

Giant Partially Thrombosed Anterior Communicating Artery Aneurysm Presenting with Cognitive Decline and Gait Disturbance

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1. Abstract

Aneurysms usually present with subarachnoid hemorrhage and signs of increased intracranial pressure. Patients who survive after their first bleeding, have an estimated annual risk of rebleeding which is 1.27%. We present a 35 years old male with a history of subarachnoid hemorrhage 7 months before admission, who declined gradually in terms of cognitive and motor function as well as voluntary voiding and undiagnosed multiple endocrinologic problems who finally diagnosed with a giant partially thrombosed anterior communicating artery aneurysm with mass effect on surrounding neurovascular structure who underwent a microsurgical clipping and aneurysm sac resection and experienced a very long post operative period regarding several post operative neurologic, endocrinologic and infectious problems.

2. Introduction

Subarachnoid hemorrhage (SAH) due to aneurysm rupture is the most common initial presentation and is associated with significant morbidity and mortality [1] sometimes, before to rupture giant aneurysms are diagnosed mainly due to mass effect on cranial nerves, seizures, repeated TIAs (transient ischemic attacks) [5].

Giant intracerebral aneurysms have a propensity to grow over time and may present with neurologic, psychologic and endocrinologic symptoms. The clue to establish an exact preoperative diagnosis in a patient with multiple clinical signs and symptoms and a circulating flow in an aneurysm sac with no visible mass effect on angiogram is a high clinical suspicion and thorough neurologic exam and use of other radiologic investigations preoperatively to

consider a precise treatment plan and to have a comprehensive understanding of surgical anatomy and pathology which the treatment team is going to face with.

Understanding the 3D anatomy of the lesion and surrounding normal and abnormal structures would help the neurosurgeon to choose the best approach in order to address the pathology and lessen the surgical insult as well, in hope of having the best surgical results.

Dealing with post operative complications of such giant thrombosed aneurysms, call the need to be aware of every possible neurologic, psychologic, hormonal and infectious complications which would probably develop over time after a successful microsurgical clipping of aneurysm neck and elimination of mass effect.

3. Case Report

A 35 years old male presented with progressive spastic paraparesis, headache, mood disturbance, cognitive and memory decline over 7 months and inability to control voiding. He also became wheelchair bound gradually during these months. He was investigated by a neurologist due to these symptoms and had received multiple drugs to control headache. Finally, a 4-vessel brain angiography was done by a neuro-radiologist because his family mentioned that he had admitted to another hospital several months ago due to severe thunderclap headache which had a medical records regarding subarachnoid hemorrhage in anterior interhemispheric fissure with a fissure grading 2.

There was an antero-inferior looking anterior communicating artery aneurysm in brain angiogram which was completed by a multi

slice thin cut brain CT angiography (Philips 168) and 1.5 tesla Brain MRI ,which revealed a giant anterior communicating artery aneurysm with intraluminal thrombosis and partial flow within the ¼ of aneurysm sac with mass effect over pituitary stalk and left A1 segment of left anterior cerebral artery .

The left A1 had been very thin and hypoplastic that was difficult to trace on CT angiogram preoperatively. The neck and the sac of the aneurysm seemed to be on anterior communicating artery with the direction of growth inferior, posteriorly toward the pituitary stalk with a giant mass on preoperative Brain MRI resembling a suprasellar tumor.

The endocrinologic evaluation showed severe hypopituitarism preoperatively which was controlled with loading and stress dose of corticosteroid and thyroid hormone replacement. The water and sodium balance were normal.

The patient underwent a right standard pterional craniotomy with microscopic microsurgical trans-sylvian approach. The broad neck which was located on antero-inferior side of anterior communicating artery aneurysm was clipped with a 7 millimeter standard Yasargil clip and the rest of the aneurysm sac and intraluminal thrombosis was resected using microsurgical dissection techniques.

The first post operative Brain scan , showed right frontotemporal acute subdural hematoma , which was evacuated at the same night after the first surgery .

The patient admitted to neurosurgical ICU post operatively and recovered well with the medical treatment regarding hypothyroidism and hypocortisolism and antiepileptics as well. The stormy post operative period started with a severe DI on the second day after clipping which was controlled with DDAVP. After being admitted to the ward, he started to communicate with the family and started to walk with walking aids. He discharged without any new neurologic deficit at the second week after surgery.

The patient was missed to follow up for the first visit in clinic, when he referred to emergency department due to drowsiness one month after clipping . The Brain scan showed a massive left fronto-temporo-parietal subacute subdural hematoma with severe mid-line shift which was evacuated emergently with two burr holes and irrigation technique. Again, he did well after hematoma evacuation but the left side wounds showed dehiscence and minor discharge a few days after evacuation of hematoma, which at that time he experienced multiple episodes of generalized tonic clonic seizures and worsening neurologic and general status with fever. He admitted to the neurosurgical ICU again and was intubated because of decreased respiratory drive. The subsequent emergent brain scan showed left fronto-temporo-parietal subdural collection which was diagnosed subdural empyema on contrast enhanced brain scan. The patient again was operated to drain left hemispheric subdural collection which was obviously pus at the time of surgery.

