

Case Report

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Received: 21/11/2017

Accepted: 6/1/2018

Giant thrombosed aneurysm of P2 anterior segment of left posterior cerebral artery: Case Report and review of literature.

P2A (anterior) segment aneurysm of posterior cerebral artery is one of the rare aneurysm of posterior circulation. We report a case of 30 years old right handed young man who presented with features of SAH in Emergency Department and cerebral angiogram confirmed left posterior cerebral artery P2A segment thrombosed fusiform aneurysm. Postoperative recovery was good except left sided ptosis after microsurgical trapping via left temporal approach. Treatment modality and outcome after intervention for P2A segment aneurysm will be discussed.

Key Words: Microsurgical Clipping, Posterior Cerebral Artery, P2A Segment, Trapping.

Aneurysms of posterior cerebral artery (PCA) account about 1% of all intracranial aneurysms^{4,6,13,15}. Distal PCA aneurysms are more rare than proximal one^{5,18}. Aneurysm of P2A segment of PCA is very rare. Knowledge of segmental anatomy of PCA is essential to classify aneurysm of PCA and their management.

The PCA is divided into four segments^{12,18}. P1 segment starts from tip of basilar artery to the origin of posterior communicating artery (PcomA). P2 segment extends from PcomA to the dorsal aspect of the midbrain. This P2 segment is further subdivided into anterior (P2A) and posterior (P2P) segments. The P3 segment begins from the lateral aspect of the quadrigeminal cistern at the origin of the posterior temporal artery to the anterior limit of the calcarine fissure. The P4 segment consists of the terminal cortical branches.

P2A aneurysm can be saccular, fusiform, dissecting, mycotic and posttraumatic^{4,5,11,12,18}. They may present as a features of SAH, mass effect if they are giant and thrombosed or may be incidental^{1,9,17}.

Diagnosis of P2A aneurysm are usually made by cerebral CT angiogram and or MRA and digital subtraction angiogram if they are complex aneurysms^{3,13}. Treatment modalities for P2A aneurysm is either microsurgery or endovascular, both are effective with good results^{10,13,15,17}. Clipping is best treatment option for P2A segment aneurysm^{6,7}. Clipping, trapping and parent artery occlusion are other surgical option for P2, P3 and P4 segment aneurysms^{7,11,14,16}. Trapping and parent vessel occlusion usually do not cause infarction because of collaterals from the branches of middle cerebral artery^{10,11}. Subtemporal approach is best choice for P1, P2 (P2A and P2P) and P3 segment aneurysms and occipital interhemispheric for P4 segment aneurysm^{2,5,6,10,11,16,17}.

Case Report:

This 30 year old right handed gentleman presented to emergency room with H/o sudden onset of severe headache followed by unconsciousness for last three days. He was nonsmoker and non hypertensive. He had multiple

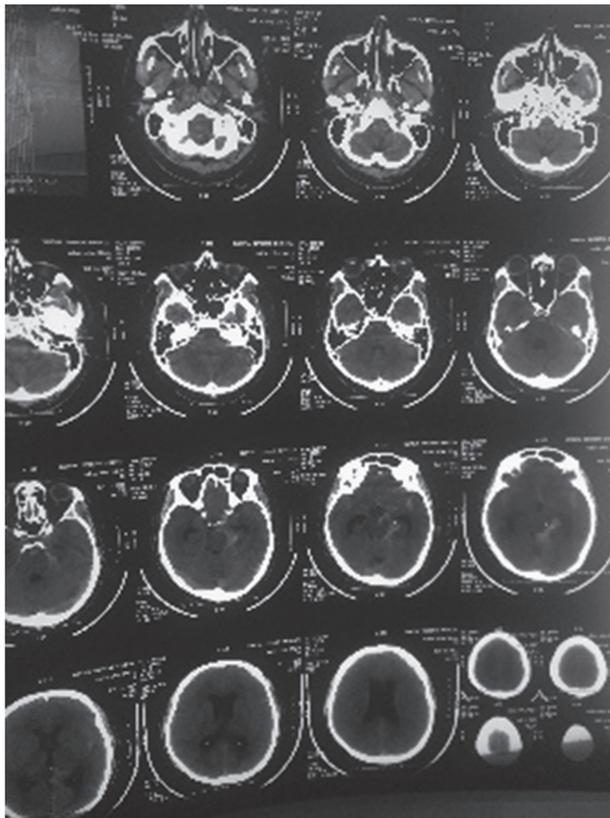


Figure 1 : Preoperative plain CT scan of brain showing SAH and more blood on left basal cistern

