Original Research Article

# The prevalence and systemic associations of sixth nerve palsy

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## Abstract

**Aim:** To evaluate prevalence and systemic association of sixth nerve palsy. **Methods:** It was an observational, prospective study. All the patients who came to our tertiary eye care center with lateral rectus palsy or paresis were examined. The detailed ophthalmic evaluation, including all systemic medical conditions were studied. The help of neuroimaging was taken as and where required bases. **Results:** We found 42 cases of sixth nerve palsy/ paresis in 6 months' period. It was more common male (26, 62%) over female (16,38%). The most commonly it was above 40 years of age (30,71%). The systemic association which we find were-Diabetes mellitus (13,31%), Hypertension (5,11%), Diabetes and hypertension both (4,9%), trauma (4,9%), Tumors (4,9%), cerebrovascular accidents (2,5%), post neurosurgery (2, 5%), pregnancy and other gynec problems (2, 5%), others (5,11%), undetermined (2,5%). The medical conditions usually recovered by itself, once systemic control of blood sugar level and blood pressure, while traumatic cases may require the surgical intervention. **Conclusion:** The incidence of lateral rectus palsy was higher with diabetes mellitus and hypertension, mainly very poor control of blood sugar level and blood pressure. The trauma and neurological conditions required the help of neuroimaging also sometime surgical intervention as and when required bases.

**Key Word:** Lateral rectus palsy, Hypertension, Diplopia.

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## INTRODUCTION

Cranial nerve VI, also known as the abducens nerve, innervates the ipsilateral lateral rectus (LR), which functions to abduct the ipsilateral eye. The sixth cranial nerve has a long subarachnoid course. The sixth nerve nucleus is located in the pons, just ventral to the floor of the fourth ventricle and just lateral to the medial longitudinal fasciculus (MLF). About 40% of its neurons project into the ipsilateral MLF only to cross over to the contralateral side and ascend to innervate that contralateral medial rectus sub nucleus to participate in contralateral eye adduction.[1,2,3] Patients usually present with binocular horizontal diplopia (double vision producing a side-by-side image with both eyes open), worse in the distance, and esotropia in primary gaze. Patients also may present with a head-turn to maintain binocularity and binocular fusion and to minimize diplopia. Examination for a sixth nerve palsy involves documenting the presence or absence of papilledema, examining the ocular motility, evaluating the eyelids and pupils, and excluding involvement of other cranial nerves (eg, V, VII, VIII) MRI is indicated for any brainstem findings to exclude pontine glioma in children (most have papilledema and nystagmus without other cranial nerve involvement) and in adults who show no improvement.

## AIMS AND OBJECTIVE

1. To evaluate prevalence of lateral rectus palsy
2. To find the systemic association of sixth nerve palsy

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## MATERIAL AND METHODS

It was an observational, prospective study. All the patients who came to our tertiary eye care center with lateral rectus palsy or paresis were examined. The detailed ophthalmic evaluation, including all systemic medical conditions were studied. The help of neuroimaging was taken as and where required bases.

Laboratory Studies required are:

- Complete blood cell (CBC) count.
- Diabetes testing (glucose, glycosylated hemoglobin [HbA1C], glucose tolerance test).
- Erythrocyte sedimentation rate, C-reactive protein, and platelets in patients older than 50 years.
- Acetylcholine receptor antibodies in the presence of variable strabismus or ptosis.

The following are not mainstream tests for abducens palsy but can be considered:

- Rapid plasma regain test
- Fluorescent treponemal antibody-absorption test
- Lyme titer
- Antinuclear antibody tests

MRI is indicated for the following:

- Patients younger than 55 years with no vasculopathic history
- Associated pain or other neurologic abnormality [11]
- History of cancer
- Bilateral sixth nerve palsy
- Papilledema
- In the event no marked improvement is seen or other nerves become involved

An LP should be considered if MRI results are negative. If a presumed microvascular ischemic sixth nerve palsy does not improve within 3-4 months or if other cranial nerves become involved, a full medical, neurologic, and imaging workup should be performed.[4]

## RESULTS

We find 43 cases of sixth nerve palsy/ paresis in 6 months' period. It was more common male (27, 62%) over female (16, 38%).

