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The clinical and etiological study of the Oculomotor nerve palsy in a rural hospital

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Abstract

Background: Most of the times the oculomotor palsies are referred to an ophthalmologist from various other specialities, as they are often perceived as a sign of serious underlying pathology, like a compression of the oculomotor nerve resulting from an expanding aneurysm at the junction of internal carotid and posterior communicating arteries, one of the few emergency situation in neuro-ophthalmology, so every case has to be evaluated and its probable etiology identified. This study is done in a rural hospital emphasizing the need to identify the cause of the third nerve palsy for its early management.

Method: The study was conducted in the Department of Ophthalmology, Adichunchanagiri Institute of Medical Science, B.G. Nagara, Mandya district, Karnataka, from November 2013 to July 2015. Thirty five cases of oculomotor nerve paralysis, presenting themselves directly to the ophthalmology outpatient department or referred from various other departments were studied and analysed.

Observations and Results: Isolated oculomotor nerve palsy was observed in 74.28% and multiple cranial nerve palsy was observed in 25.17%. Microvascular ischemia 40% as an etiology was found as the predominant cause, which showed a good prognosis for the complete recovery in 31.42% cases.

Conclusion: Predominant mode of presentation was isolated oculomotor nerve palsy, with microangiopathy as the major etiological factor, which has a good prognosis for complete recovery.

Keywords: Isolated Oculomotor Nerve Palsy, Pupillary Sparing, Microvascular Ischemia.

Introduction

The oculomotor nerve is entirely motor in function, it supplies the superior rectus, inferior rectus, inferior oblique, medial rectus and levator palpebrae superioris, as well as autonomic pupillary sphincter and ciliary muscles of the eye. The most common etiology is ischemia due to diabetes mellitus. Etiologies causing multiple cranial nerve palsies include head trauma, vascular pathology, tumours and inflammation due to infectious and non-infectious origin. Collaboration between various specialists is very essential for the evaluation and management of the oculomotor nerve palsy, such a collaboration is still difficult in developing countries because of technical and financial hurdles.

Materials and Methods

After obtaining the approval of the Institutional Ethics committee, the informed consent from the patients were obtained. The study was conducted for a period of 18 months (November 2013 to July 2015), the sample size consisted of 35 cases of oculomotor nerve paralysis, presenting themselves directly to the department of ophthalmology or referred by various other departments were studied and analysed. A standard case protocol was maintained, in the history emphasis was given for drooping of eye lid(s), headache, diplopia, fever, trauma, vomiting, convulsions, history of exposure etc. In past history emphasis was given to diseases such as diabetes mellitus, hypertension, and tuberculosis. Current or past medications if any was noted, any history of addictions was also noted. The visual acuity and colour vision was measured using conventional methods, detailed slit lamp examination, thorough clinical examination was done including symmetry of face, head posture, and extraocular movements in all nine cardinal positions of gaze, Hirschberg test, cover test, prism cover test and aberrant regeneration were performed. Ptosis evaluation and grading of ptosis if present was done as follows: mild (<2 mm), moderate (2–4 mm) and severe (4–8 mm). Size, shape and light reflexes of the pupils were noted, the normal pupillary diameter was standardized to 3 mm. Miosis and mydriasis were considered when the diameter was less than 3mm and greater than 7mm respectively. The degree of anisocoria, if present, was recorded. Physiological anisocoria was ruled out after repeating the measurements in dim light. Detailed fundus examination was done and the findings were recorded. Detailed systemic examination was done with special emphasis to central nervous system, cardiovascular and endocrinological examination. Blood pressure measurement, routine blood investigations including blood sugar levels, erythrocyte sedimentation rate and serum cholesterol, VDRL and HIV antibodies, radiological examination of skull, orbital fissures, optic foramina, paranasal sinuses, computed tomography, and carotid angiography were performed wherever indicated. They also underwent otorhinolaryngological examination. All patients were reviewed after two weeks, eight weeks, twelve weeks and at the sixth month.

Inclusion Criteria: Cquired oculomotor nerve palsy with a recent onset (within two weeks), all age groups and both sexes were included, Oculomotor nerve palsy associated with other neurological signs and symptoms other than the palsy itself and acceptance of the patients to undergo investigations where ever needed.

Exclusion criteria: Congenital oculomotor nerve palsies, patients with incomitant squint due to myogenic, myasthenic and restrictive causes, patients who were terminally ill, oculomotor nerve palsy secondary to neurosurgery were excluded from the study.

