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Giant Partially ThrombosedAnterior CommunicatingArteryAneurysm Presenting with Cognitive Decline and Gait Disturbance

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1. Abstract

Aneurysms usually present with subarachnoid hemorrhage and signsofincreasedintracranialpressure.Patientswhosurviveafter their first bleeding , have an estimated annual risk of rebleeding whichis1.27%.Wepresenta35yearsoldmalewithahistoryof 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 problemswhofinallydiagnosedwithagiantpartiallythrombosed 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 postoperativeperiodregardingseveralpostoperativeneurologic, 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 giantaneurysmsarediagnosedmainlyduetomasseffectoncranial nerves, seizures, repeated TIAs (transient ischemic attacks) [5].

Giantintracerebralaneurysmshaveapropensitytogrowovertime andmaypresentwithneurologic,psychologicandendocrinologic 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 examanduseofotherradiologicinvestigationspreoperativelyto considerapreciseteatmentplanandtohaveacomprehensiveunderstanding 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 lessonthesurgicalinsultaswell,inhopeofhavingthebestsurgi- cal 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 whichwouldprobablydevelopovertimeafterasuccessfulmicrosurgicalclippingofaneurysmneckandeliminationofmasseffect.

3. Case Report

A35 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 multipledrugstocontrolheadache.Finally,a4-vesselbrainangiographywasdonebyaneuro-radiologistbecausehisfamilymentionedthathehadadmittedtoanotherhospitalseveralmonthsago 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 arteryaneurysminbrainangiogramwhichwascompletedbyamulti

slice thin cut brain CT angiography (Philips 168) and 1.5 tesla BrainMRI,whichrevealedagiantanteriorcommunicatingartery aneurysmwithintraluminalthrombosisandpartialflowwithinthe ¼ofaneurysmsacwithmasseffectoverpituitarystalkandleftA1 segment of left anterior cerebral artery .

The leftA1 had been very thin and hypoplastic that was difficult totraceonCTangiogrampreoperatively.Theneckandthesacof theaneurysmseemedtobeonanteriorcommunicatingarterywith 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 ofcorticosteroidandthyroidhormonereplacement.Thewaterand sodium balance were normal.

The patient underwent a right standard pterional craniotomy with microscopicmicrosurgicaltrans-sylvianapproach.Thebroadneck whichwaslocatedonantero-inferiorsideofanteriorcommunicat- ingarteryaneurysmwasclippedwitha7millimeterstandardYas- argilclipandtherestoftheaneurysmsacandintraluminalthrom- bosis was resected using microsurgical dissection techniques.

The first post operative Brain scan , showed right frontotemporal acutesubduralhematoma,whichwasevacuatedatthesamenight after the first surgery .

ThepatientadmittedtoneurosurgicalICUpostoperativelyandre- coveredwellwiththemedicaltreatmentregardinghypothyroidism and hypocortisolism and antiepileptics as well. The stormy post operative period started with a severe DI on the second day after clippingwhichwascontrolledwithDDAVP.Afterbeingadmitted totheward,hestartedtocommunicatewiththefamilyandstarted towalkwithwalkingaids.Hedischargedwithoutanynewneuro- logic deficit at the second week after surgery.

The patient was missed to follow up for the first visit in clinic, whenhereferredtoemergencydepartmentduetodrowsinessone monthafterclipping.TheBrainscanshowedamassiveleftfron- to- temporo-parietalsubacutesubduralhematomawithseveremid- lineshiftwhichwasevacuatedemergentlywithtwoburrholesand irrigationtechnique.Again,hedidwellafterhematomaevacuation but the left side wounds showed dehiscence and minor dischargea few days after evacuation of hematoma, which at that time he experiencedmultipleepisodesofgeneralizedtonicclonicseizures andworseningneurologicandgeneralstatuswithfever.Headmit- ted 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.Thepatientagainwasoperatedtodrainlefthemispheric sub- duralcollectionwhichwasobviouslypusatthetimeofsurgery.

