An unusual cause of third nerve palsy

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CASE REPORT

A 74-year-old Caucasian, non-hypertensive, non-diabetic, otherwise fit male presented to the outpatient department with a 1-week history of painless left ptosis and diplopia of gradual onset. There were no other neurological symptoms.

Examination revealed partial left third nerve palsy (i.e. ptosis, eyeball fixed down and outward but with normal reacting pupil). There was no other neurological deficit and systemic examination was normal.

Investigations revealed normal full blood counts, erythrocyte sedimentation rate, glucose, electrolytes, thyroid function test, serum immunoglobulins, chest X-ray and negative antinuclear and rheumatoid factor. Computed tomography brain scan with contrast enhancement was normal. The third nerve palsy improved spontaneously to normal over a period of 3–4 weeks.

The patient re-presented 2 months later, this time with features of gradual painless partial right third nerve palsy (ptosis, eyeball fixed down and out with normally reacting pupil). Again there was no further neurological deficit and systemic examination was normal.

Following this assessment, the anatomy of the third cranial nerve was considered in detail leading to a positive Tensilon test to confirm the diagnosis of ocular myasthenia gravis. Computed chest scan did not reveal any evidence of thymoma. Anti-acetylcholine receptor antibodies were absent. He has remained well on a small dose of pyridostigmine.

INTRODUCTION

This article describes an uncommon presentation of a rare disorder and the approach adopted to arrive at the correct diagnosis on the second visit.

DISCUSSION

This patient initially presented with unilateral partial third nerve palsy and the common causes of this were considered and ruled out clinically and with simple investigations. *Table 1* shows the differential diagnosis of a third nerve palsy. On this visit the routine investigations failed to localize the cause of the lesion.

On subsequent presentation with the third nerve palsy affecting the other eye, the diagnostic difficulty was resolved by a knowledge of anatomical course of the third cranial nerve. The third cranial nerve nuclei are placed in close proximity centrally within the midbrain and both nuclei are separated by the aqueduct of sylvius. Each nucleus consists of a number of nuclei supplying the different eye muscles, the light reflex and accommodation and/or conversion. It can be seen that a single lesion, or separate bilateral lesions (e.g. vascular/demyelination), are highly unlikely to cause the symmetrical muscle paralyses and spare the pupillary reflexes.

The nerves then pass anteriorly through the substance of the midbrain in close proximity to corticocerebellar and pyramidal fibres and lesions in this area would also cause long tract signs, which were not present in this patient. In the posterior fossa the nerve travels in close proximity to the Circle of Willis where aneurysmal dilatation of the vessels cause compression usually resulting in a painful and complete third nerve palsy. It is clear that bilateral lesions in this area are not in keeping with the clinical presentation and spontaneous improvement in this patient.

A pituitary cause is unlikely in the absence of field defects. A cavernous sinus lesion was excluded on the basis of history and intact fourth and sixth cranial nerves. Local orbital pathology was unlikely in the absence of proptosis.

Ocular myopathies are usually bilateral slowly progressive disorders and are rare. The differential diagnosis narrowed to myasthenia gravis, which, however, usually presents with diplopia and bilateral ptosis. The Tensilon test confirmed the diagnosis.

This case confirms the difficulty of establishing an aetiological diagnosis in patients with isolated ocular palsies. In a prospective analysis of 105 cases of extrinsic ophthalmic muscle palsies without other neurological signs, oculomotor nerve was the most frequently involved and in 25% of cases the cause remained undetermined (Batocchi et al, 1997). The assessment of patients with largely isolated cranial, bulbar and respiratory muscle weakness due to myasthenia may be difficult and misleading, and a Tensilon test or a trial of medication may be necessary to establish the diagnosis (Maher et al, 1998). Two cases of myasthenia in elderly women were misdiagnosed as stroke by neurologists (Kleiner-Fisman and Kott, 1998).

Myasthenia gravis is a disorder characterized by weakness and fatigue of voluntary muscles. This is an autoimmune disease which leads to a reduction of the number of acetylcholine receptors at the muscular motor endplate.

Myasthenia gravis is an uncommon disorder with a prevalence of 7–9 per 100 000. It is twice as common in females with a peak age of 30 years.

The disease is generalized in 85% and confined to extraocular muscles in 15% of patients (Heitmiller, 1999). Ocular myasthenia causes a relatively mild disability and usually has a good

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prognosis, but may convert into severe generalized weakness. In a retrospective analysis of 78 patients with ocular myasthenia, 31% developed generalized myasthenia. Among these 75% developing within 4 years after the onset of disease (Sommer et al, 1997).

Myasthenia in the elderly is slightly different and is characterized by an increased prevalence in males, low frequency of ocular forms, negative human leukocyte antigen (HLA) B8, negative anti-acetylcholine receptor antibodies, low frequency of thymoma and a good response to steroids (Bille-Turc et al, 1997). In a series of elderly patients with myasthenia gravis, 20% of patients had ocular form and 86% were sero-positive (Antonini et al, 1996). The main immunological difference between early and late onset myasthenia is the presence of antibodies to muscle titin, which are detected in 50% of patients with late-onset myasthenia (Aarli, 1999). HM

TABLE 1.
Differential diagnosis of third nerve palsy

Site	Causes	Clinical features
Brainstem	Infarction (as a result of atherosclerosis, hypertension or diabetes) Demyelination Tumour	Altered consciousness Bilateral signs of contralateral lateral rectus weakness Complete third nerve palsy Vertical gaze disturbance Contralateral cerebellar or rubral tremor (Claudes' syndrome) Contralateral hemiparesis (Weber's syndrome) Contralateral ataxia (Benedict's syndrome) Both above and vertical gaze palsy (Nothnagel's syndrome)
Subarachnoid space at base of brain	Posterior communicating artery aneurysm Meningitis Infarction Tumour Neurosurgery Trauma Uncal herniation	Acute onset Complete third nerve palsy Painful Supportive history and findings
Cavernous sinus	Internal carotid artery aneurysm Caroticocavernous fistula Infection Thrombosis	IV, VI nerves involved Sometimes V nerve involved Horner's syndrome II nerve involvement unlikely Bruit over orbit
Pituitary	Tumours	Field defects
Orbit	Trauma Tumours Cellulitis	Often II nerve involvement Proptosis Painful Unilateral
Ocular myopathies	Muscular dystrophy	Painless gradual Bilateral Normal pupils
Neuromuscular	Myasthenia gravis	Same as ocular myopathies

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