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A complete right oculomotor nerve palsy secondary to carotid cavernous fistula with a background of poorly controlled diabetes: A case report

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Abstract— **Background:** The coulometer or the third cranial nerve gives innervation to the four of the six extraocular muscles, namely the medial rectus, superior rectus, inferior rectus, inferior oblique. This cranial nerve is responsible for the upward and downward as well as adduction movement of the eyeball. It also retract the upper eyelid by innervating the levator palpebrae superioris muscle.Oculomotor nerve regulates the pupillary constriction via the parasympathetic nervous system. Oculomotor nerve palsy may affect any of these roles depending from its aetiology. **Case presentation:** We are reporting a case of complete right sided oculomotor nerve palsy secondary to carotid cavernous fistulain a poorly controlled diabetic patient. This patient had a complete right sided ptosis with the eyeball deviated to the 'down and out' position in keeping with dilated pupil. A magnetic resonance angiography had confirmed the diagnosis of carotidcavernous fistula of which an urgent embolization procedure was performed. **Conclusions:** Diagnosing an oculomotor cranial nerve palsy correctly and to determine its exact etiology is vital. A complete, pupil-involving oculomotor nerve palsy warrants an urgent radiological imaging as to accurately localized the lesion that give rise to the presenting symptoms.

Keywords: Oculomotor nerve palsy, diabetes mellitus, carotid cavernous fistula.

Background: The oculomotor nerve provides the parasympathetic nerve fibres that is responsible for pupils constriction and also innervate the upper eyelids as well as all extraocular muscles except the lateral rectus and superior oblique muscle [1,2].

High blood pressure and diabetes mellitus are the commonest causes of acquired oculomotor nerve palsy [3]. However, oculomotor nerve palsy may also be resulted from an aneurysm or subarachnoid haemorrhage that cause direct compression to the nerve [4]. As the result of nerve compression, pupil dilatation occurs along with other oculomotor nerve palsy symptoms [5].Disorderslike posterior communicating artery or posterior cerebral artery aneurysm can lead to such condition [6,7].

A non-pupil-sparing oculomotor nerve palsy prompt an urgent radiological investigation [8]. MRA or CT angiography must be performed urgently to exclude an aneurysm [9,10].

Case Presentation:

A 56 years old man presented to the accident and emergency department with sudden onset of right ptosis and diplopia. He denies headache or ocular pain. He has underlying diabetes mellitus for about 10 years but defaulted treatment for the past 5 years. HbA1cis 14%.

Clinical examination revealed a complete right eye ptosis (Figure 1E) and the right eyeball deviation with 'down and out' position (Figure 1B). Right eye adduction (Figure 1C, 1F), elevation (Figure 1A) and depression (Figure 1H, 1I)were restricted. His right pupil was 5 mm in size as opposed to 2 mm on the left and both pupils were reactive. Other cranial nerves examination was unremarkable.MRA confirmed the findings of carotid cavernous fistula (Figure 2, 3 & 4). He then underwent a procedure of embolization of the CCF and all symptoms resolved subsequently.

Discussion:

The most common cause for a complete oculomotor nerve palsy is blood vessel ischaemia. Long standing chronic diseases such as diabetes, hypertension and dyslipidaemia remains the main risk factors for such disorder [3]. Clinical manifestation include complete ptosis and eyeball in the 'down and out' position [11].

However, if the oculomotor nerve palsy involved the pupil, further investigation with CTA or MRA should be performed in order to rule out compression from the probable aneurysm originating from the internal carotid and posterior communicating artery [9,10]. Compression along the parasympathetic pupillary fibres will cause the pupil size to be dilated [5].

Once aneurysm has been confirmed from the diagnostical imaging, further treatment with either clipping, embolization or coiling has been proven beneficial [12]. Complete resolution of oculomotor nerve palsy has been demonstrated following the treatment of the aneurysm by such methods [13].

Conclusion:

Carotid cavernous fistula can leads to non-pupil-sparing oculomotor nerve palsy.Diagnosing an oculomotor nerve palsy correctly and to determine its exact etiology is crucial as it determine the next step of management. A complete, pupil-involving oculomotor nerve palsy warrants an urgent radiological imaging as to accurately localized the lesion that give rise to the presenting symptoms.

