Ocular Morbidity in Children with Cerebral Palsy

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ABSTRACT

INTRODUCTION: Cerebral palsy is a disorder apparent at birth or in childhood due to damage in the neonatal period, leading to non-progressive deficits. Handicaps like complete or partial loss of hearing, speech and/or sight may also be present in children with cerebral palsy. The study was conducted to determine ocular morbidity in children and adults with cerebral palsy.

METHODS: A cross-sectional study was conducted at Self Help Group for Cerebral Palsy, Dhapakhel with a sample size of 38. All patients underwent orthoptic evaluation, anterior segment evaluation, dilated fundus examination, dry refraction and cycloplegic refraction.

RESULT: Among the 38 children participated, 39.47% had strabismus only, 15.78% had refractive error only, 21.05% had strabismus and refractive error, 2.63% had dry eye and 21.05% normal eyes.

CONCLUSION: Children with cerebral palsy have ocular morbidities like refractive error and strabismus which needs to be identified timely to prevent its long term effects.

KEY WORDS: Cerebral palsy, ocular morbidity, refractive error, strabismus.

INTRODUCTION

Cerebral palsy is a disorder apparent at birth or early childhood due to injuries during birth or neonatal period leading to non-progressive and non-resolving deficits. Children with cerebral palsy are both mentally and physically challenged. Mentally, they have either learning disorders or severe intellectual impairment. Physically, they may have defects in posture and movements. Associated handicaps like complete or partial loss of hearing, speech and/or sight may also be present. Various forms of physical and mental disability in patients with cerebral palsy are the key barrier for the utilization of ocular facilities. Education of children with cerebral palsy relies mainly on visual stimulation and early identification of visual defects are important because most of them are amenable to treatment. There is an estimated 60,000 children with cerebral palsy in Nepal (based on data for other developing countries with similar demographic and socio-economic profiles) and there is no published report on ocular morbidity in those children.

METHODS

A cross sectional study was conducted at Self Help Group for Cerebral Palsy, Dhapakhel to study ocular morbidity in children with cerebral palsy. The study was conducted in the year 2009 with a sample size of 38. Orthoptic evaluation, anterior segment evaluation, dilated fundus examination and refraction both dry and cycloplegic was done.

Children were accompanied by their teachers throughout the examination and all the examination were done in their familiar surroundings. Visual acuity was tested whenever possible with Snellens Chart/illiterate E chart. In non-verbal children, visual acuity was assessed with fixation pattern. The extra ocular movements were examined and nystagmus was noted whenever detected. Strabismus was assessed by cover
test both for distance and near. Pupillary reaction was noted for any abnormality. Cyclopentolate 1% was used for cycloplegic refraction. Dilated fundus evaluation was done with direct and indirect ophthalmoscope.

RESULTS

A total of 38 cases entered the cross sectional study reported herein. The gender and ethnic distribution is given in figure I and II.

Figure I: Distribution of children according to gender

Among 38 patients male: female ratio was 1.2: 1.

Figure II: Distribution of ethnicity of children

Regarding ethnicity, Indo-aryan comprised 55% as compared to 45% Tibeto-burman.

Figure III: Geographical distribution of children

Regarding the geographical distribution, majority of the children were from Kathmandu valley (80%).

Ocular morbidity was seen among 78.95% of children with cerebral palsy and only 21.05% had normal eyes.

Figure IV: Distribution of ocular morbidity

Refractive error and strabismus were the major causes of ocular morbidity among the children with cerebral palsy. Among those with ocular morbidity, 39.47% children had strabismus only, 15.78% had refractive error only, 21.05% had strabismus and refractive error and 2.63% had dry eyes.

Figure V: Distribution of refractive error

Among the children with refractive error, simple myopia was present in 28.57% (n=4) cases, simple hypermetropia in 21.42% (n=3) cases and 50% (n=7) had astigmatism.

Those with myopia and hypermetropia, they had high refractive error and refractive amblyopia was present in 21.05%. Similarly, among those with strabismus amblyopia (strabismic) was present in 5.26%.
Similarly, among the children with strabismus, esodeviation was present in 28.94%, exodeviation present in 28.94% and alternating esodeviation and exodeviation was present in 2.60%.

6% of patients had associated nystagmus, 3% had associated microcornea and microphthalmia and 3% had associated ptosis.

**DISCUSSION**

The association of certain eye defects with cerebral palsy has been known since 1834. Squint and refractive errors are common in these children. 20.5% of these children had normal eyes. In the present study also, 20% of the children were normal. Even the incidence of abnormalities is known to increase with the severity of the cerebral palsy. The incidence of squint in general population is only 2-3%. A high incidence of strabismus in children with cerebral palsy has been noted, ranging from 15-62% with an average of 44%. Esotropia is about 3 times more than exotropia. However, in the present study, esotropia and exotropia were equal. The fluctuation between esotropia and exotropia has been noted. In the present study also 1 patient had alternating esotropia and exotropia.

Brain damage causes certain forms of non-hereditary strabismus. Brain damage may also affect the centres for motor fusion and causes strabismus. That can be the reason for strabismus in children with cerebral palsy as there is non-progressive disturbances that occurred in the developing infant or fetal brain.

In a study by K. J. Saunders et al, a significantly higher prevalence and magnitude of refractive error was found in the cerebral palsy group as compared to controls pointing to impairment of the emmetropization process. In a study by Maria Estela Arroya et al, patients requiring optical correction between 6-12 years included 30% in normal children, 48.2% in patients with Down Syndrome and 41.1% in the cerebral palsy group.

Early correction of refractive error in children with cerebral palsy is required before the end of neural plasticity period. The recovery of amblyopia is much slower over 7 or 8 years of age even with the use of appropriate ocular patching.

Over 40-75% of children with cerebral palsy have some form of visual problem or impairment. They may have an acuity loss, field loss, oculomotor problem and/or a processing problem.

Although ophthalmologists cannot help those with cortical visual impairment with field loss and procession problem, simple prescription of glasses can make the images around clearer which has beneficial effect on incidental or observational learning. Oculomotor problems in cerebral palsy can affect stereopsis and smooth eye movements. Similarly, procession problems lead to difficulty in making sense of visual information.

The visual system of children with neuromotor disabilities could lead to a unilateral or bilateral amblyopia due to high level of hyperopia present.

High levels of hyperopia lead to a continual blurred image which could break the emmetropization development.

**Conclusion**

Children with cerebral palsy present with different ocular co-morbidities; strabismus and refractive error accounting for majority of the cases. Timely identification of these conditions and early treatment helps to decrease the visual morbidity accentuating their rehabilitation.

**ACKNOWLEDGEMENTS**

Authors would like to acknowledge Nepal Eye Hospital and Professional Support Service Nepal for assisting in conducting the study. We would also like to the convey our heartfelt thanks to Self help group for cerebral palsy for their valuable services in helping us assess the children. We would also like to acknowledge Mr. Karna Desar for his valuable time for computer works.
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