

Original Research Article

Etiopathogenesis and Prognostic Factors of Isolated Third Nerve Palsy – A Cross-Sectional Study

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ABSTRACT

Aim: To evaluate the etiology, epidemiological trends and prognostic factors for recovery in isolated third nerve palsy patients.

Methods

A cross-sectional study was conducted on 25 consecutive patients who presented with isolated third nerve palsy in Government Kilpauk Medical College and hospital, Chennai for a period of 18 months. Detailed history taking, general examination, complete ophthalmological examination, neurological examination and radiological investigation were done. All the patients were followed up for 6 months to assess their prognostic factors for recovery. The results were statistically analyzed.

Results

In our study, the mean age of presentation was 50.08±18.32 years. There was no sexual preponderance. Pupillary involvement was found in 48% patients. Majority of cases in our study were due to microvascular ischemia (60%) and showed complete recovery. Post-traumatic nerve palsy accounted for 24% of total cases. The overall recovery of oculomotor nerve palsy in our study was 60%. Majority of patients with partial (76.9%) and pupil sparing palsy (84.6%) had complete recovery as compared to patients with complete and pupil involving oculomotor nerve palsy.

Conclusion

Microvascular ischemia was presumably the most common etiology of isolated third nerve palsy which had complete recovery rate provided adequate risk factor management was done. Isolated third nerve palsy with pupil sparing and partial palsy were significant indicators of complete recovery.

Keywords: microvascular ischaemia, trauma, nerve palsy, pupil, prognosis.

INTRODUCTION

Third nerve palsy can be isolated or combined with other cranial nerve palsies. It can result from lesions anywhere from the oculomotor nuclei in the midbrain to the extraocular muscles within the orbit. The annual incidence of isolated third nerve palsy is 4 per 1,00,000 population¹. It may be partial or complete, congenital or acquired, pupil involving or pupil sparing palsy. The most common site of lesion for isolated third nerve palsy is at the sub-arachnoid space. The presence or absence of pupillary involvement has been the most helpful sign in differentiating patients between ischemic and compressive causes of third nerve palsy^{2,3}. Recovery may be either complete, partial, partial with aberrant regeneration or persistent palsy^{4,5}. In this study, we evaluate the etiology, epidemiological trends and prognostic factors for recovery in isolated third nerve palsy patients.

MATERIALS AND METHODS

A cross-sectional study was conducted on 25 consecutive patients who presented with isolated third nerve palsy in Government Kilpauk Medical College and hospital, Chennai from September 2019 to February 2021 for a period of 18 months. All isolated third nerve palsy patients irrespective of age, sex and etiology were included in the study while patients with other cranial nerve involvement, Myasthenia and thyroid orbitopathy were excluded.

Detailed history taking regarding diplopia, headache, drooping of lids and history of diabetes, hypertension, hyperlipidemia and trauma were noted. General examination, complete ophthalmological examination including head posture, ptosis evaluation, orthoptic evaluation, pupillary assessment, extraocular movements and aberrant regeneration, visual acuity, colour vision, slit lamp examination, fundus examination and neurological examination were done. Systemic evaluation including blood pressure, blood sugar and lipid profile were done. CT/MRI Brain and orbit with CTA/MRA with or without contrast was done according to the condition. All the patients were followed up for 6 months to assess their prognostic factors for recovery.

Statistical analysis

Statistical analysis was performed using a statistical software package (SPSS for Windows, version 21.0; SPSS, Inc., Chicago, IL). Age of the patients was presented as mean +/- standard deviation in years and categorical variables were presented by frequency distribution. Fisher exact test analysis was done with recovery as dependent variable. The independent variables were risk factors, trauma, laterality, type of palsy, pain, pupillary involvement and aetiology. A p-value of <0.05 was considered to be statistically significant.

