

Third Nerve Palsy With Pupillary Involvement a Key for Early Diagnosis of Posterior Communicating Artery Aneurysm

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Abstract

Compression of third nerve may develop due to several intra-cranial pathologies in its course. In most patients, aneurysm of posterior communicating artery aneurysm is the culprit which may be fatal if ruptures. The effect of surgical treatment on the recovery of neural function in patients with third nerve palsy caused by aneurysm of the posterior communicating artery is poorly documented. We are reporting a case of 38 year old female patient having features of third nerve palsy with pupillary involvement. Clinical diagnosis of un-ruptured posterior communicating artery aneurysm was confirmed with computed tomography angiography of brain. Early detection and clipping of un-ruptured aneurysm not only helped in resolution of symptoms but also saved the life of patient. Thus structured and properly done clinical examination by an ophthalmologist has a key role in making prompt diagnosis of posterior cerebral artery aneurysm.

Keywords: *Pupillary; Artery Aneurysm; Marfan's syndrome; Angiography; Exotropia*

Introduction

The diagnosis of an aneurysm in a patient is sufficient to make a physician insomniac. Through this case report, author wants to drag attention on this rare disease and part played by ophthalmologist in its management.

An aneurysm is a balloon-like bulge or weakening of an arterial wall. As the bulge grows, the aneurysm wall becomes thinner and weaker which may burst or leak with a slight rise in blood pressure. Aneurysms develop from a weakened arterial wall which may be a result of hereditary condition or acquired disease. Aneurysms can occur in any blood vessel but mostly affects larger blood vessels where an artery branches. Approximately 80% of intra-cranial aneurysms are found in the front (anterior circulation) of the brain, while 20% found in the back (posterior circulation) of the brain.

Approximately 5% of the population may have or develop intra-cranial aneurysm; of those, 20% have multiple aneurysms. Un-ruptured aneurysms are more common (2.7 million per year) than ruptured (20,000 per year) [1]. However, 85% of aneurysms are not diagnosed until they rupture. Intra-cranial aneurysms are usually diagnosed between ages 35 to 60 and are more common in women [2]. The most important inherited conditions associated with aneurysms include Ehlers-Danlos IV, Marfan's syndrome, Neurofibromatosis NF1, and Polycystic Kidney Disease [2].

Case Report

A 38 years old female patient presented to us with chief complaint of headache, double vision and drooping of left upper eyelid for past one and half month. Her family members also noticed outward deviation of left eye for past one and a half months. Her whole illness started after an episode of high grade continuous fever with running nose, which subsided over a period of three days by medication advised by a local physician. After recovery from fever, she developed throbbing headache which starts from left eye and gradually radiates to whole left half of skull.

During initial period, her headache was tolerable but later it became severe (described as “Worst headache of her Life”) and was not subsided with usual pain killers. Along with that, she also developed doubling of images, specially looking on right side and upwards. Family members noticed outward deviation of her left eye. Couple of days later, her left eye lid started drooping and within no time she was unable to open it. Patient was also known case of hypertension for past one year and was on dietary modification. She was smoker (10-15 sticks/day) for past 15 years. There was no history of any Transient Ischemic Attack, Cerebro-vascular Accidents and trauma. No other significant past history and medical history obtained. She is married, having three children with no history of oral contraceptive pill intake [3].

At time of examination, patient was a febrile with pulse of 84 per min. and blood pressure of 140/80 mm of Hg. No abnormality was found in Cardio-Vascular System, respiratory & abdominal systems. On Central Nervous System examination, patient was well oriented to time place and person with Glasgow Coma Scale of 15/15 (E4, V5, M6). All her higher cerebral functions were normal and intact. Except 3rd nerve all other cranial nerves were intact. Sensory and motor functions were intact. Muscle bulk, tone and power of both upper and lower limbs were normal. Signs of cerebellar and meningeal irritation were absent.

Ophthalmic examination on her first visit showed Visual Acuity of right eye (unaided) 6/6 and of left eye 6/18 with -1.00DS 6/6. There was slight tilting of head towards right side on opening of left eye with wrinkling over forehead and bowing of left eyebrow [Figure 1]. Ptosis of left eye was nearly complete with poor LPS function. Left upper lid crease was at 4 mm. Bells phenomenon was poor in her left eye with absent Marcus jaw winking phenomenon.

