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Profile of isolated sixth cranial nerve palsy: A hospital based study

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Isolated sixth cranial nerve palsy is a type of mononeuropathy resulting in the weakness of the lateral rectus muscle that allows the eye to move to its lateral side. The majority of this neuropathy occurs due to diabetes mellitus and hypertension. In addition, a significant number of them are also idiopathic in origin. The condition is known to resolve spontaneously without specific treatment in 3 to 6 months period. There had been no report from Nepal describing this entity. Therefore a hospital-based study of 44 patients with isolated lateral rectus palsy was carried out to see the demographic and clinical profile of this neuropathy in our institution.

Twenty-four patients were male. The commonest type was found to be of the idiopathic variety (56.8%) followed by uncontrolled diabetes mellitus. Among the idiopathic group 44% of patients had symptoms suggestive of viral infection. None of the patients were found to have features suggestive of raised intracranial pressure. Computerized tomography (CT) or magnetic resonance imaging (MRI) studies were not found to be cost-effective while evaluating the cases of isolated lateral rectus palsy, as all scans were negative in this study. All patients recovered spontaneously within 3 to 6 months.

Key Words: abducent nerve, cranial nerve palsy, diplopia, neuropathy

Isolated sixth cranial nerve palsy is a disorder that causes mononeuropathy with double vision, which is responsible for paralyzing the ocular muscle, the lateral rectus that allows the eye to move to its lateral side. Sixth cranial nerve (Abducent nerve) disorders are often associated with diabetes, hypertension, trauma, infections (e.g. meningitis or sinusitis), infarction, cranial aneurysms, tumors, or increased intracranial pressure and ophthalmic migraine. The etiology of isolated sixth cranial nerve palsy remains undetermined in 25% of the cases despite full diagnostic evaluation, especially among adults. [3] Therefore, the yield of causative factors for sixth cranial nerve palsy is very low on imaging studies and most of them fall in the category of unknown etiology. The vast majority of this neuropathy occurs due to diabetes, hypertension or idiopathic variety and resolves spontaneously without specific treatment in a 3 to 6 months period.[7] Most of the literature originating from developed countries suggests that the patients with isolated sixth cranial nerve palsy should be evaluated thoroughly, including complete neuro-imaging to rule out lesions in the brain.[2,7, 8,] Some had shown that frequently sixth nerve palsy can be due to pontine lesions.[5] However, there is no such study report from Nepal in this regard. Therefore, a hospital based

retrospective analysis was carried out in order to find out the clinical profile of isolated sixth cranial nerve palsy and its causes, highlighting the associated findings of brain imaging. This study is expected to form base line data for initiating future researches and also to formulate guidelines for the management of these patients so as to minimize the expenses, which could have been practiced without any rationale.

Material and Methods

The record sheets of patients with sixth cranial nerve palsy from January 2000 through December 2003 were collected from the Record Section of the Neuro-ophthalmology Clinic, B. P. Koirala Lions Center for Ophthalmic Studies, Kathmandu, Nepal and all cases of isolated sixth cranial nerve palsies (mononeuropathy VI) were included in the study. Cases who had multiple neuropathies and those who did not turn up for the first follow- up or with incomplete data were excluded from the study. All patients had complete records of examination including ocular exams; special test records like Hess's chart, diplopia charts, blood test reports, and a neurological examination note, CT/MRI scan reports, and at least one follow-up note. Tabulation was done to analyze the required information from these sheets. Photographs were also collected from the photographic record room. The mean follow up period was 19 months.

Results

Demographics and Clinical Features

Over a period of 4 years, a total of 1050 patients were examined in the Neuroophthalmology clinic, out of which 48 were cases of isolated sixth nerve palsy, which accounted for 4.6% of total clinic attendance. Four cases were excluded from the study due to unavailability of complete records. Thus 44 case sheets were evaluated in detail to find out the relevant profile. Out of 44 cases, 24 of them were males accounting for 54.5% and the rest were females. The majority of them belonged to the age group of above 40 years. The mean age of males was 46 years with SD 7.06 and the mean age among females was 44 years with SD of 6.54 (Table 1). There were several presenting symptoms but the commonest were diplopia followed by deviation of eye (Figure 1). Thirty-two of them had complained that they had diplopia whereas only 19 of them were aware of deviated eyes (Table 2). Forty cases (90.9%) were found to have unilateral involvement whereas 4 cases (9.1%) were bilateral in nature. Three out of these 4 bilateral cases were traumatic in origin.

Age in years	Males	Females	Total
0-10	2	0	2
11-20	1	0	1
21-30	3	2	5
31-40	2	3	5
41-50	9	5	14
51-60	3	5	8
>60	4	5	9

Table 1. Distribution of patients based on age groups

Symptoms	No. of cases	Percentage
Diplopia	32	72.7
Deviation of eye	19	43.2
Headache	12	27.3
Eye ache	4	9.1
Dizziness	5	11.4

Table 2. Presenting symptoms of patients with isolated sixth cranial nerve palsy

Etiology and Diagnosis

Table 3 summarizes the etiology in the series of 44 patients. Twenty-five cases (56.8%) belonged to the idiopathic group, 10 cases (22.7%) were due to diabetes

Causes	No. of patients	Percentage
Idiopathic	25	56.8
Diabetes mellitus	10	22.7
Trauma	4	9.1
Gradenigo syndrome	2	4.5
Ocular myasthenia	2	4.5
Systemic hypertension	1	2.4

Table 3. Causes for isolated 6th cranial nerve palsy

mellitus, 4 cases (9.1%), due to trauma, 2 cases (4.5%) due to Gradenigo syndrome, 2 cases (4.5%) as a result of myasthenia gravis, and 1 patient (2.3%) due to severe

Time for recovery	No. of patients	Cumulative Percentage
Within 1 month	11	25
Within 3 months	18	65.9
Within 6 months	10	88.6
Over 6 months	5	100

Table 4. Recovery time in 44 patients

systemic hypertension without any intracranial lesion. Diagnosis was made clinically and radiological and laboratory investigations were done mainly to exclude other pathology.