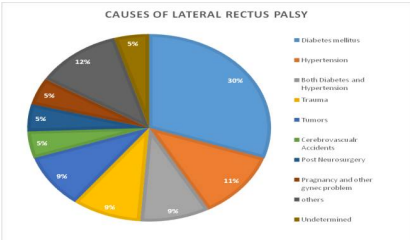
**Table 1:**

| Gender | Number | Percentage |
|---|---|---|
| Male | 27 | 62 |
| Female | 16 | 38 |
| Total | 43 | 100 |

The most commonly affected age was more 40 years (30,71%). The systemic association which we find were- Diabetes mellitus (13,31%), Hypertension (5,11%), Diabetes and hypertension both (4,9%), trauma (4,9%), Tumors (4, 9%), cerebrovascular accidents (2,5%), post neurosurgery (2,5%), pregnancy and other gynec problems (2,5%), others (5, 11%), undetermined (2,5%).

**Table 2:**

| Systemic Associations | Number | Percentage |
|---|---|---|
| Diabetes mellitus | 13 | 31 |
| Hypertension | 5 | 11 |
| Both Diabetes and Hypertension | 4 | 9 |
| Trauma | 4 | 9 |
| Tumors | 4 | 9 |
| Cerebrovascualr Accidents | 2 | 5 |
| Post Neurosurgery | 2 | 5 |
| Pragnancy and other gynec problem | 2 | 5 |
| Others | 5 | 11 |
| Undetermined | 2 | 5 |
| Total | 43 | 100 |




The medical conditions usually recovered by itself, once systemic control of blood sugar level and blood pressure, while traumatic cases may require the surgical intervention

## DESCUSSION

In our defined population, 137 cases of sixth nerve palsy were identified over the 15-year period. In order of frequency, causes and associations were: undetermined (26%), hypertension (19%), diabetes mellitus (15%), trauma (12%), multiple sclerosis (7%), cerebrovascular accident (4%), neoplasm (4%), post-neurosurgery (3%), and aneurysm (2%). Where sixth nerve palsy was the presenting sign in cases of neoplasm (n=1) and aneurysm (n=3), history and examination revealed the presence of other neurologic symptoms or signs. The peak incidence of sixth nerve palsy was in the 7th decade of life when the most common causes and associations were undetermined (34%), diabetes (23%), and hypertension (20%)[5] We conducted a retrospective population-based case-control study to determine the presence and magnitude of any association of preexisting diabetes mellitus and systemic hypertension with isolated sixth nerve palsy. Diabetes mellitus occurred more frequently in cases (23.7%) than in controls (5.3%; P = 0.001; OR, 5.59; 95% CI, 1.79-17.42). Systemic hypertension occurred with similar frequency in cases (51.3%) and controls (39.5%; P = 0.14; OR, 1.62; 95% CI, 0.85-3.08). Coexistent diabetes mellitus and hypertension were more common in cases (18.4%) than in controls (2.6%; P = 0.002; OR, 8.36; 95% CI, 1.83-38.18). the conclusion was that. there is a 6-fold increase in odds of having diabetes in cases of sixth nerve palsy over controls, whereas systemic hypertension does not seem to be associated with increased odds.[6] A total of 657 patients with isolated CN 3/4/6 palsies (61.1% male, mean age 54.8 years) were identified. Compared with control group, the patients with isolated CN 3/4/6 palsies exhibited an increased risk of ischemic stroke (CN3: adjusted HR 3.69 (95% CI 2.20-6.19); CN4: 2.71 (95% CI 1.11-6.64); CN6: 2.15 (95% CI 1.31-3.52)). The association between CN 3/4/6 palsies and ischemic stroke was detected in both separate subgroup and sensitivity analyses. The conclusion was the patients with CN 3/4/6 palsies exhibited an increased risk of developing ischemic stroke. Therefore, isolated ocular motor nerves palsies appear to represent an unrecognized risk factor for ischemic stroke, and these require further confirmation and exploration.[7]

## CONCLUSION

The incidence of lateral rectus palsy was higher with diabetes mellitus and hypertension, mainly very poor control of blood sugar level and blood pressure. In diabetic patients, total duration of diseases is also important. Though all systemic condition, diabetes and hypertension with lateral rectus palsy is alarming sign for control them. The trauma and neurological conditions required the help of neuroimaging also sometime surgical intervention as and when required bases.

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