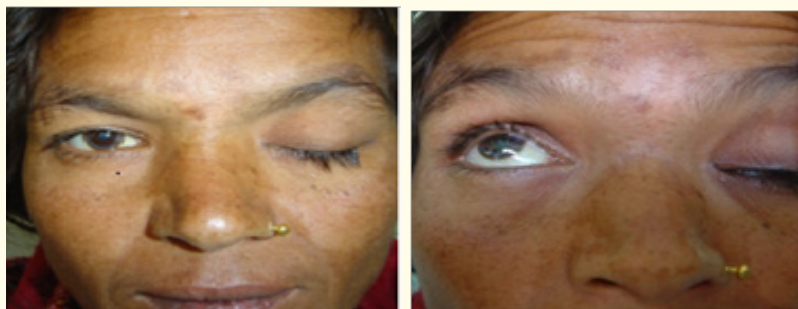


Figure 1: Photograph of Patient with third cranial nerve palsy secondary to left posterior communicating artery aneurysm shows : (a)left eye complete ptosis. (b) Tilting of head towards right side, wrinkling over forehead, bowing of left eyebrow on opening of left eye.



Figure 2: Photograph of Patient showing- (a)Ptosis, Left upper lid crease is at 4 mm; (b) Poor LPS function and poor Bells phenomena in left eye; (c) Marcus jaw winking phenomena absent (d) Down and outward deviation of left eye.

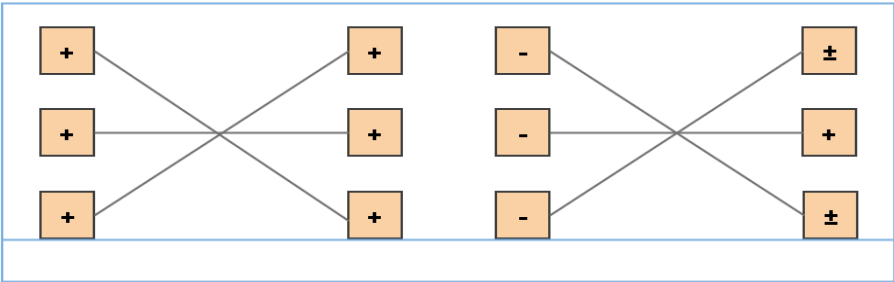
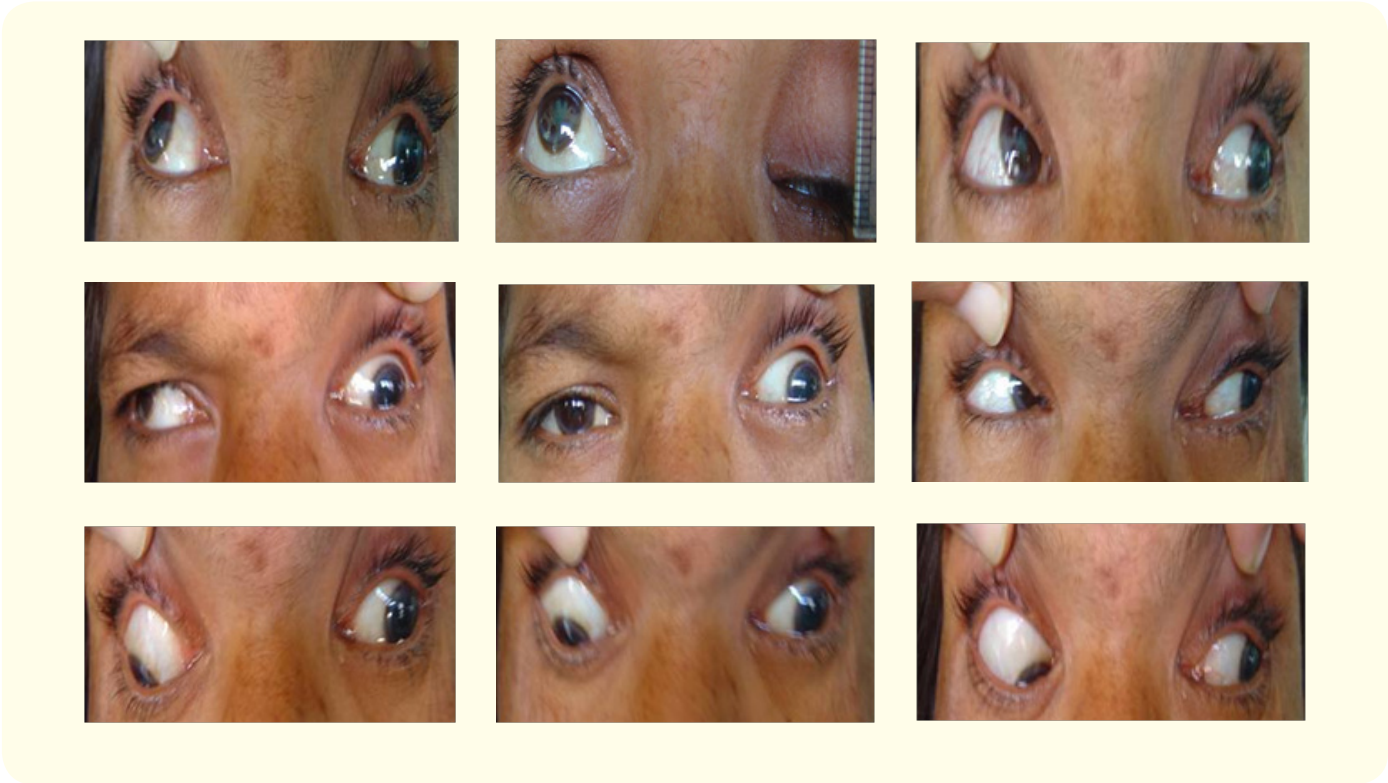


