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Association of congenital ptosis and prematurity of infants with refractive error, strabismus and Amblyopia and their prevalence in pediatric age group

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Abstract
Refractive errors are considered to be a preventable cause of blindness, leading to visual disabilities in children. Uncorrected refractive error can result in Amblyopia or strabismus. Congenital ptosis associated with abnormalities of visual development and function, including amblyopia strabismus and refractive errors. The predominant refractive error being Hypermetropia represented 83% strabismus and amblyopia were present in 38% and 9.1% of children respectively. Congenital ptosis often associated with visual impairment. In studies it has been found the commonest type of refractive error in congenital ptosis is astigmatism. It has also found association of strabismus, amblyopia and mixed strabismic and refractive etiology with congenital ptosis. Stimulus deprivation amblyopia was less common. In Retinopathy of prematiruty patients the incidences of myopia, astigmatism, anisometropia and the severity of myopia increased according to the presence of ROP and treatment. Studies in the whole signifies the need for early screening of children for refractive errors even from the pre verbal age group to eliminate complications like amblyopia and strabismus.

Keywords: Uncorrected refractive error, congenital ptosis, premature infants, strabismus, amblyopia, cross-sectional study

1. Introduction
Refractive errors are considered to be a preventable cause of blindness, leading to visual disabilities in children. Uncorrected refractive error can result in amblyopia or strabismus. The risk of developing amblyopia occurs if the children are not screened early for refractive errors and corrected on time. Most of the children with uncorrected refractive errors are asymptomatic and screening helps in early detection and timely intervention to avoid complications. Congenital ptosis is often associated with visual impairment. Congenital ptosis associated with abnormalities of visual development and function, including amblyopia, strabismus and refractive errors.

This paper also demonstrate the association of refractive error, strabismus and amblyopia in 3 year old premature infants. Retinopathy of prematurity (ROP) is an eye disease that can happen in premature babies. It causes abnormal

Blood vessels to grow in the retina and can lead to blindness.

To show the prevalence of refractive error strabismus and Amblyopia cross sectional observational study was conducted in Dammam Kingdom of Saudi Arabia from March to July 2013.Total of 1350 children, aged 1-15 years were seen at this center's pediatric ophthalmology unit. The predominant refractive error being Hypermetropia which represented 83%, strabismus and Amblyopia also present in 38% and 9.1% of children respectively. Total of 1350 children presented at the centre. Mean age of the children was 7.6 years with an age range 1-15 years. Of the 1350 children, a total of 600 (44.4%) were found to have refractive errors of which 51% we're males. Of the total 600 patients with refractive errors, 498 we're Hypermetropia, 80 were myopes and 22 had astigmatism. Strabismus was seen in 228 of the children. Strabismus in the myopic group, 62 children who had no strabismus. 2 children had esotropia and 16 had exotropia, regarding the presence of strabismus in Hypermetropia

about 293 of the children with hypermetropia had no strabismus. About 193 children had esotropia and 12 had exotropia.
In the mixed astigmatism group, 17 of the children had no strabismus whereas 1 had esotropia and 4 had exotropia.
A total of 57 children had amblyopia. 27 amblyopes were hypermetrope with no strabismus. 26 amblyopes were hypermetrope with esotropia. 1 was hypermetropia with exotropia.

Group of children with astigmatism
1 child without strabismus had amblyopia. 2 child with exotropia had amblyopia. 18 children had amblyopia in BE, 13 had it in RE and 26 had amblyopia in the LE.
Congenital ptosis often associated with visual impairment. To show the association of refractive error strabismus and Amblyopia here's hospital based prospective and descriptive study conducted at Tribhuvan University, BP koirala Lion's center for ophthalmic studies in Nepal from February 2003 to July 2004. All the consecutive cases with congenital ptosis were included and cases with psuedoptosis were excluded. Among the 78 cases of congenital ptosis, refractive error was present in 13 cases with astigmatism as the commonest refractive error. Strabismus was found in 23 cases of congenital ptosis. Among the strabismus combined exotropia with Hypotropia was found in majority of cases (16.7%). Visual impairment due to amblyopia was found in 15 cases (19.2%) of congenital ptosis with mixed strabismic and refractive etiology as the commonest one (46.7%), followed by pure strabismic (26.7%), pure refractive (20%) and stimulus deprivation amblyopia (6.7%). Stimulus deprivation amblyopia was less common.
Premature infants is a baby born before 37 full weeks of gestation. ROP is an eye disease that can happen in premature babies. It causes abnormal blood vessels to grow in the retina and can lead to blindness. 161 eyes from 82 premature infants were retrospectively reviewed and divided into 3 groups according to the presence of ROP and treatment. The incidences of myopia, astigmatism, anisometropia and the severity of myopia increased according to the presence of ROP and treatment. (P=0.03, 0.02, 0.001, 0.04 respectively). The severity of hyperopia in group 2-2 (61 eyes, regressed ROP with treatment) was higher than those in the other two groups (P=0.01). No significant differences in the incidences of strabismus and amblyopia among the three groups (P=0.80 and 0.85, respectively) we're found.