episodes of vomiting after ictus. On examination, he was fully conscious and oriented with Hunt and Hess grade III. He had no neurological deficit but nuchal rigidity was there. Urgent CT scan of brain showed diffuse SAH with Miller Fischer grade III and blood was more dense in and around basal cistern (figure.1). CT angiogram of brain revealed fusiform aneurysm at P2A segment of left PCA with a size of 10 X 6.2 X 6.8 mm (figure.2a&b). Left subtemporal craniotomy and trapping of aneurysm was performed with opening of aneurysmal sac and removal of thrombus. Peroperative findings were quite different from the findings of CT angiogram. The aneurysm was giant and thrombosed at P2A segment (figure3a,b&c). After trapping of aneurysm, thrombectomy and excision of sac was carried out. Peroperative period was uneventful. Post operatively patient woke up with mild or partial left sided third nerve palsy and there was no hematoma and edema on 1st postoperative CT scan(figure 4a). On 3rd postoperative day, patient complained headache and nausea for which CT scan was advocated and it revealed left temporal infarct which was not present in previous CT scan(figure 4b). A course of mannitol was started and doses of dexamethasone was increased. There was no motor deficit. Patient was discharged on 14th postoperative day(figure 5) after having cerebral CT angiogram which showed total occlusion of aneurysm(figure 2c&d).

Discussion:

Aneurysms of PCA are rare and they account about 1% of all intracranial aneurysms^{4,6,12,14}. Anatomically PCA is divided into four segments^{12,18}. P1 segment begins from basilar artery bifurcation to the origin of PcomA. P2 segment is further divided into anterior (P2A) and posterior(P2P) parts. P3 segment extends from anterior aspect of the quadrigeminal cistern at the origin of the posterior temporal artery to the anterior limit of the calcarine fissure. P4 segment consists of terminal cortical branches. Aneurysms occur more at proximal segments than at distal segments. The series of cases reported by Drake and Yasargil indicated that majority of PCA aneurysms are found at the proximal portion of PCA, namely P1 and P2 segments^{4,5,18}. In Ciceri's series of 21 PCA aneurysms, 7 (33%) were located at P1-P3 segment and 1(4%) at junction of P3 and P4 segments³. In a series of 11 cases of Kitazawa, 2 were found at P1 segment, 2 at P1-P2 segments, 6 in P2 segment and 1 at P3 segment¹¹.

Aneurysms at P2A segment are very rare. In our series of 449 cases of intracranial aneurysms we found 1 P2A segment aneurysm which accounted about 0.2%. Among the posterior circulation aneurysm in our series of 31 cases it exhibited about 3.2%.

These aneurysms can be saccular, fusiform, mycotic, post traumatic and dissecting^{4,5,10,11,18}. In Kitazawa's series of 11 cases, 7 aneurysms were saccular and 4 were fusiform¹¹. In a review of 10 patients with 13 PCA aneurysm, Chang et al found 6 saccular, 5 fusiform, 1 broad based and 1 giant fusiform. Some of PCA aneurysm are giant and thrombosed¹. Drake reported 42% incidence of thrombosed giant aneurysm and Yasargil a 50% incidence of giant aneurysm^{4,5}.

Cerebral CT angiogram and or MRA is usually helpful to come to the diagnosis and treatment plan, however, some complex aneurysm may require DSA for treatment strategy.

Treatment of P2A segment aneurysm is either surgery or endovascular procedure like other aneurysms of PCA. Best treatment for P2A segment aneurysm is surgery and subtemporal approach is always preferable^{6,7,10,16}. Direct clipping of neck of aneurysm is a standard choice^{5,7,10,18}. However, in case of complex P2A segment aneurysm proximal occlusion of parent artery, excision of aneurysm sac and trapping of aneurysms are other surgical option^{4,7,8,18}. Bypass or revascularization surgery is usually not required before trapping or proximal occlusion for P2A segment aneurysm because of sufficient collateral vascular supply to their area from branches of middle cerebral artery².