List of abbreviations

MRA -magnetic resonance angiography
CTA – Computer tomography angiography
CCF – Carotid cavernous fistula

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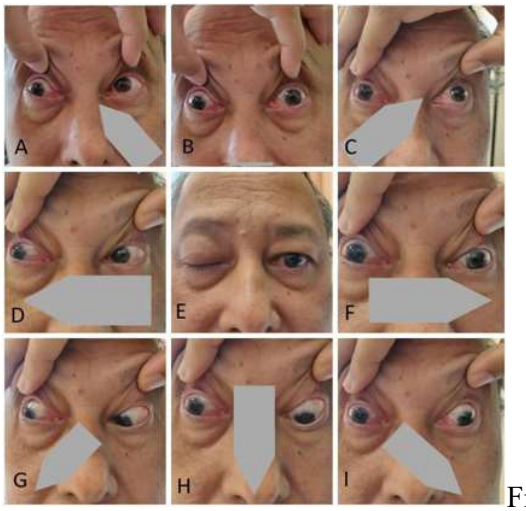

Figure 1

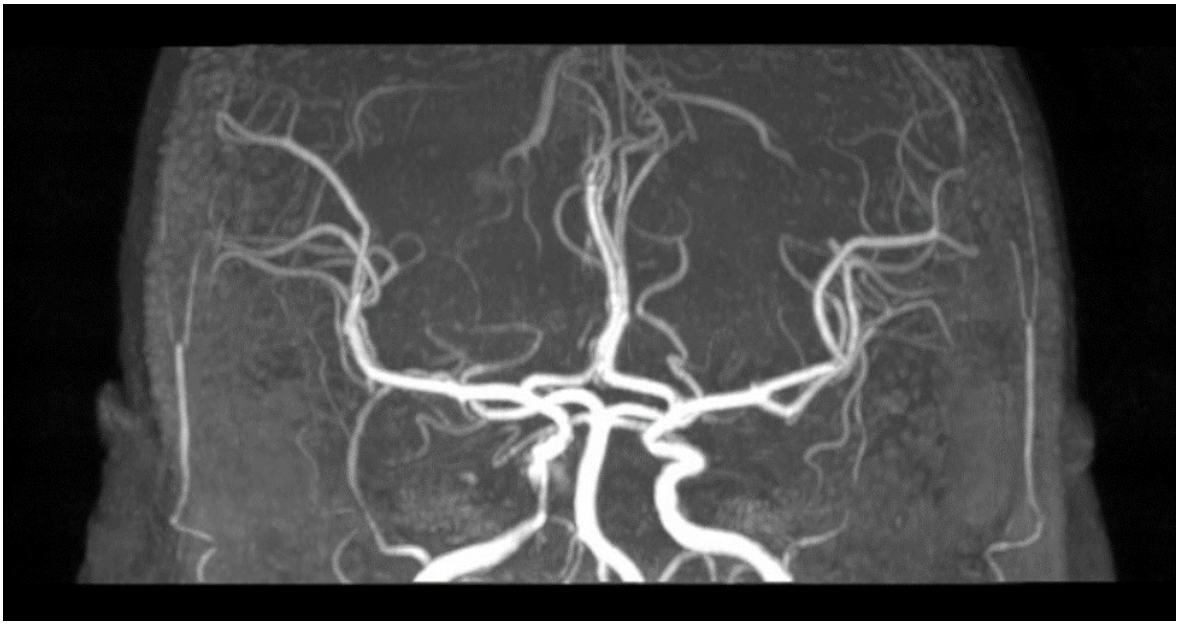

Figure 2

Figure 3

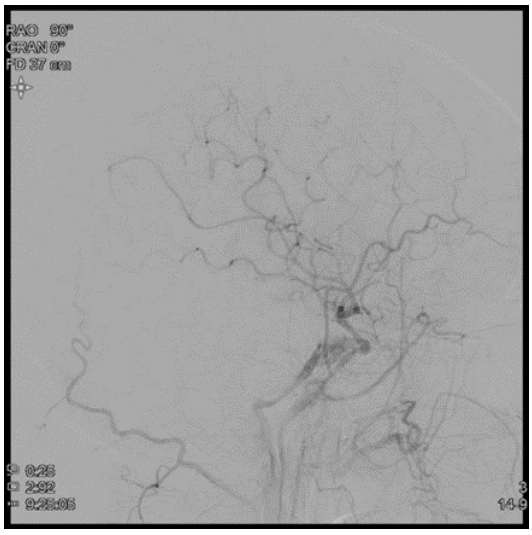

Figure 4

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