Results

Maximum number of patients belonged to age group between 51 to 60 years 22.85% (eight) cases and 61 to 70 years 22.85% (eight) cases. The remaining cases belonged to the following age groups, 21 to 30 years 8.57% (three) cases, 31 to 40 years 14.28% (five) cases, 41 to 50 years 20% (seven) cases and more than 70 years 11.42% (four) cases. Among the gender 65.7% (twenty three) cases were females and 34.28% (twelve) cases were males. The oculomotor nerve involvement was unilateral in 94.28% (thirty three) cases and bilateral in 5.71% (two) cases. All the cases with bilateral oculomotor nerve palsy had lesions located in the midbrain involving the oculomotor nucleus complex. Isolated oculomotor nerve palsy 74.28% (twenty six) cases was the predominant mode of presentation, while multiple cranial nerve palsy involving oculomotor nerve was seen in 25.71% (nine) cases. Among the thirty five cases, ptosis was seen in 42.85% (fifteen) cases, of which 53.3% (eight) cases had mild ptosis, 13.33% (two) cases had moderate ptosis and 33.33% (five) cases had complete ptosis. In the study group 45.7% (sixteen) cases had diabetes and 8.57% (three) cases had systemic hypertension. Among the isolated oculomotor nerve palsy, pupil sparing was noted in 76.92% (twenty) cases and involvement of pupil was seen in 23.07% (six) cases. The remaining nine cases with multiple cranial nerve palsies had pupillary involvement. Out of the 20 cases of pupillary sparing isolated third nerve palsy, 65% (thirteen) cases had complete recovery and 35% (seven) cases had partial recovery. Out of the remaining 6 cases of isolated oculomotor nerve palsy having pupillary involvement five cases had partial recovery and one case of intracranial aneurysm was lost during follow-up. All the patients with multiple cranial nerve palsies had involvement of the pupil, among them 22.22% (two) patients showed complete recovery, 55.55% (five) patients showed partial recovery and 22.22% (two) cases was lost during follow-up. In the study group, pupillary sparing oculomotor nerve palsy 37.14% had better prognosis of complete recovery compared to cases which had involvement of pupil. Among the twenty six cases with isolated third nerve palsy the predominant cause was microvascular ischemia seen in 53.84% (fourteen) cases, the remaining included post-traumatic 23.07% (six) cases, intracranial aneurysms 3.84% (one) case, undetermined 15.38% (four) cases and 3.84% (one) case of oculomotor nerve schwannoma, a very rare tumor, only about 38 documented cases are there till date. Among the nine cases with multiple cranial nerve palsy, the predominant cause was orbital inflammatory disease 66.7% (six cases), neoplasm accounted for 22.22% (two cases) and post-traumatic 11.11% (one case). In the study group of thirty five cases, 42% (fifteen) cases had complete recovery. Among the cases having complete recovery, the majority 73.33% (eleven cases) belonged to cases having microvascular ischemia as the cause, the remaining complete recovery was seen in undetermined group 13.33% (two) cases and orbital inflammatory group 13.33% (two) cases.

Table 1: Mode of presentation of oculomotor nerve palsy

Type of involvement	Number of cases	Percentage (%)
Isolated nerve palsy	26	74.28
Multiple cranial nerve palsy	9	25.71
Total	35	100

Table 2: Classification of Respondents by Pupil involving/Pupil sparing

Pupil involving/Pupil sparing	Respondents	
	Number	Percent
Pupil involving	15	42.9
Pupil sparing	20	57.1
Total	35	100.0

Table 3: Oculomotor nerve palsy according to etiology

Etiology	Number	Percentage
Microvascular ischemia	14	40
Post traumatic	7	20
Intracranial aneurysm	1	2.85
Neoplasm	3	8.37
Orbital inflammatory group	6	17.14
Undetermined cause	4	11.42
Total	35	100

(Both isolated oculomotor nerve palsy and oculomotor nerve palsy associated with other cranial nerve palsies)

Table 4: Recovery pattern in isolated oculomotor nerve palsy according to the etiology

Etiology	Complete recovery		Partial recovery		Lost during follow-up	
	Number	Percentage	Number	Percentage	Number	Percentage
Microvascular ischemia	11	42.30	3	11.53	-	-
Post-traumatic	-	-	6	23.07	-	-
Intracranial aneurysm	-	-	-	-	1	3.84
Oculomotor nerve schwannoma	-	-	1	3.84	-	-
Undetermined group	2	7.69	2	7.69	-	-
Total	13	49.99	12	46.13	1	3.84

