

Prevalence of ocular manifestations in children with developmental delay

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Abstract

Aim: This is a study conducted in children with developmental delay, to describe the prevalence of various ocular abnormalities in children with developmental delay.

Materials and methods: Children under 12 years with developmental delay attending the child development clinic and referred to department of ophthalmology for eye examination were studied for the presence of ocular manifestations by undergoing a complete ophthalmic examination and the prevalence of different conditions was statistically analysed.

Results : Children with developmental delay were studied over a period of 12 months and ocular manifestations were seen in 83.6% of cases. Amongst the various ocular manifestations, refractive error was found to be the most common finding (59.7%). The second common diagnosis was optic atrophy (9.7%) followed by strabismus (8.69%), cortical visual impairment (4.3%) and ptosis (1.08%).

Conclusion : Visual handicap plays a significant role in overall disability of developmental delay children. Hence an early ophthalmologic screening and intervention in these children can help to substantially improve the developmental and academic achievement.

Key Words: Developmental delay, Refractive error, Strabismus, Optic atrophy, Amblyopia.

Introduction

Developmental delay is operationally defined as significant delay in two or more developmental domains. The developmental domains are Gross motor, Vision and fine motor, Speech, Hearing and language, Personal/social. Significant delay is defined as performance or ability of two standard deviations or more below the mean on accepted norm-referenced developmental testing i.e. Denver Developmental Screening Test.

It has been reported that certain deficits often go untreated either through lack of diagnosis or unawareness of their importance in developmental delay population and they receive less than average care. High on the list of such deficits are vision and audition. Amblyopia is one entity which has always been less investigated in children with developmental delay and assessment and

management of visual deprivation in challenged children is a complex challenge to the treating clinician. The main aim of this study was to show the ocular characteristics of a group of developmental delay children of different intelligent quotient (IQ) and age who were examined and provided with visual care.

We have several published studies using animal models that have shown the dramatic effects that various forms of sensory disturbance and deprivation can have on the developing visual system. Hence this attempt was made to study the prevalence and ocular abnormalities as a part of ophthalmological screening examination for patients referred from pediatric clinic of our hospital as, development and academic achievement can be enhanced in the formative early years.

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Materials and methods

Study design- Prospective study This study was conducted in the department of Ophthalmology in children under 12 years with developmental delay over a period of one year. Scale used to assess developmental delay- Social quotient, emotional quotient, intelligence quotient. Only children fulfilling criteria of developmental delay in this test as assessed by a pediatric specialist and pediatric psychologist were included in the study. Patients were included in the study only after obtaining an informed consent from the parents. Family history regarding consanguinity or affected family members were asked for. Ocular complaints regarding visual inattention, deviation of eyes, nystagmus, abnormal head posture were enquired.

Ophthalmological assessment included routine ocular examination with special reference to structural observation of external eye, examination of strabismus, visual acuity testing, complete cycloplegic refraction (with atropine) and detailed fundus examination. The biggest challenge was evaluation of vision and visual correction in these children who had delayed development. The visual acuity testing was hence done beginning from central steady maintained vision to clear fixation preference using Teller Acuity Cards for children below 3 years, Lea Symbol chart for children above three years and who are unable to read alphabets on Snellen chart and Snellen chart for the rest as, conventional testing methods are often impractical and unsuccessful for a reliable estimation of visual deficiency. Other ocular investigations like slit lamp examination was done in indicated cases. The data obtained was evaluated statistically .

Results

Table 1. Distribution of patients according to age of presentation and their percentage

Age at presentation	6 Months - 1 year	1-3 years	3-7 years	7-10 years	10-12 years
Percentage	28.26%	35.8%	27.1%	4.3%	4.3%

Table shows that highest number of patients were between 6 months to 1 year of age

Table 2. Distribution of patients according to gender

Gender	Males	Females
Number	65	27
Percentage	70.6%	29.3%

Table shows male children had high prevalence of ocular manifestation

Consanguinity: Consanguinity between parents was seen in 12cases.

