

MICROSURGICAL CLIPPING OF GIANT SACULAR MIDDLE CEREBRAL ARTERY ANEURYSM: A CASE REPORT

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ABSTRACT

Giant saccular middle cerebral artery aneurysm is rare vascular lesion and few cases have been reported in the literature. Microsurgical clipping is applied to treat a giant middle cerebral artery aneurysm. A 26 year-male presented with complain severe headache, multiple episodes of vomiting and one episode of sudden loss conscious since few hours prior to admission at emergency department. Cerebral Angiography showed a giant saccular middle cerebral artery (MCA) aneurysm. A standard right pterional approach applied to expose MCA and microsurgical clipping was performed. No any serious neurological complication was noted after surgery except right facial palsy. Patient was discharged at the 12th day of surgery. Endovascular therapy as well as STA-MCA bypass surgery plus clipping are usually applied to manage the giant MCA aneurysm. However, alone microsurgical clipping is also effective and has better result.

KEYWORDS

Intracranial aneurysm, Giant, middle cerebral artery, surgical clipping, outcome



INTRODUCTION

Giant saccular middle cerebral artery aneurysms are rare lesion. Giant intracranial aneurysms are surgically complex and challenging lesion, with maximum diameter of 25mm or more and mortality more than 60% within 2 year.¹ The most common location of giant aneurysms is in internal carotid artery (ICA) and middle cerebral artery (MCA) region (16%-32%).² MCA region is one of the most common sites for rupture of giant aneurysm.³ Both endovascular and surgical management of giant MCA aneurysms are technically challenging issue due to its crucial natural history, unique anatomic features. The poor outcome or death in 30% of the patients has reported in direct surgical treatment of giant MCA aneurysm.⁴ We describe a patient who underwent direct surgical clipping without bypass for ruptured giant aneurysm arising from bifurcation of M1 segment of right MCA with maximum diameter 2.8cm.

CASE PRESENTATION

A 26- year old male presented with complain of severe headache, multiple episodes of vomiting and one episode of loss of conscious (LOC) few hours prior to admission in emergency department. He was alert and neck stiffness without any neurological deficit, had past history right ear infection. Computer Tomography (CT) scan demonstrated a large high density mass with subarachnoid hemorrhage (SAH) in right Sylvian cistern (Figure A). Cerebral angiography disclosed aneurysm arising from bifurcation of M1 segment of right MCA measuring 2.8 x 2.4 cm having narrow neck at the origin measuring 2mm (Figure B). Surgery was performed on the third day of ictus. After performing right pterional craniotomy and opening dura, right MCA segment was then dissected in the Sylvian fissure to expose aneurysm beyond the origin of the lenticulostriate arteries. The MCA was persuaded distally to expose frontal, parietal and temporal segments were identified. The dome of aneurysm was punctured by a 25 gauze needle and 15ml bleed was aspirated. The aneurysm completely collapsed. The neck of aneurysm was seen and two fenestrated and one simple straight clipping were used after application of temporary clips over parent vessels. Temporary clip was removed. Indocyanine Green (ICG) was used to be sure occlusion of the blood flow to aneurysm dome or not. After being confirmed the complete occlusion of aneurysm, dome of aneurysm was cut off and sent for histopathology test. Patient developed right facial palsy and left upper and lower limb weakness as compared to right side of the body. Non-contrast CT was done after 48 hours of surgery and right basal ganglia infarction was noted (Figure C). Tab clopilet 75mg was started and improvement in power was noticed slowly. Histopathology test reported that tissue with dilated and congested thin walled blood vessels and small thrombus formation. Patient was discharged on the 12th day of surgery. Patient was followed up on 15th day of discharge with completely improved in power and facial palsy (Figure D).

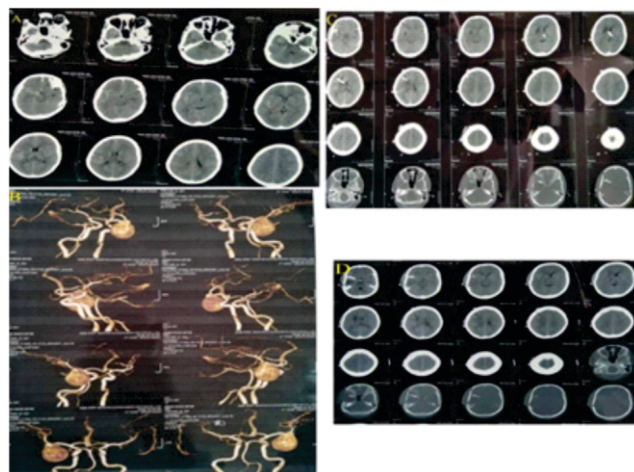


Figure 1. Preoperative axial CT image showing basal cistern and right sylvian fissure subarachnoid hemorrhage (A), Preoperative cerebral 3D CT angiography image showing giant saccular aneurysm of M1 segment of right middle cerebral artery (B), Postoperative axial CT image showing EVD in situ and right basal ganglian region hypodense area (C) and Postoperative axial CT image showing improved in hypodense area at the follow up time (D).