RESULTS:

In our study, among 25 patients, 14 were males (56%) and 11 were females (44%) [Figure 1]. The age of patients in our study ranged between 11 years and 74 years. The mean age of presentation was 50.08+/-18.32 years. Majority of patients in our study belonged to the age group of 61-70 years (32%) [Figure 1].

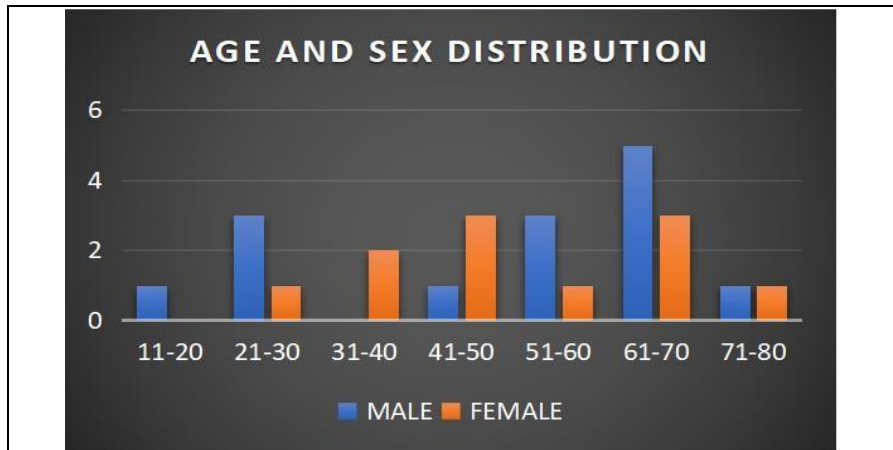


Figure 1: Bar chart depicting Age and Gender distribution of the study population. X-axis denotes age in years and Y-axis denotes the number of male and female patients

Right sided palsy was found in 17 patients (68%) and left sided palsy in 8 patients (32%). 48% patients had complete palsy while 52% of patients had incomplete palsy. One case of congenital palsy (4%) was identified whereas all others were due to acquired causes (96%). Pupillary involvement was found in 12 patients (48%) and pupil was spared in 13 patients (52%). Pain was associated in 40% of patients. The causes of isolated third nerve palsy are depicted in the figure 2. In our study, eleven patients (44%) had diabetes and eight patients (32%) had systemic hypertension.

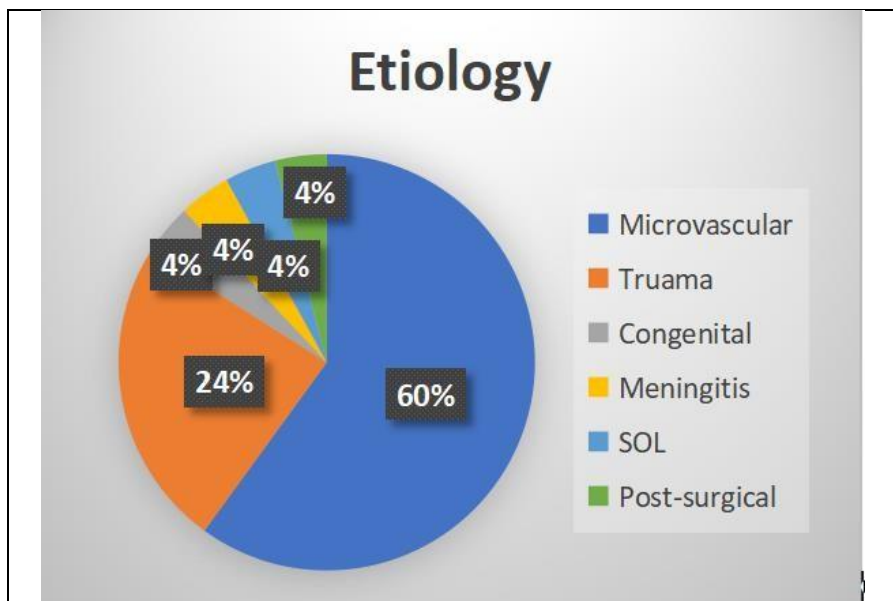


Figure 2: Pie chart depicting the etiological pattern of isolated third nerve palsy in our study

One patient had complete third nerve palsy due to right cavernous hemangioma and advised neurosurgeon opinion [Figure 3]. One patient presented with third nerve palsy following excision of pituitary adenoma.