Ocular Features

Table 3. Distribution of patients according to refractive errors

Refractive status	Hypermetropia	Myopia	Astigmatism
Number	35	10	10
Percentage	38.04%	10.86%	10.86%

Table shows that hypermetropia is more common than myopia and astigmatism

Table 4. Distribution of patients according to type of strabismus

Strabismus	Esotropia	Exotropia
Percentage	37.5%	62.5%

Table shows that exotropia was more common than esotropia

Table 5. Distribution of patients according to other manifestations like cataract, cortical visual impairment, optic atrophy, ptosis

Others	Cataract	Cortical Visual Impairment (CVI)	Optic Atrophy	Ptosis
Number	None	4	9	1
Percentage	None	4.34%	9.78%	1.08%

Table shows that optic atrophy was highest amongst other types of manifestation

Discussion

Majority of patients with developmental delay have associated visual and ocular abnormalities. Visual impairment delays or alters both visual and general development of the child. Though there is substantial evidence documenting increased frequency of ocular and visual anomalies among mentally and developmentally challenged children they are overlooked as they have other associated handicaps.

Over a course of one year 92 children under the age of 12 years with developmental delay were screened. Of the 92 children studied, 65 were males and 27 were females forming 70.6% and 29.3% respectively. In a study by Wu H J et al^[1] sex distribution was found to be 68% males and 32% females which is similar to our study. Presentation age was found to be maximum of around 35.8% (Table 1,2) around the age group of 1 to 3 years suggesting that the parents are aware of the condition at this age and try maximally for medical assistance during this period and with growing years their enthusiasm and hope fade. History of consanguinity was present in 12 cases constituting 13.04%. The non ophthalmic diagnosis in majority of these cases was cerebral palsy. Ocular manifestations in children with developmental delay were seen in 83.6% cases in this study. This is comparable with studies conducted by Akinci A et al^[2] who reported that 77% of children with intellectual disability had ocular features. Another study by Katoch S et al³ found that 68% of children with cerebral palsy had visual morbidity. The high incidence of visual morbidity in this population is probably related to the lesions in the subcortical oculomotor centres or cerebellar lesion. The most common ocular manifestation noted in this study were refractive errors (59.7% cases) (Table 3). It has been noted in few studies that these kids have a tendency of going towards wide ranges of spherical refractive values both in myopic and hypermetropic direction and many studies have even shown that hypermetropia accounts for maximum percentage in these children which is similar to findings in children without any developmental delay. Even our study showed majority having hypermetropia (38.04%) compared to myopia (10.86%). Only difference was seen in a study showing maximum of myopes, this could be explained by the fact that different forms of cerebral palsy might present with different type of refractive error, say myopia is reportedly more frequent in spastics while hypermetropia in dyskinetics. As age advances the refractive errors change. Optic atrophy was the second most common finding seen in 9.7% cases. Strabismus was seen in 8.69% of cases, cortical visual impairment in 4.3% and ptosis in 1.09% (Table 4,5).

Bankes et al^[4] studied 200 children with developmental delay and found refractive errors in

49%, squint in 37%, nystagmus in 7.5% and other features like cataract, optic atrophy and retinopathy of prematurity. Akinci A et al^[2] studied refractive errors and ocular findings in children with multiple disabilities and found that 77% of patients with intellectual disability had ocular findings.

Children with intellectual disability had more strabismus, nystagmus, hypermetropia and astigmatism than controls and increasing severity of intellectual disability was related to higher prevalence of the above features. Mets M B et al^[5] studied causes of childhood blindness and visual loss in an institution for severely mentally retarded children and found bilateral optic atrophy to be the most common cause of visual loss (65%). The second most common cause was cortical visual impairment followed by chorioretinal scars.

Cortical visual impairment is thought to be the end-result of hypoxic ischemic insult to the developing brain in-utero and worsens the visual outcome in these patients. But it is also seen that these are the patients who improve drastically with visual rehabilitation.

Only 16.3% of the children screened had normal vision. 59.7% had refractive errors confirming that this group accounts for the big chunk of low vision in these children.

Conclusion

In developmentally delayed children visual handicap plays an important role in the overall morbidity. Hence all pediatricians must be encouraged to seek ophthalmologic assistance in management of these children and help to substantially improve the developmental and academic achievements.

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