

Visual assessment in delayed development and cerebral palsy children in tertiary care center

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Abstract

Aim: To assess vision in children with delayed development or cerebral palsy attending OPD at tertiary care hospital, for early assessment and accurate detection of visual disorder, which in turn helps their rehabilitation, locomotor and cognitive functions.

Materials and Methods: Total of 24 (18 males and 6 females) children with delayed development and 12 (6 males and 6 females) with cerebral palsy were examined. Central steady maintenance method (CSM) was used for visual assessment as children were not co-operative for Teller's acuity card. Thorough examination was done in children including dilated refraction & fundus examination. Clinical findings like nystagmus, squint, roving eye movements were noted and photographed. Selected children were given glasses and few were advised visual stimulation exercises.

Results: Out of 36 children, about 24 were males and 12 were females. It was noted that about 16% in developmental delay children and about 17% in cerebral palsy children had abnormal birth history. Among 24 children with developmental delay, 16% had squint, 12.5% had horizontal nystagmus, among 12 children with cerebral palsy, 66% had fundus abnormalities, 50% had squint, 16% had horizontal nystagmus. Central steady maintenance was good in 8% of developmental delayed children and 15% of cerebral palsy children.

Conclusion: Above study showed that visual assessment in children with delayed development and cerebral Palsy provided relevant information for creating a rehabilitation program aimed at the individual as a whole. Visual impairment plays key role in locomotor and cognitive performance in CP and visual exploration seems to be crucial in rehabilitation of affected children, contributing to their motor improvement and to a better visual prognosis.

Keywords: Cerebral palsy, Delayed development, Visual assessment, Tertiary care center.

Introduction

Developmental delay is defined as significant delay in the acquisition of milestones in one or more domains of development at the expected age. Prevalence of this is about 2.5% under 5yrs of children. Prevalence of visual impairment in such kids is about 15-40%. Cerebral palsy is defined as Permanent, non-progressive neurodevelopmental disorder that occurs during pregnancy, delivery, or shortly after birth. Incidence is 2-2.5 in 1000 infants. Prevalence is about 15 % in premature infants < 1kg BW. Prevalence of visual impairment in such cases 60-70%.

The spectrum of visual problems in children with cerebral palsy (CP) is extremely broad and includes both peripheral problems, such as strabismus, refraction disorders, and retinopathies, and cerebral visual impairment (CVI), which is a problem of central origin.^{1,4} The literature shows that 60 to 70% of children with CP and developmental delay also manifest CVI.⁴ CVI is defined as a deficit of visual function caused by damage to, or malfunctioning of, the retrogeniculate visual pathways (optic radiations, occipital cortex, visual associative areas) in the absence of any major ocular disease.^{2,3} This involvement of the retrogeniculate visual pathways is common in CP given that the lesions that most frequently underlie this condition also affect the visual areas of the brain. Periventricular white matter damage, which can involve the optic radiations and also other levels of the

geniculostriate pathway, is the lesion that – more than any other – highlights this relationship.^{5,6} There are few studies in the literature exploring the visual dysfunction associated with CP⁷⁻¹⁰ and delayed development children.

Our study was done to assess the visual impairment in such children so that early detection can help to aid rehabilitation and contribute in the motor improvement of such children.

Materials and Methods

On approval of ethical committee, 36 children including both children with cerebral palsy and delayed development attending OPD of Minto Ophthalmic Hospital Bangalore Medical College and Research Institute, Bangalore in the period of February 2017 to July 2017 were included in our study after taking patient attenders consent.

Total of 24 (18 males, 6 females) children with delayed development and 12 (6 males, 6 females) with cerebral palsy aged between 0-6 years were examined. Children were initially examined with torch light for central steady maintenance of light reflex. Detailed squint evaluation was done for required children, selected children were given glasses and advised squint correction after taking paediatric fitness and few children were advised visual stimulation exercises.

Central steady maintenance method was used for visual assessment, as children were not co-operative for

Teller acuity cards. CSM method was done with torch light, each child was examined for central corneal reflex, steadiness of fixation, maintenance of fixation on movements of eyes on either side. Thorough examination was done in all children including dilated refraction and fundus examination. Clinical findings like nystagmus, strabismus, roving eye movements were noted and photographed. Selected children were given glasses and few were advised visual stimulation exercises. Data was collected and analysed using descriptive statistics.