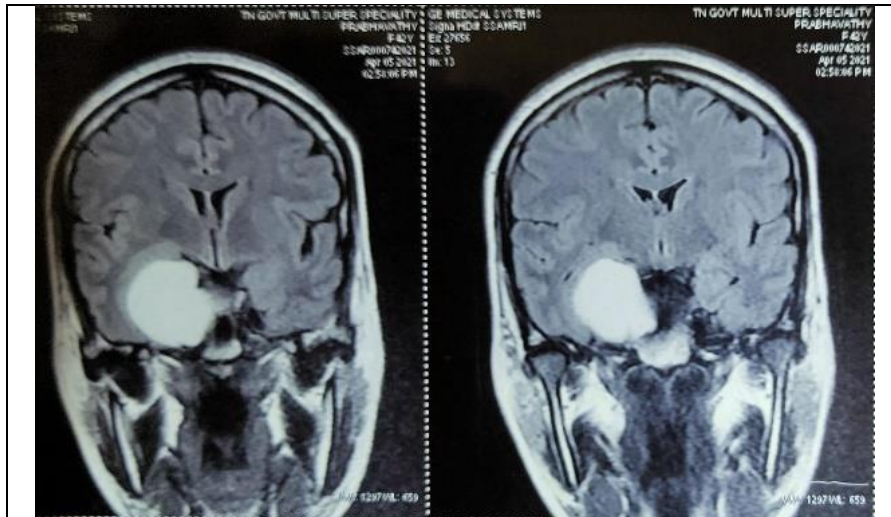


Figure 3: MRI image of a 42 years of female showing right cavernous hemangioma with right sided oculomotor nerve palsy

The recovery of patients with respect to etiology after 6 months of follow up is depicted in table 1.

Etiology	Recovered	%	Not recovered	%	Lost to follow up	%
Microvascular	12	80	1	6.66	2	13.33
Trauma	1	16.66	5	83.33	-	-
Congenital	-	-	1	100	-	-
Meningitis	1	100	-	-	-	-
Space occupying lesion	-	-	1	100	-	-
Post-surgical	-	-	1	100	-	-
TOTAL	15	60	8	32	2	8

Table 1: Table showing comparison of recovery with respect to etiology.

Patients with third nerve palsy due to microvascular etiology had good recovery. Aberrant regeneration of third nerve palsy was noted in one patient with congenital palsy and treated with recession-resection surgery [Figure 4].

