Clinical Study of 3rd, 4th and 6th Cranialnerve Palsies Leading to Visual Disturbances

K. Haridev Kumar[1], K. B. Chandra Bhanu[2], Rama Ashok[3]

ABSTRACT

Introduction: 3rd,4th and 6th cranial nerves are responsible for all ocular movements and normal binocular vision. Palsy of any of these nerves result squinting and diplopia which leads to defective vision. Study aimed to study is to know the common etiological factors causing 3rd, 4th and 6th nerve palsies resulting defective ocular motility for early diagnosis and effective management.

Material and Methods: More than 50 cases with symptoms and signs of cranial nerve palsies admitted in REH, Warangal for complete clinical evaluation and treatment. All cases were analyzed and results were recorded.

Results: A total of 50 patients were included, fulfilling inclusion and exclusion criteria, with mean age of onset being 55.8. 62% cases are noticed in males. Majority of our patients presented with double vision in 29 (58%) cases, followed by ptosis in 9 (18%) cases; headache and pain in eyes in 7 (14%) cases and 4 (8%) cases respectively. 6th nerve palsy (36%) is most commonly effected followed by 3 rd nerve palsy ((305). Most common etiological factors are vascular origin(40%) Vascular lesions are most commonest cause secondary to hypertension and diabetes. Other causes are inflammatory, trauma and idiopathic.

Conclusion: Complete clinical evaluation and investigations may reveal the underlying cause. Addressing of the underlying systemic disease and medical and surgical management of ocular complications may improve the quality of vision.

Keywords: 3rd, 4th and 6th Cranial Nerves, Nerve Palsy, Ocular Motility, Diplopia, Vascular Disorders

INTRODUCTION

3 rd, 4th and 6th cranial nerves are principal motor nerves that supply to six extraoccular muscles responsible for normal ocular movements and their coordination essential for binocular vision.3 rd cranial nerve supplies to four extra ocular muscles i.e., superior, inferior, medial recti and inferior oblique muscles. 4th cranial nerve supplies to superior oblique muscle. 6thcranial nerve supplies to lateral rectus muscle. Except inferior oblique, all extra ocular muscles originate from apex of the orbit in the form of common tendon of annulus of zinn. Inferior oblique takes its origin from anterior, inferior and medial portion of orbit near the lacrimal sac. Recti muscles are inserted to sclera anterior to the equator of eye ball, whereas oblique muscles are inserted posterior to the equator. Recti muscles are responsible for horizontal and vertical ocular movements. Oblique muscles are responsible for torsional or cyclical movements.

Theoretically ocular movements are divided into two groups - Ductions and Versions

Ductions: adduction, abduction, supraduction, infraduction, excycloduction, encycloduction.

Versions are binocular movements in same direction, also called GAZES. They are dextroversion, levover-sion, supraversion, infraversion, dextroelevation, dextrode-pression, levoelevation, levodepression.

Extra ocular movements are governed by higher centres like motor cortex, midbrain, Pons, cerebellum and Vestibular apparatus interlinked to visual system. Any disturbance to these vital structures are leading to ocular motility disorders. They can be vascular like aneurysms, hemorrhage, infarction secondary to systemic diseases like hypertension, diabetes, trauma, inflammation, metabolic and space occupying lesions.

Ocular nerve palsies can be manifested as:

Symptoms: Diplopia, ptosis, facial anesthesia and dysarthria, ataxia etc.,

Systemic symptoms: dizziness, headache, nausea and vomiting, limb weakness etc,

Signs: Limited ocular movements or manifesting squint, ptosis, proptosis, facial asymmetry, abnormal head posture, visual field restriction, negative forced duction test.

We aim to study common etiological factors causing 3rd, 4th and 6th nerve palsies resulting defective ocular motility for early diagnosis and effective management

MATERIAL AND METHODS

This was a prospective study conducted at Regional eye hospital, Warangal, Telangana state in a period of 2 years from 2015 to 2017. 50 patients with symptoms and signs of ocular motor nerve palsies of 3rd, 4th and 6th were included and admitted for complete evaluation and treatment.

A detailed clinical history was recorded regarding history of trauma, thyroid dysfunction, systemic vascular diseases like hypertension and diabetes, hyperlipidaemia and risk factors

[1]Assistant Professor, [2]Assistant Professor, [3]Assistant Professor, Department of ophthalmology, Kakatiya Medical College, Warangal, India

Corresponding author: Dr. K. B. Chandra Bhanu, Assistant Professor, Department of Ophthalmology, Kakatiya Medical College, Warangal, India

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Type of nerve palsy	No of cases	Percentage%
3rd nerve palsy	15	30
4th nerve palsy	0	0
6th nerve palsy	18	36
3rd + 4th nerve palsy	4	8
3rd+6th nerve palsy	5	10
3rd+4th+6th nerve palsy	8	16
Total	50	100

Table-1: Distribution of nerve palsies:

Etiology	Number of cases	Percentage %
Vascular	20	40%
Inflammatory	16	32%
Trauma	7	14%
Tumors	1	2%
Idiopathic	5	10%
Congenital	1	2%
Total	50	100%

Table-2: Causes of nerve palsies

like smoking, alcoholism etc. History regarding previous ocular surgeries like retina and squint are also recorded.