Figure 3: Photograph demonstrating limited adduction, supraduction and infraduction of left eye.

On further examination for ocular muscles, it was found that only lateral rectus and superior oblique were having normal function while medial rectus, superior rectus, inferior rectus and inferior oblique were having under action [Figure 3]. Convergence was inadequate and cover test showed left exotropia with hypotropia and intorsion. Angle of deviation by Hirschberg method was 45°exo with 15°hypotropia [Figure 2(d)]. Other findings of both eye examination were discussed in tabulated form [Figure 4]. The pupil of left eye was mid dilated, non reactive and fixed. Fundus examination was found normal [Figure 5]. Intra-ocular pressure of both eyes [Right - 15; Left - 16 mm of Hg] found within normal range. No evidence of loss of color vision. These finding were suggestive of unilateral third nerve palsy with pupillary involvement. This was further confirmed by Diplopia and Hess Charting [as shown in Figure 6 and 7].

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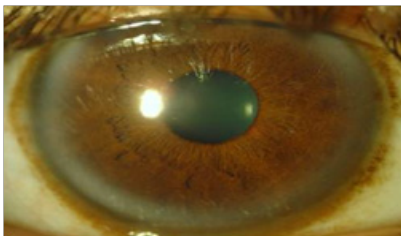


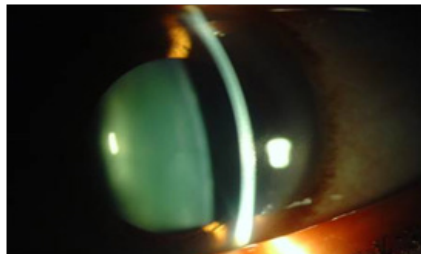
Right Eye Finding	Structure	Left Eye Finding
Normal but peri-limbal pigmentation	Conjunctiva	Normal but peri-limbal pigmentation
Arcus juveniles	Cornea	Arcus juveniles
Brown in colour, Normal pattern	Iris	Brown in colour, Normal pattern
2mm diameter, round, regular, reacting to both direct & consensual light	Pupil	6mm diameter round, regular, mid dilated fix pupil, non reacting
		
Normal depth quite	Anterior Chamber	Normal depth quite
		
Clear	Lens	Clear
Clear	Vitreous	Clear
Pink round regular with sharp margins	Disc	Pink round regular with sharp margins
0.2	CDR	0.2
Healthy with good foveal reflex	Macula	Healthy with good foveal reflex
2:3	Vessels	2:3

Figure 4: Tabulated presentation of detail findings of Ocular examination of both eyes of the patient.



Figure 5: Fundus Photograph-showing Normal Study.

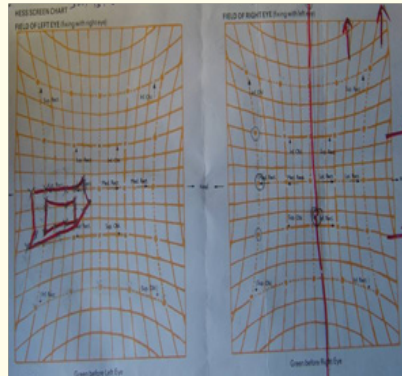


Figure 6: Hess charting shows over action of all the muscles and shifting of action beyond the Limit of chart configuration of RT eye and under-action of all muscles except lateral rectus and superior oblique.