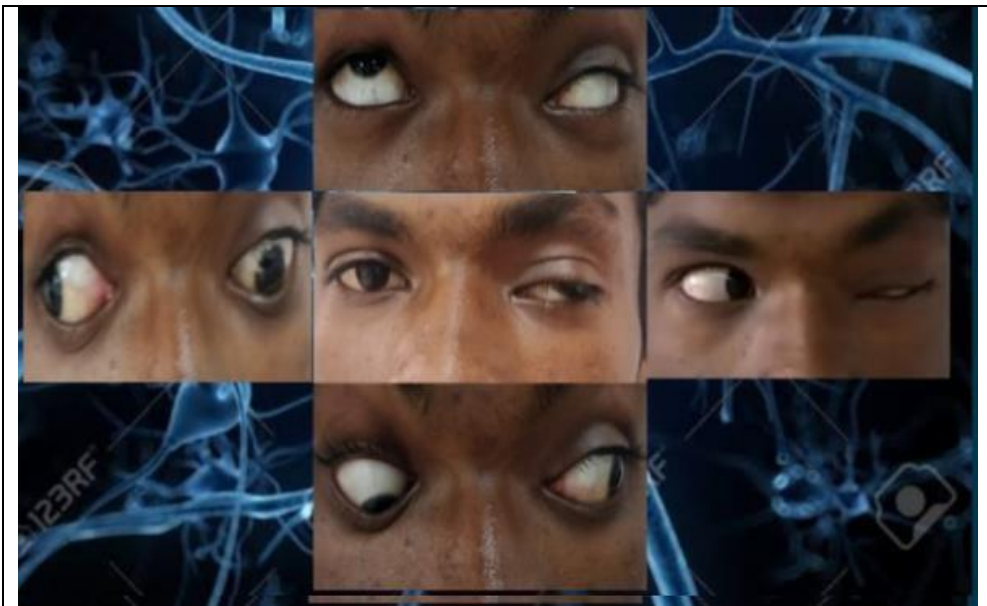


Figure 4: A) 23 years old presented with congenital palsy with secondary synkinesis (Left eye third nerve palsy - lid retraction of Right eye noted on adduction of left eye)



Figure 4: B) Pre- and Post-operative picture of the same patient

Independent variable	Dependent variable	p-value
Risk factors (DM/HTN)	Recovery	.004*
Trauma	Recovery	.018*
Laterality	Recovery	.689
Type of palsy	Recovery	.009*
Pain	Recovery	.082
Pupillary involvement	Recovery	.009*
Etiology	Recovery	.005*

Table 2: Table depicting prognostic factors of recovery

(* Fisher exact test: p-value <0.05 is considered statistically significant)

Variables like risk factors, trauma, partial palsy, pupil sparing and microvascular ischemia were associated with recovery of palsy (p-value <0.05) and variables like laterality and pain were not associated with recovery (p-value >0.05).

DISCUSSION

Isolated third nerve palsy is relatively rare and sometimes life endangering when caused by aneurysms. Age, risk factors like diabetes, hypertension and hyperlipidemia, type of palsy (partial or complete), presence of associated symptoms and signs of neurological involvement aid in diagnosis and management of oculomotor nerve dysfunction. In our study, the mean age of presentation was 50.08+/-18.32 years. The average male: female ratio was 1.27 which showed no sexual preponderance. This was observed in accordance with previous studies by Keane et al. and Choi et al.^{6,7}. Pupillary involvement was found in 48% patients which is identical to the study conducted by Fang et al. where 43% patients were identified with pupillary involvement⁴. Majority of cases (60%) in our study were due to microvascular ischemic causes which was consistent with Fang et al, where he identified 42% patients had microvascular ischemia¹. Post-traumatic nerve palsy accounted for 24% of total cases as compared to Richards et al. (14.7%)⁸. The overall recovery of oculomotor nerve palsy in the present study (60%) was better compared to earlier studies by Singh et al. (50%)⁹. Among various causes of third nerve palsy, 60% of microvascular ischemic cases showed complete recovery which was similar to the study done by Akagi et al¹⁰. He reported that the recovery rate of patients with oculomotor nerve palsy were 91%, 0 %, 40%, and 40% for those with vascular disease, aneurysm, trauma, and neoplasm, respectively. Majority of patients with partial (76.9%) and pupil sparing palsy (84.6%) had complete recovery as compared to patients with complete and pupil involving oculomotor nerve palsy which was consistent with the study done by Kumar et al.¹¹ where he found 87.5% of pupil sparing cases had complete recovery.

LIMITATIONS:

Smaller sample size is the major limitation of the study. Some patients did not undergo HbA1C as advised. Hence, their status of glycaemic control could not be assessed. Two patients were lost to follow up due to various reasons like migration and other family issues.

CONCLUSION:

Microvascular ischemia was presumably the most common aetiology of isolated third nerve palsy which had complete recovery rate provided adequate risk factor management was done. Isolated third nerve palsy with pupil sparing and partial palsy were also significant indicators of complete recovery.

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