Thebacteriologicresultsshowedgramnegativegrowthwhichwas diagnosedklebsiellaonculture and treated with three broad spec- trum 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 con- trolled 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 collec- tion size and clinically the patient was able to walk with walking aidsandtoleratedparenteralnutritionwithgoodgeneralcondition.

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 develop- mentandpopularizationofendovascularproceduresfortreatment of intracranial aneurysms, treatment of such aneurysms is still point of debate and need intricate microvascular techniques and sometimescerebralvascularbypassprocedures.Incompleteoblit- eration and aneurysm recanalization remains a problematic event in successful cases of giant aneurysm treatment with coil embol- ization (with or without stenting) [3].

Someoftheseaneurysmshavewide,calcifiedneckwithcomplete or partial involvement of parent and other collateral vessels. Be- causeoflargesizeoftheseaneurysms,themasseffectofthelesion over surrounding structures may produce a variety of symptoms suchascompromisingthebloodflowofothervessels,neurologic symptomsduetocompressionofadjacentneuraltissuesandifthe growingmassislocatednearsomeareaofthebrainthatregulates hormonalbalanceofthebodysuchaspituitarystalkandhypotha- lamicregion,thepresentingsymptomsrepresentsingleormultiple organmalfunction.Thrombosisandmicroembolioriginatingfrom intracranial artery aneurysms causing brain ischemia and stroke has been reported [4].

Theagepresentationoftheselesionsisusuallybetweenthe5thto 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 anteri- orcommunicatingarteryaneurysmwithprominentmasseffecton leftA1, which made it invisible during angiogram and decreased flowfromtheleftanteriorcerebralarterythatjustifiedsomeofthe patientsymptomsrelatingtofrontalandmedialparietaldecreased function . Some possible mechanisms are postulated the associ- ation between mood disorder and anterior communicating artery aneurysm.Anteriorcommunicatingarteryprovidemajorblood

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].

Thenaturalhistoryofgiantcerebralaneurysmsandearlysurgical 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 aneurysmsisthedifficultytoaccesstheneckoftheaneurysmbecause 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 properclipplacementissometimesproblematicduetobroadbase andcalcificationoftheneckandincorporationofparentarteryand smallbutfunctionallyimportantperforatingbranchesarisingfrom or near the neck .

Thegoaloftreatmentofgiantintracranialaneurysmsistoexclude thelesionfromthecirculationwithpreservingfunctionintheneu- ral tissues fed by the parent vessel [6].

Successfulsurgicaltreatmentoftheseaneurysmsrestoncomplete understanding of anatomy, size, extension, direction of growth, existence of flow within the bulk of aneurysm, and each lesion hasauniqueanatomical-pathologicalconsideration,andtreatment strategy as well.

Inrecentyears,introductionofadvancedmicrosurgicaltechniques and bypass procedures, and endovascular treatment options, has changed the treatment approach of such lesions.

Avarietyoftechniquesandapproacheshasbeendevelopedbutthe mainstayoftreatmentisstillremovingthebulkoflesionandeliminatingmass effectandsecuring theneckandremovingtheaneurysm from the cerebral arterial circulation with proper microsurgical techniques and clipping. In this regard, several methods are availablefromdirectclippingoftheneckwithexcisingthebulkof aneurysm, hunterian ligation and trapping with cerebral revascularization.Choosingeachoptiondependsonmultiplevariety,from patient criteria to lesion characteristic and surgeon preference.

5. Conclusion

There are a lot of post craniotomy complications, mentioned in theliteratureandeasilyknownbyeveryneurosurgeon,eachoneis 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 sometimesitmaybegoingtobeaverylong-lastingscenario,team workwithotherspecialtiessuchasendocrinologist,infectiousspecialist, and other clinicians and consultation with expert and referee neurosurgeons and looking through the literatureto see what theothercolleagueshasrecommendedinsuchasituationas well.

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