The bacteriologic results showed gram negative growth which was diagnosed klebsiella on culture and treated with three broad spectrum antibiotics based on antibiogram results.

During the struggle to control infection in the ICU, he showed an episode of adrenal insufficiency which was diagnosed and controlled clinically.

Finally, the patient, recovered very well and moved from ICU to the ward and was discharged after 12 weeks of antibiotic therapy with subsequent brain scan revealing decrease in subdural collection size and clinically the patient was able to walk with walking aids and tolerated parenteral nutrition with good general condition.

4. Discussion

Giant intracranial aneurysms are rare, complex and heterogenous lesions with incidence rate of 5 % of all cerebral aneurysms. The pathogenesis of giant aneurysms are thrombosis and growth and sometimes they may present with rupture. Despite rapid development and popularization of endovascular procedures for treatment of intracranial aneurysms, treatment of such aneurysms is still point of debate and need intricate microvascular techniques and sometimes cerebral vascular bypass procedures. Incomplete obliteration and aneurysm recanalization remains a problematic event in successful cases of giant aneurysm treatment with coil embolization (with or without stenting) [3].

Some of these aneurysms have wide, calcified neck with complete or partial involvement of parent and other collateral vessels. Because of large size of these aneurysms, the mass effect of the lesion over surrounding structures may produce a variety of symptoms such as compromising the blood flow of other vessels, neurologic symptoms due to compression of adjacent neural tissues and if the growing mass is located near some area of the brain that regulates hormonal balance of the body such as pituitary stalk and hypothalamic region, the presenting symptoms represent single or multiple organ malfunction. Thrombosis and microemboli originating from intracranial artery aneurysms causing brain ischemia and stroke has been reported [4].

The age presentation of these lesions is usually between the 5th to 7th decade of life with slightly female preponderance. The most prevalent intracranial site of these lesions is anterior circulation with more than 2/3 arising from cavernous carotid and the initial segments of intracranial carotid .In our observation, the patient was a 35 years old male with a giant partially thrombotic anterior communicating artery aneurysm with prominent mass effect on left A1, which made it invisible during angiogram and decreased flow from the left anterior cerebral artery that justified some of the patient symptoms relating to frontal and medial parietal decreased function . Some possible mechanisms are postulated the association between mood disorder and anterior communicating artery aneurysm. Anterior communicating artery provide major blood

supply to medial the portions of the frontal and parietal lobes and to the limbic system. The structural abnormalities and organic lesions within the frontal lobe and limbic system can produce depressive symptoms [2, 7].

The natural history of giant cerebral aneurysms and early surgical attempts to treat such a lesion was area of argument during early 1960, however the first module of treatment which was observation alone, had a high mortality rate at the subsequent years following diagnosis and the risk of aneurysm growth over time was high. Moreover, the risk of rupture is relatively high because of large size of these lesions.

The difficulty of surgical approach in dealing with giant aneurysms is the difficulty to access the neck of the aneurysm because of bulky and expanding size of lesion and the depth in which the lesion is embedded and compressed important brain parenchyma. So, Careful dissection of neck and dome and good proximal control are essential steps. Also, it is important to emphasize that proper clip placement is sometimes problematic due to broad base and calcification of the neck and incorporation of parent artery and small but functionally important perforating branches arising from or near the neck .

The goal of treatment of giant intracranial aneurysms is to exclude the lesion from the circulation with preserving function in the neural tissues fed by the parent vessel [6].

Successful surgical treatment of these aneurysms rest on complete understanding of anatomy, size, extension, direction of growth, existence of flow within the bulk of aneurysm, and each lesion has a unique anatomical-pathological consideration, and treatment strategy as well.

In recent years, introduction of advanced microsurgical techniques and bypass procedures, and endovascular treatment options, has changed the treatment approach of such lesions.

A variety of techniques and approaches has been developed but the mainstay of treatment is still removing the bulk of lesion and eliminating mass effect and securing the neck and removing the aneurysm from the cerebral arterial circulation with proper microsurgical techniques and clipping. In this regard, several methods are available from direct clipping of the neck with excising the bulk of aneurysm, hunterian ligation and trapping with cerebral revascularization. Choosing each option depends on multiple variety, from patient criteria to lesion characteristic and surgeon preference.

5. Conclusion

There are a lot of post craniotomy complications, mentioned in the literature and easily known by every neurosurgeon, each one is going to occur in certain circumstances or sometimes as an unexpected scenario. Dealing with every complication and struggling for the patient to find the best clinical results needs patience as sometimes it maybe going to be a very long-lasting scenario, team

work with other specialties such as endocrinologist, infectious specialist, and other clinicians and consultation with expert and referee neurosurgeons and looking through the literature to see what the other colleagues has recommended in such a situation as well.

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