towards left side with intraventricular haemorrhage. Cerebral angiography (Fig.2) confirmed fusiform aneurysm of M4 part of right MCA. In view of fusiform aneurysm, source of fungal infection was ruled out and cardiac evaluation was done which was normal. Right fronto-temporo-parietal craniotomy was planned and an opening was made over the discoloured surface and hematoma was evacuated. A fusiform aneurysm originating from M4 part of distal MCA (Fig.3) was found inside the haematoma and the aneurysm was trapped and excised. Post-operatively patient was neurologically intact and computed tomography (CT) scan (Fig.4) done after 48 hours had minimal residual hematoma without any midline shift, edema or infarct. Postoperative course of the patient was uneventful and patient was discharged after 13th postoperative day without any neurological deficit. On follow up after two weeks, patient had fully recovered.


Figure 1: Pre-operative NCCT Head showing right parietal ICH with SAH.

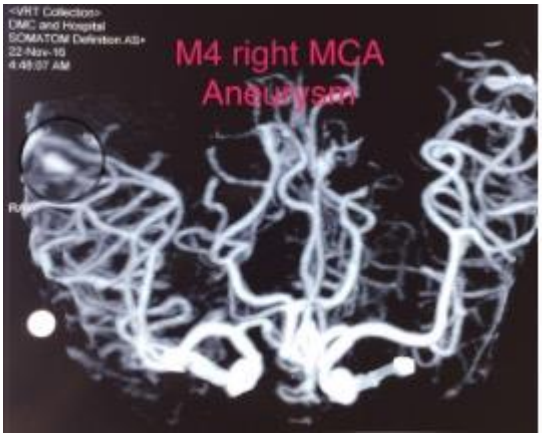


Figure 2: CT angiography showing right distal middle cerebral artery fusiform aneurysm

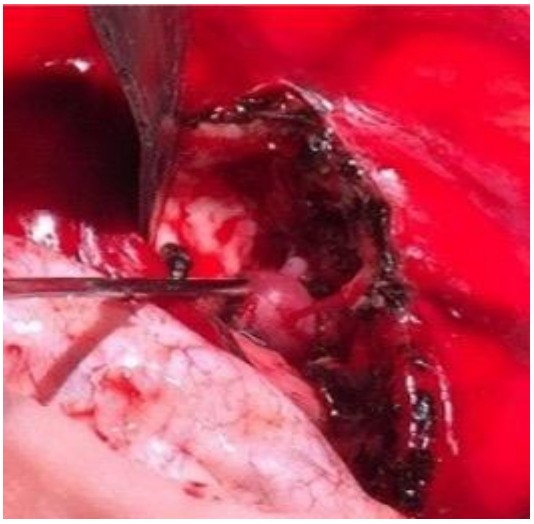

Figure 3: Intra-operative image showing distal middle cerebral artery aneurysm.

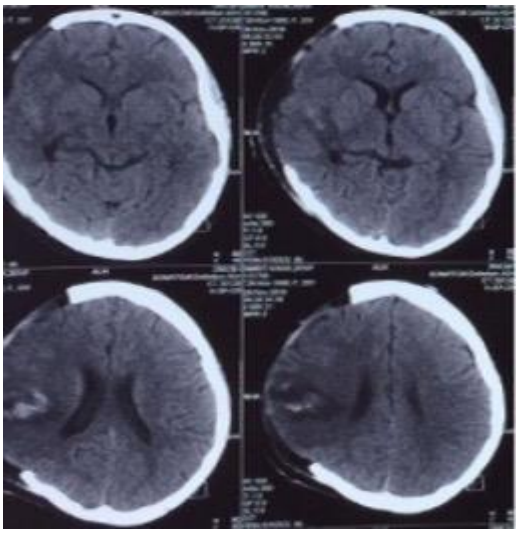

Figure 4: Post-operative NCCT showing minimal residual hematoma and no midline shift.

## DISCUSSION

The MCA is a direct extension of the internal carotid artery and is divided into four segments (M1–M4). The prevalence of MCA aneurysms is approximately 14.0–43.0 % among all cerebral aneurysms.[6,7,8] Majority of MCA aneurysms usually arise from the M2 bifurcation segment or the proximal M1 segment.[8,9]

Ruptured dMCA aneurysms are very rare, constituting 0.47% of all cerebral aneurysms and 2% of MCA aneurysms. In two large surgical series of 1012 and 3005 patients, there were 4 and 18 patients respectively with distal MCA aneurysm.[1,2] Recently, it has been reported that the incidence of dMCA aneurysm ranged from 2–6% of cerebral aneurysms.[1,8,10,11] According to Gibo et al.[12] dMCA aneurysms were classified based on location into four segments M2 (insular segment), M2–M3 junction, M3 (opercular segment) and M4 (cortical segment). Most MCA aneurysms occur at division of the main trunk (M1–M2 junction).[3,6] Most of MCA aneurysms arise from primary bifurcation due to hemodynamic stress. In his study Day et al.[9] found that out of 102 cases of spontaneous fusiform middle cerebral artery aneurysms, 69% of the aneurysms originated proximal to the MCA genu (M1 segment), 21% from insular (M2 segment) and 10% from distal (M3 or M4 branches). In our case, the aneurysm originated from the M4 segment in the distal MCA and it was a fusiform aneurysm which is very uncommon. In the case of MCA aneurysm ICH incidence is reported to be about 45%, and this worsens the outcome than other anterior circulation aneurysms.[11,13] In this case, ruptured d-MCA aneurysms was associated with intra-parenchymal bleed involving right parietal lobe with SAH with IVH involving lateral ventricle. Treatment of ruptured dMCA aneurysm is challenging. Micro-neurosurgical clipping and trapping with excision of aneurysm are the treatment options available.[14] In our case aneurysm was trapped and excised. Horiuchi et al. reported about post-surgery recuperation that despite the poor pre-operative grades due to ICH early surgery gained favorable outcome, while Rinne, et al. reported that unfavorable outcome was achieved due to ICH.[8, 15] In our case of ruptured fusiform d-MCA aneurysm, despite the ICH with SAH and IVH, favourable outcome was achieved due to early surgery.

## CONCLUSION

Ruptured fusiform aneurysm of M4 part of middle cerebral artery are rare. Early diagnosis with CT angiography and prompt surgical intervention increases chances of positive outcome.

## CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

## CONFLICT OF INTEREST

None

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