A complete general examination and recording of vital data was performed, complete evaluation of anterior segment with slit lamp biomicroscopy, snellens chart, Visual field, Extra ocular movements, Cover test / prism bar cover test, forced duction test and force generation test and IOP recording, complete Fundus examination by direct and indirect ophthalmoscopy

Special investigations like CT scan plane, MRI plane and contrast (angiogram), hematological like CBP, ESR, ANA, CRP, blood sugar, lipid profile, temporal nerve biopsy in case of Giant cell arteritis,

Systemic - cardiac and neurological evaluation was done.

After complete evaluation, provisional diagnosis was made and it was conformed with corresponding investigations. Each case was thoroughly analyzed to arrive at probable diagnosis for further management.

RESULTS

A total of 50 patients were included, fulfilling inclusion and exclusion criteria, with mean age of onset being 55.8 . >60% cases were >50 years age group. 62% cases are noticed in males. As males are more prone for smoking, alcoholism, hyperlipidaemia and cardiovascular diseases

Majority of our patients presented with double vision in 29 (58%) cases, followed by ptosis in 9 (18%) cases; headache and pain in eyes in 7 (14%) cases and 4 (8%) cases respectively. Some patients had other complaints including diminution of vision, defective side vision, blurring of images, inability to read, difficulty in using staircase. 6th nerve palsy(36%) was the most commonly effected followed by 3rd nerve palsy (305) (table-1). Most common etiological factors were vascular origin (40%) (table-2).

DISCUSSION

We studied the clinical profile of the patients with acute ocular motor nerve palsy, presenting to our tertiary eye care centre. Our mean age of presentation was being 55.8. > 60% cases were >50 years age group.[3] Due to high prevalence of inflammatory, structural and infectious causes, age at presentation is now become a important consideration in terms of work up for causes. In our study, affection of cases of third nerve, sixth nerve and multiple cranial nerves were above 50 years. Study by Menon., *et al*. [4] found majority of patients with third nerve palsy and multiple nerve involvement in between 11 - 40 years of age. Our data confirmed the nerve distribution reported in previous studies which found sixth nerve involvement to be most common; while fourth nerve involvement to be least.[1,3,5]

62% cases are noticed in males. As males are more prone for smoking, alcoholism, hyperlipidemia and cardiovascular diseases in this study cranial nerve palsies are more common in males than females because of vascular disorders like hypertension, diabetes, hyperlipidemia and risk factors like smoking, alcoholism, obesity. It is observed that nerve palsies are more common in age group >40 years.

Various etiologies causing acute onset ocular motor cranial neuropathies, includes presumed micro- vascular ischemia, inflammation, trauma and compression. Vascular etiology was most common affecting 40% cases in previous studies it is 34.8% and 31%[1,3], similarly trauma was the cause in 14% of cranial nerve palsy in our population vs 15% - 21% in other studies.[1,3]

Risk factors: smoking, alcohol, hyperlipidemia, cardiac disorders. Second most common causes are inflammatory lesions like Orbital pseudotumor, Koch's and Cysticercosis. So, prevention of systemic diseases like hypertension, diabetes, hyperlipidemia may prevent cranial nerve palsies. Space occupying lesions are mainly due to aneurysm of PCA and pituitary adenoma.

> 70% of cases are recovered spontaneously and completely by effective management of systemic disorders like hypertension, diabetes, hyperlipidemia, physiotherapy and steroids in case of inflammatory and idiopathic cases within 6 months. The remaining cases were partially recovered and needed special treatment like surgical correction and prescription of prisms to avoid diplopia.

Interventional Radiological procedures and Neurological surgeries advised for aneurysms and tumors.

In Rucker study [6], Rush and Young study [7] observed the most common etiological factor as idiopathic. In other Indian studies like Rowe at al [2] and P.S.Reedy et al [8] noticed that TB was the most common cause. But in one study only 2 cases were reported with Tuberculosis

Menon v et al[4] study, Richard BW et al[9] study noticed that other significant cause was Trauma (blunt injury). In this study the incidence was 14%. The trauma was mainly due to two wheeler riders. So, use of helmets can prevent trauma related cranial nerve palsies and it is a life saving measure also.

Tiffin et al[10], menon v et al[4] had reported that in majority of cases, etiology was unknown (33%). But in Our study only 10% of cases were noticed without any cause. Because of present day advanced investigations revealing all possible

causes.

CONCLUSION

It is concluded that the most common cause of the cranial nerve palsy is vascular (HTN and DM). So, early diagnosis and effective management of theses systemic diseases can prevent cranial nerve palsies and their consequences.

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