CHAPTER 6
NERVE PALSIES IN DIABETES

Neuro-ophthalmological manifestations are very common ocular pathologies in diabetics. The severity of these affections is variable, but they can lead to important visual function impairment. Oculomotor nerve palsy (ONP) raises less interest in literature than diabetic retinopathy which has become a public health problem in our country. The cause of neuropathy can be explained by metabolic alterations, inflammation or vascular occlusion producing the ischemic degeneration of the nerve, infarction or haemorrhage in the nucleus or in the path of the cranial nerve from its emergence to the orbit. ONP affects 0.4% to 14% of diabetics; it is seven to eight times commoner in people having diabetes than in non-diabetic ones. Other conditions such as blood hypertension, coronary artery disease, left ventricular hypertrophy, high hematocrit, are thought to promote ONP.

The VIth cranial nerve is also commonly involved. The IVth cranial nerve palsy is not common with an incidence of about six to 15%, despite its limited number of nervous fibres compared to the other oculomotor nerves (making it more susceptible to micro-vascular lesions).

Pathology:

ONP in diabetes is due to micro-angiopathy that results in nerves lesions by the mean of vasa nervosum occlusion and leads to mesenchymal and interstitial tissues necrosis particularly in the intra-cavernous portion. Anatomy and pathophysiology explain the rarity of multiple and bilateral forms. In fact, the three oculomotor nerves had a common blood supply at the cavernous sinus by internal carotid artery branches. Some authors explained the simultaneous nerve lesions by one of these branches occlusion; another physio-pathological hypothesis is ischemia of the posterior fossa.The bilateral involvement especially of the same nerve is even rarer . The possibility of two vasa nervosum infarction at the same time remains relatively

low. It is even rarer for ischemia to involve the identical vasa nervosum on both sides at the same time. An ischemic injury of the oculomotor nerves nuclei might be another explanation, in the absence of histological evidence. The diabetic origins of bilateral palsies remain an exclusion diagnosis, neurological exploration and MRI are compulsory and other differential diagnosis must be eliminated in these cases, such as: tuberculous or fungalmeningitis, syphilis, botulism, thyroid ophthalmopathy, multiple sclerosis, arteritis, insufficiency of the basilar artery, Wernicke encephalopathy or rarely a tumour.

Image : showing left lateral rectus palsy

Image: showing oculomotor nerve palsy

Diagnosis:

Clinically, binocular diplopia is the main symptom; however, it can be unrecognized when the palsy is minimal. That is why, any headache in diabetics must evoke a sub-clinical occulomotor palsy suspicion, especially in the presence of unexplained visual disturbances.

Evaluation of light reflex may be contributory to diagnosis. In fact, pupillary involvement in diabetes-associated oculomotor nerve palsy occurs in about 1/4th of all cases. Certain characteristics help us to differentiate an ischemic insult from an aneurysmal injury to the IIIrd nerve such as an incomplete involvement and anisocoria < 2 mm. Patients with pupillary involvement usually have no diabetic retinopathy changes or less severe grades of diabetic retinopathy. Besides, ophthalmoplegia resolves much earlier than anisocoria in diabetic oculomotor nerve palsies.

Pupillary conditions that arise out of diabetes are mainly caused due to diabetic neuropathy of the autonomic nerves. This leads to diabetic autonomic neuropathy. Damage to the nerves and blood vessels of the eyes lead to disorders of the oculomotor nerves and lead to conditions like small pupil sizes and diabetic ophthalmoplegia.

When it comes to the diagnosis of pupillary conditions, the patient's past medical history, existing medical conditions, and a physical examination of the eyes are usually conducted. While the presence of smaller pupil sizes is clearly seen in a physical examination of the eyes, the responses of the pupil to light and darkness is tested by other tests including:

- Swinging Flashlight test
- Pupil dilation test
- Slit-lamp examination
- Pharmacologic pupil dilation/constriction test

By determining the size of the pupils, pupillary responses, and their dilation and constriction, pupillary conditions are evaluated and diagnosed.

Diagnosis of Diabetic Ophthalmoplegia

Diabetic ophthalmoplegia is a condition that arises when the oculomotor nerves are affected by diabetic autonomic neuropathy,which leads to weakness and paralysis of the eye muscles. This condition is also called as diabetic third nerve paralysis. Apart from conducting nerve function tests and

other pupil tests, the diagnosis of diabetic ophthalmoplegia is differential.

Tests include:

- Pupil dilation/constriction test
- Slit-lamp test
- Swinging flashlight test

Management:

Brain imaging is required to eliminate a tumoral, a vascular or an inflammatory cause. MRI is the mainstay of investigation.

ONP regresses spontaneously after three months in average. According to statistics seventy- three percent of patients cure within 6 months following the acute episode. A complete resolution might be obtained in 86% to 100% of cases.

ONP in diabetics are alternating and recurrent. The relapse does not obscure the prognosis and the average time of evolution is shorter than the first episode.

Mostly in these conditions spontaneous resolution occurs, so the clinical monitoring and an equilibrium of diabetes is the rule. The patient can be advised with an alternating occlusion or prism wearing, to control diplopia. Botulinum toxin has also been used successfully in some diabetics. The surgery is indicated from nine to 12 months of evolution in the absence of diplopia regression.