DISCUSSION

Most of giant aneurysms are saccular variety and constitute approximately 5% of all intracranial aneurysm.⁵ Giant MCA aneurysms have always remained the most difficult lesion among cerebrovascular diseases to treat. Digital subtraction angiography still provides most pivotal information to select the best treatment option for complex aneurysm regardless of emerging 3D reconstruction techniques of CT angiography, MR-base flow modeling.⁶ Surgical therapy has grown up well with improvement in instrumentations, refinement of skull base microsurgical techniques, and application of anesthetic techniques like hypothermic circulatory arrest. Few giant aneurysms come to surgical management due to improved radiological imaging and earlier diagnosis of large aneurysm.

The combined surgical morbidity and mortality for giant intracranial aneurysms have remained in the 20% to 50% range in the recent years² despite the MCA aneurysms have been described suitable for surgery. It may be due to cruel pathological anatomy, like aberrant arterial branches, intraluminal thrombus, wide aneurysm neck, atherosclerotic aneurysm neck, and adherent perforating arteries. The management for giant cerebral aneurysm including MCA aneurysm with direct surgical procedure requires 1) exposure of aneurysm, 2) trapping of the parent artery, 3) incision of the aneurismal dome and removal of the thrombus, 4) clipping of the aneurismal neck, 5) release of the trapping.⁴ Complex aneurysms of the MCA are special challenge, to treat by surgical clipping, due to multiple perforators that lead to difficult accessibility in M1 and M2 branches. A study done by Hideki et al reported that one case of ischemia was noted following clipping among four saccular giant MCA aneurysms.⁷ Ischemia is unavoidable complication. Therefore, intensive protective therapy for the brain as well

as pre and intra-operative studies need to be done well to evaluate cerebral tolerance to probable ischemia.

Since the establishment of Guglielmi detachable coils in 1990, endless morbidity with surgical treatment and continuous advancement in endovascular therapy have inspired pursuit of coiling of giant aneurysms.⁸ The indication for Open microsurgery has been changed due to endovascular option. However, endovascular coiling is a non-invasive technique, but complications have been reported, including a 10.5% morbidity rate and an 8% mortality rate in the recent series of large and giant aneurysms treated with endovascular coiling and a higher rate of recurrence (52%) and retreatment (47%) for giant aneurysms.⁹

Only smaller series or case reports have been studied for treatment of giant MCA aneurysms. Few researchers have reported large series of revascularization in patients with giant MCA aneurysms.¹⁰ A study done by Shi ZS et al that described application of endovascular coiling with bypass surgery for treatment of giant MCA aneurysms and preservation of perforator branches.¹¹ There was no study discussed about ischemia well. Development of emboli at the occlusion site and inadequate flow from bypass may lead to ischemic events and rupture of aneurysms.¹² A study done by Hashi K et al that described that the ischemic complications occurred in 12 of the 137 cases within 24 hours, in 11 cases within 24-48 hours, in 6 cases later 48 hours and at unknown times in 5 cases; a total of 25% (34/137) of all cases.¹³

In our patient, direct surgical clipping was essential for the giant MCA aneurysm, since it had ruptured and had a mass effect over the middle cranial fossa. So temporary clipping of

MCA was applied over parent vessels. The dome of the aneurysm was punctured by a 25-gauge needle and 15 ml of blood aspiration was done. It collapsed and permanent clipping of the giant aneurysm was applied. The dome of the aneurysm was excised to decrease mass effect and sent for histopathology report. Although a perfect outcome was achieved by direct surgical clipping without bypass for a giant M1 segment of MCA aneurysm, ischemia is an undeniable complication encountered in treatment of giant MCA aneurysms similar to other studies.^{13,14} This challenging issue should be studied well and overcome with the application of pre and intra-operative monitoring systems. Enough studies with a large number of cases of giant MCA segment aneurysms need to be researched for evaluation of outcome and complications.

CONCLUSION

Endovascular therapy as well as STA-MCA bypass surgery plus clipping are usually performed to manage the giant MCA aneurysm. Ischemic event is an inevitable problem encountered during giant MCA aneurysm treatment whatever the surgical procedures are applied. Alone direct surgical clipping with excision of aneurysm is safe and effective for management of giant M1 segment of MCA aneurysm.

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CONFLICT OF INTERESTS

There is no conflict of interests

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