Results

In our study, Out of 36 children, about 24 were males and 12 were females. About 24 children were cases of delayed development and 12 cases were cerebral palsy.

Table 1:

	Male	Female	Total
Delayed development	18	6	24
Cerebral palsy	6	6	12
Total	24	12	

It was noted that about 16% in developmental delay children and about 17% in cerebral palsy children had abnormal birth history. In abnormal birth history birth asphyxia was most common during delivery. Most of these children were not able to fix and follow the light showed that they were having very poor vision. Among 24 children with developmental delay, 16% had squint with exotropia was most common in both developmental delay and in cerebral palsy children. 12.5% had horizontal nystagmus, 8% had central steady maintenance. Among 12 children with cerebral palsy, 66% had fundus abnormalities, 50% had squint, 16% had horizontal nystagmus, central steady maintenance was good in 8% of developmental delayed children and 15% of cerebral Palsy children.



Fig 1: central steady maintenance method

Table 2: Spectrum of visual abnormalities

	Developmental delay	Cerebral palsy
Central steady maintenance	8%	15%
horizontal nystagmus	12.5%	16%
Strabismus	16%	50%

abnormal birth history	16%	17%
fundus abnormality	8%	66%
refractive error	4%	1%
menace reflex positive	2%	1%
roving eye movement		1%

Among 24 children with developmental delay around 8% had fundus abnormalities, 4% had refractive error. Among 12 children with cerebral palsy about 1% had refractive errors, 1% had roving eye movements. Menace reflex positive in 2% of developmental delay and 1% of Cerebral Palsy children showed that they are totally blind.



Fig 2: Children having Strabismus



Fig 3: Visual assessment in delayed development child

Discussion

Cerebral palsy (CP) is a permanent, non progressive disorder of movement and posture due to lesion of the foetal or infant brain. Children who have CP may also experience a range of conditions in addition to impaired motor function. These may include abnormal sensation and perception, impairment of sight, hearing or speech, seizures, mental retardation, difficulties in feeding, bladder and bowel impairment and breathing difficulties because of postural affection.

Visual assessment in children with Delayed Development (DD) & Cerebral palsy (CP) is very important, even though many children were not cooperative for assessment. Many of them were presented at the age of 2 years for visual assessment, and had abnormal birth history. 2% of DD and 1% of CP children did not responded to light, with positive menace reflex suggesting that they were totally blind, Since Visual rehabilitation was not helpful in these children. It was found that squint was more common in Cerebral palsy children and most of the children had optic atrophy with history of birth asphyxia and presented late for the examination.

In a study conducted by Elmenshawy, Amal A., Ismael, Ahmed et al in paediatric clinic of Research Institute of Ophthalmology and National research centre done on 46 cerebral palsied children with age between 2 years and 12 years found major ocular abnormalities such as strabismus 32. 8% and refractive errors as myopia reportedly more frequent 41. 4% while hypermetropia was 20% and astigmatism was 10%. Optic atrophy was reported in 20% Nystagmus was seen in 11. 4%, chorioretinal degeneration in 14.3%, optic hypoplasia in 5.7% and albinotic retina in 2. 9%. Cortical visual impairment (CVI) was seen in 51.4% of cases.

In a study conducted by ARNOLD S. BREakey et al in New York, 44 per cent of the patients had normal ocular findings, while 56% had abnormal findings such as strabismus, nystagmus, optic atrophy.¹² Similar results are found in our study. As there are not much studies conducted on these children for visual assessment, comparing becomes difficult.

Visual assessment in global development delayed and cerebral palsy children is important to be examined as simple refractive correction and visual stimulation exercises can improve their vision and give them better life.

Conclusion

It was found that many children presented late for eye examination. Most of the children had birth asphyxia which results in poor vision secondary to damage to visual cortex in brain. Assessment of vision in these children is very difficult because they will be uncooperative for vision assessment with Teller's acuity card. Many children had optic atrophy secondary to birth asphyxia does not benefit from refraction and correction and visual stimulation exercises. But examining these children in early age and proper refractive error correction and visual stimulation exercises would help them to some extent.

Early assessment and accurate detection of visual disorders is of paramount importance in children with cerebral palsy and delayed development. Giving full refractive correction and visual stimulation exercises would help them to have better life. Such data is also helpful in planning for rehabilitation programs for such cases.

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