Figure 7: Showing green before lt eye i.e. crossed, vertical, horizontal Diplopia. Maximum separation in dextro-elevation.

In order to find intra-cranial cause of symptoms, computed tomography (CT) of head & orbits with angiography was done on advice of a neurologist. CT findings were indicating the presence of saccular aneurysm of left sided posterior communicating artery causing pressure on adjacent brain tissue leading aforementioned symptoms [Figure 8 and 9].

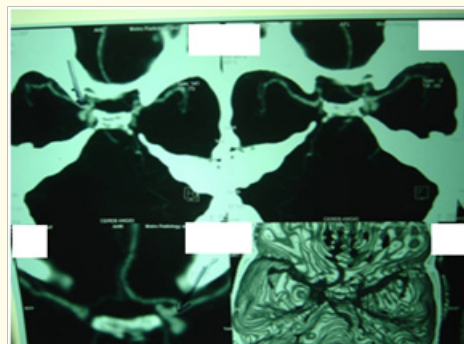


Figure 8: photograph of film of computed tomography (CT) of head & orbits with angiography indicating presence of saccular aneurysm of left sided posterior communicating artery.

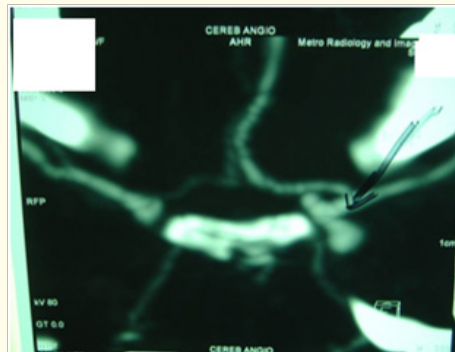


Figure 9: photograph of film of computed tomography (CT) of head & orbits with angiography with arrow mark indicating position of saccular aneurysm of left sided PCA.