Since the idiopathic type was the largest group, followed by diabetes mellitus, these subgroups were further analyzed. In the diabetic group, all had uncontrolled diabetes. Out of 25 patients in the idiopathic group, 7 (28%) had flue like symptoms with running nose and sore throat immediately before the onset of the disease and remained for a variable time, whereas 4 (16%) had a history of fever before the onset of eye symptoms. So 44% of patients had some signs of viral infection, which was not detected by hematological analysis or urinalysis.

Imaging

Thirty-nine patients underwent either CT or MRI scans of head and orbit. All 39 scans were found to be normal and did not help in diagnosis.

Treatment

All patients were kept under close observation only, with some supporting treatment in some patients. Recovery was seen in all the patients, the recovery period being variable from 1 month to several months. Eleven cases recovered within 1 month, 18 recovered within 3 months, resulting in almost 65% recovery within a 3 months period as shown in Table 5. The mean follow up period was 19 months.

Discussion

In 4 years time, our clinic data showed that almost 4.6% out of total attendance were cases of isolated sixth nerve palsy. This may not represent a true scenario because of the highly specialized tertiary nature of our Neuroophthalmology Clinic. This could have led to over estimation of the prevalence. Males were affected slightly more than females accounting for 54.5% of the total in our series but not to the point of reaching statistical

Figure 1. Photograph of a patient with left 6th nerve palsy who recovered spontaneously in 3 months.

significance. This corroborates with previous reports.[1,6,7] Most of the reports which have shown involvement in younger adults are either traumatic in origin or due to intracranial space occupying lesion (SOL).[2,5]

On exploring the causes of isolated sixth cranial nerve palsy, we found that 25 cases (56.8%) belonged to the idiopathic group, followed by diabetes mellitus accounting for 10 cases (22.7%). In contrast to the literature from the western countries, hypertension was not the major cause for sixth nerve palsy in our series. Lopez and collegues[1] found hypertension to be the major cause for this entity. The patients with systemic hypertension presenting with sixth cranial nerve palsy were found to have bilateral infarction of the rostral pontine tegmentum.[1]

In the diabetic group, all had uncontrolled diabetes. Eleven patients (44%) from the idiopathic group had some signs of viral infection, which was not detected by hematological analysis or urinalysis. This probably calls for virology tests to identify the causes of sixth cranial nerve palsy.

In 39 patients either CT or MRI scans of head and orbit were obtained. All 39 scans were found to be normal and did not help in diagnosis. This is in contrast to the previously published reports from developed countries which have shown the association of intracranial pathology with isolated sixth cranial nerve palsy.[4] Rose et al. in their series stated that multiple sclerosis, though rare, could be implicated in causing VI nerve palsy, which often can be diagnosed by MRI.[6] In our series MRI or CT scans were negative for structural lesion in the brain and the condition

resolved spontaneously. This shows that imaging studies are rarely useful in a case of isolated lateral rectus palsy.

Diplopic was the commonest symptom followed by deviation of eye, which is similar to previously published papers.[2] Thirty-two patients had diplopic whereas only 19 of them were aware of deviated eyes. This could either be due to the small amount of deviation or lack of awareness in our society.

No specific treatment was instituted in the patients in our series. As mentioned before, recovery was seen in all cases, the recovery period being variable from one month to several months as quoted in other literature. The recovery time matched with previously published reports.[3, 7]

Similar to most of the modern studies on the subject, our series is retrospective in nature, and thus potentially subject to sources of bias and variation. Also, since this is a hospital-based study, this cannot represent the country profile.

Recommendations

1. As expensive investigations like CT/ MRI scans, were not helpful in the diagnosis and treatment of isolated sixth cranial nerve palsy, these investigations should probably be reserved in cases with other suspicious associated findings. This would help lowering the cost of management especially in a country like ours where not many people can afford this expensive modality of investigation.
2. Such cases can be managed at peripheral hospitals with regular follow-up. This will avoid unnecessary referral to a tertiary center, which is expensive as well as troublesome for the patients.
3. Patients with diabetes mellitus should have strict diabetic control. Development of health awareness programs would tackle this problem in an effective manner.
4. Viral etiologies should be studied in the future. Virology may help us in pointing out the preventive aspect of this disease.

Conclusions

Isolated lateral rectus palsy is more common than previously thought. The unilateral variety was seen more frequently than the bilateral one. The commonest cause found to be was idiopathic variety followed by uncontrolled diabetes mellitus. None of the patients had features of raised intracranial pressure. All patients recovered within 3 to 6 months. Imaging studies were not helpful in the diagnosis nor in the treatment of the condition.

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