Surgical results are usually good in most of the series of P2A aneurysms like other PCA aneurysm surgery. In

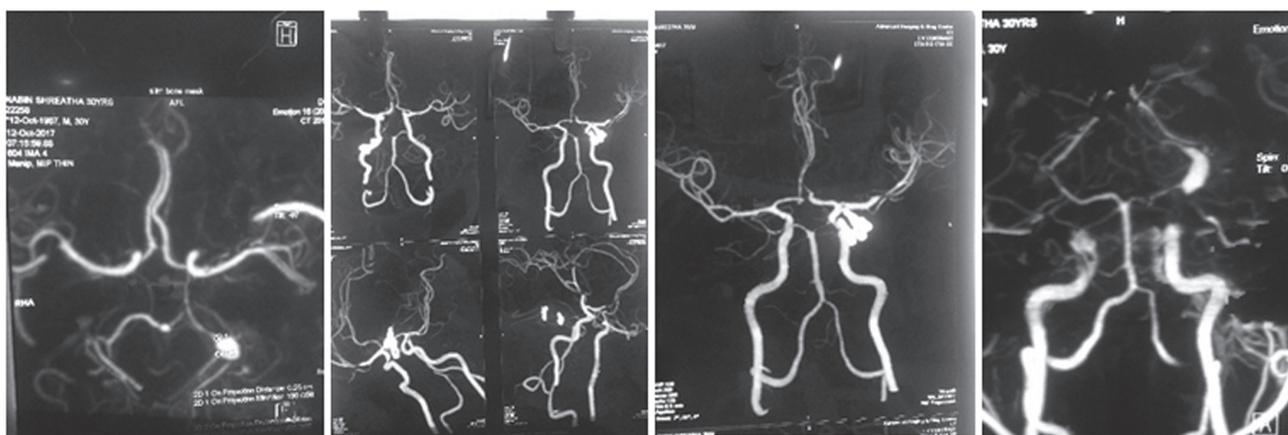


Figure 2a & b : Preoperative cerebral CT Angiogram showing fusiform aneurysm at P2A segment of PCA
 Figure 2c & d : Postoperative cerebral Angiogram revealing total occlusion of aneurysm and multiple clips in situ



Figure 3a: Peroperative images showing thrombosed giant aneurysm, 3b; opening of the aneurysm sac & 3c; clips showing trapping of the aneurysm

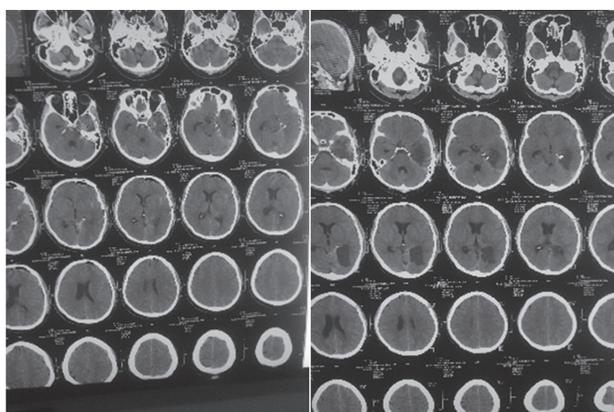


Figure 4a: CT Scan of first postoperative day showing no hematoma and infraction except mild edema and residual SAH

Figure 4b: CT Scan on third postoperative day revealed left temporal infraction

Sakata's series of 11 cases, 7 had good result, 2 had poor result and one died³. In Goehre's series of 34 PCA aneurysm surgery, 25 patients out of 34 had good results⁷.

3rd and 4th nerve injury, temporal lobe edema, infarction and ICH are some of the common complications after P2A segment aneurysm surgery like other PCA aneurysm surgery^{1,4,5,7,14,18}. In Drake's experience there were 3 infarcts in 39 cases, for a rate of major morbidity



Figure 5: Photograph of patient prior to discharge from the hospital. This photograph was taken with permission of family members and patient himself

of 8%^{4,5}. In Chang's series 2 patients had developed postoperatively neurological deficits attributable to the trapping, accounting a complication rate of about 9%¹.

Endovascular procedure is another treatment option for P2A segment and other aneurysms at PCA^{9,13,17}. Endovascular treatment includes GDC coiling, parent artery occlusion. In Ciceri's series of 21 cases of PCA aneurysm, 11 aneurysms were obliterated out of 14 patients who were coiled. 95% of the patient were at GOS of 5 and 5% of GOS 3 with morbidity of 15%³.

Conclusion:

P2A segment aneurysm of PCA are very rare and proper angiographic diagnosis followed by surgical intervention usually produces good results with minimum morbidity.

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