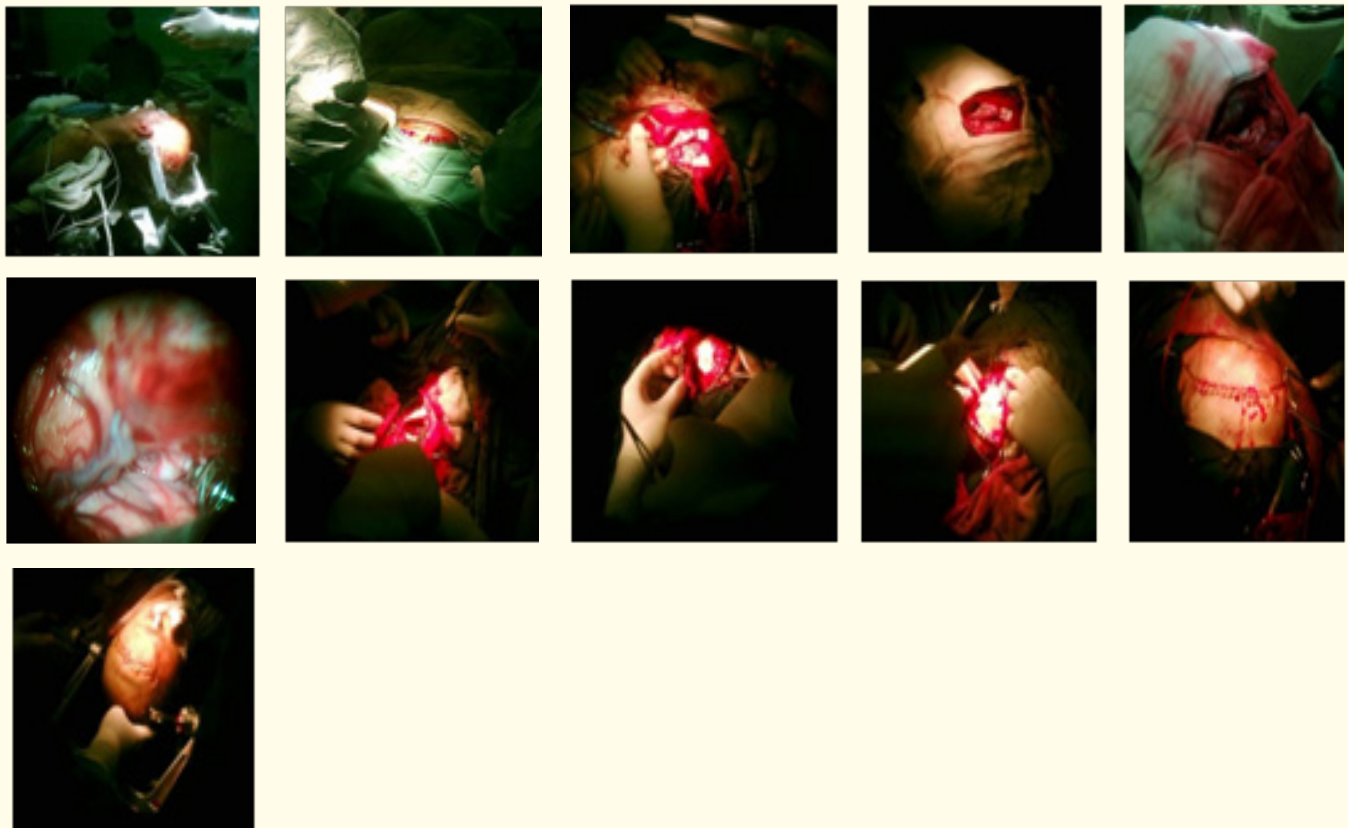


Figure10: Intra-Operative Photograph demonstrating clipping of PCA aneurysm. The most common treatment for an aneurysm is direct surgical clipping. Using general anesthesia, an opening is made in the skull, called a craniotomy. The brain is gently retracted so that the artery with the aneurysm may be located. A small clip is placed across the neck of the aneurysm to block the normal blood flow from entering the aneurysm. The clip is made of titanium and remains on the artery permanently.

Considering this death-dealing lesion, urgent neurosurgery opinion was taken, who advised for urgent surgery. After taking consent and other blood investigations, patient was operated under general anaesthesia and clipping of aneurysm was done. Intra and post-operatively systemic pressures were kept low by medicines and intra- ventricular pressures were lowered by CSF drainage through lumbar catheter [Figure 10]. Post surgery patient recovered dramatically in 2 weeks from her symptoms of third nerve palsy.

Discussion

Spontaneous (non traumatic) sub-arachnoid hemorrhage (SAH) mostly results from aneurysmal rupture. Ruptured intracranial aneurysms account for approximately 75% to 80% of spontaneous SAH [4]. Overall, its incidence is between 6 and 8 per 100,000 persons per annum in most Western civilizations [4]. Some studies have suggested that the actual incidence of a SAH is significantly higher secondary to-misdiagnosis, death before hospital admission or lack of autopsy in the general population [4]. Thus diagnosis of un-ruptured intracranial aneurysm can prevent many potential deaths.

Despite of this high incidence of SAH, many patient seeks medical advice for the symptoms appearing due to pressure of growing aneurysm. Symptomatology of the intra-cranial aneurysms depends on the vessel involved and site of aneurysm. Proper evaluation of such signs and symptom precludes the devastating complication of intra-cranial aneurysm.

Usually the third nerve palsy is first sign of posterior communicating artery aneurysm and also the last sign before rupture. The case discussed above was first seen by neurologist who referred it to ophthalmology outdoor marking it as an eye problem. Promptness and efforts of ophthalmologist played a key role in making of the correct diagnosis. Therefore, as an ophthalmologist one should be careful and expeditious to rule out intra-cranial aneurysm as a reason of third nerve palsy.

Confirmation for intra-cranial aneurysm is best done with computed tomography angiography, which also helps as decisive tool for surgery. CT angiography has a sensitivity of 98% to 100% (with 95% confidence interval) and specificity of 100% for intracranial aneurysms [5]. MR angiography is also equivalent to CT but it is time consuming and costlier [6].

Presence of an intracranial aneurysm itself dictates as a neurosurgery emergency. As soon as the site and type of aneurysm is diagnosed, definite treatment should be planned along with control of blood pressure and intra-cranial pressure. The anatomical features of aneurysm (like saccular aneurysm with narrow neck) allows, endovascular procedure like coiling should be considered. In case of unavailability of endovascular facility, presence of fusiform aneurysm or wide necked saccular aneurysm, open surgery is more beneficial.

Conclusion

Compression of third nerve may develop due to several intra-cranial pathologies in its course. Features of third nerve palsy with pupillary involvement are more suggestive of posterior cerebral artery aneurysm. CT angiography of brain is to be advised liberally for prompt diagnosis. Early diagnosis and urgent surgical intervention is a key to save the life of patient.

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