Table 5: Recovery pattern in oculomotor nerve palsy associated with other cranial nerve palsy according to the etiology

Etiology	Complete recovery		Partial recovery		Lost during follow-up	
	Number	Percentage	Number	Percentage	Number	Percentage
Orbital inflammatory group	2	22.22	4	44.44	-	-
Post-traumatic	-	-	1	11.11	-	-
Neoplasm	-	-	-	-	2	22.22
Total	2	22.22	5	55.55	2	22.22

Table 6: Recovery pattern according to pupillary involvement

Pupillary involvement	Complete recovery		Partial recovery		Lost during follow-up	
	Number	Percentage	Number	Percentage	Number	Percentage
Pupil spared	13	37.14	7	20	-	-
Pupil involved	-	-	12	34.28	3	8.57

Discussion

In the present study maximum number of patients belonged between age group 51 to 60 years 23% (eight patients) and 61 to 70 years 23% (eight patients), while Vimala Menon and co-workers found maximum incidence of oculomotor nerve palsy (71%) in the 11 to 40 years age group.[1] Out of 35 patients, 65.7% (23patients) were females and 34.28% (twelve patients) were males, Green and co-workers have reported equal sex distribution.[2] Unilateral oculomotor nerve palsy was seen in 94.28% (thirty three) patients, out of which right eye oculomotor nerve palsy was observed in 69.69% (twenty three) patients, left eye oculomotor nerve palsy was observed in 30.30% (ten) patients and 5.71% (two) patients had bilateral oculomotor nerve palsy, the results could be compared to earlier studies by Green and co-workers and Rush and Younge.[2,3] In the present study the number of isolated oculomotor nerve palsy is 74.28%, compared to studies by Rucker 68.5% and Richards and co-workers 68.1%.[4,5] In the present study, microvascular ischemia (40%) emerged as the predominant cause for oculomotor nerve palsy where a specific aetiology could be determined, which could be compared to most of the earlier studies who have found similar results.[2-5] Post-traumatic oculomotor nerve palsy accounted for 20 % of total cases in the present study, compared to a study by P. Muthu and P. Pritty in June 2000, they found a 15% occurrence of isolated 3rd nerve palsy attributable to head trauma.[6] Rush and Younge series (16.2%),[3] and Richards and Younge series (14.7%).[5] In the present study, idiopathic orbital inflammatory group comprised of 17.14% cases, compared to Vimala Menon series (9.5%),[1] only such study where orbital inflammatory diseases were considered as a separate group. Intracranial neoplasms were suspected in 8.57% of cases, compared to Vimala Menon[1] series (9.5%). Intracranial aneurysms causing oculomotor nerve palsy were diagnosed in only 2.85% of cases in the present study while most of the earlier studies[3,4,5,7] had higher incidence of aneurysms, except for the two Indian series who found lower incidence. Rama et al,[8] in their study, used carotid angiography but found only 1.8% of intracranial aneurysms and concluded that aneurysms are less frequent in the South Indian region. In the present study, etiology was undetermined in 11.42% cases

which could be compared to most of the earlier studies[2-5] which had similar results. In Rama et al,[8] series, undetermined aetiology accounted for only 10.5% cases though they did not offer definite explanation for this low incidence. In the study complete recovery was seen in 42.85% of cases compared to earlier studies by V.P. Singh et al.[9] (50%) and Rush and Younge (44.6%).[3] Microvascular ischemia group had the best recovery (31.42%) which is comparable to previous study by Rush and Younge series.[3] Pupil sparing oculomotor nerve palsy 37.14% had better prognosis for complete recovery compared to 5.71% pupil involving oculomotor palsy.

Conclusion

Isolated oculomotor nerve palsy is the predominant mode of presentation which has a good recovery rate, microvascular ischemia appears to be the major etiological factor and the prognosis for complete recovery is good, but when oculomotor nerve palsy is associated with multiple cranial nerve palsies or other neurological features the chance of complete recovery is less. Even though certain etiological factors such as microvascular ischemia can be done using simple laboratory investigations, collaboration with other specialists helps in guiding the diagnosis and evaluation, especially in rural hospitals where sophisticated complementary investigations are not available.

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