2. Material and Method

2.1 Study on the prevalence of Refractive error strabismus and Amblyopia in pediatric age group

This is the cross sectional observational study conducted in a private hospital in Dammam, kingdom of Saudi Arabia, from March to July 2013. Total of 1350 children, aged 1-15 years were seen at this center's pediatric ophthalmology unit. All the children underwent complete ophthalmic examination with cycloplegic refraction.
Refraction, uncorrected VA and best corrected VA using LogMar ETDRs chart was recorded. Presence or absence of strabismus and Amblyopia was also recorded.
All details were entered in a computerized proforma.
Normal VA for the purpose of this study was defined as an uncorrected VA equal to or better than 0.3 log Mar in the better eye. Amblyopia was defined as initial BCVA of 0.20 log Mar or worse and at least two line log Mar differences between the amblyopic and fellow eye, without ocular pathology in the either eye.
Diagnosis of strabismus was defined as an intermittent or constant horizontal deviation of 10 or more prism diopters, a vertical deviation of 3 or more prism DS, or other eye movement disorders.
The children were grouped as; Myopia with a refractive error of more than -0. 50DS and hypermetropia with a refractive error of more than +0.50DS.
Hypermetropia and myopia were further subdivided into three subgroups based on the spherocylinder power of the refraction, namely:
Mild if < and equal to 3.00DS, moderate from 3.00 to 6.00 DS and high if >and equal to 6.00Ds
Compound astigmatism was divided into two groups:- Compound myooic astigmatism or compound hyperopic astigmatism.
Mild if compound astigmatism was between 0.50 and 1.00DS moderate if compound astigmatism was between 1.25 and 2.50 DS, high if compound astigmatism was more than 2.50DS.

2.2 Association of congenital ptosis with Refractive error strabismus and Amblyopia

This is a hospital based prospective and descriptive study conducted at Tribhuvan University, B. P Koirala Lion's centre for ophthalmic studies in Nepal from February 2003 to July 2004.All the consecutive cases with congenital ptosis were included and cases with psuedoptosis were excluded from the study.
78 cases (95 eyes) of congenital ptosis.

2.3 Association of premature infants with Refractive error, anisometropia, amblyopia and strabismus

Total of 161 eyes from 82 premature infants were retrospectively reviewed and divided into three groups according to the presence of ROP and treatment;
Group 1(68 eyes); without ROP
Group 2-1 (32 eyes); spontaneously regressed ROP
Group 2-2 (61 eyes); Regressed ROP with treatment
The incidences and clinical features of refractive errors, anisometropia, amblyopia and strabismus at the age of 3 years were compared among the 3 groups.

3. Result

3.1 study on the prevalence of refractive errors, strabismus and Amblyopia in pediatric age group

It was clinic based rather than population based study.
The predominant refractive error being Hypermetropia which represented 83%, strabismus and Amblyopia were present in 38% and 9.1% of children, respectively.
Of the 1350 children, a total of 600 were found to have refractive errors of which 51% were males.
Of the total 600 patients with refractive errors, 498 (83%) were hypermetrope, 80(13.3%) were myopes, and 22 (3.6%) had astigmatism. Hypermetrope was present in 183 (30.5%), 198 (33%) and 117 (19.5%) and myopia in 28 (4.6%), 34 (5.6%), and 18 (3%) corresponding to mild, moderate and high subgroups respectively.
Strabismus was seen in 38% (228) of the children.
Strabismus in the myopic group with 77.5% (62) children who had no strabismus. 2(2.5%) children had esotropia and 16 (20%) and exotropia.
Exotropia was the predominant type of strabismus in children with myopia, with no obvious relation between the extent of

compound myopic astigmatism and the frequency of strabismus.
Regarding the presence of strabismus in hypermetrope, about 59% (293) of the children with hypermetrope had no strabismus.
About 32% (193) children had esotropia and 2.4% (12) had exotropia.
Esotropia was subsequentially more frequent in children with mild to moderate compound hyperopic astigmatism than in children with myopia (p=0.0001)
In the mixed astigmatism group, 17 (77%) of the children had no strabismus, whereas 1 (4.5%) had esotropia and 4 (18%) had exotropia.
Total of 57(9.5%) children had amblyopia.
27 (47%) amblyopes were hypermetrope with no strabismus
26 (45%) amblyopes were hypermetrope with esotropia.
1 (1.7%) was hypermetrope with exotropia.
Group of children with astigmatism
1 child without strabismus had amblyopia.
2 child with exotropia had amblyopia.
The majority of Amblyopic children had mild to moderate compound hyperopic astigmatism, while 19.2% had high astigmatism.
18 (32%) children had amblyopia in BE, 13(23%) had it in the RE and 26(46%) had amblyopia in the LE.

3.2 Association of congenital ptosis with Refractive error, strabismus and Amblyopia in congenital ptosis

Among the 78 cases (95 eyes) of congenital ptosis, Refractive error was present in 13 cases (16.7%) with astigmatism as the commonest refractive error (8.9%).
Strabismus was found in 23 cases (26.9%) of congenital ptosis.
Among the strabismus, combined exotropia with hypotropia was found in the majority of cases (16.7%).
Visual impairment due to amblyopia was found in 15 cases (19.2%) of congenital ptosis with mixed strabismic and refractive etiology as the commonest one (46.7%) followed by pure strabismic (26.7%), pure refractive (20%) and stimulus deprivation amblyopia (6.7%).
Stimulus deprivation amblyopia was less common.

3.3 Association of 3 year old premature infants with refractive error strabismus and Amblyopia

The incidences of myopia, astigmatism, anisometropia and the severity of myopia increased according to the presence of ROP and treatment (p=0.03, 0.02, 0.001, 0.04 respectively).
There were no significant differences in the incidences of hyperopia among the three groups; however the severity of hyperopia in group 2-2 was higher than those in other two groups (p=0.01).
Patients in group 1 had better best corrected visual acuity (BCVA) compared with those of the other two groups (p<0.001).
No significant differences in the incidences of strabismus or amblyopia among the three groups (p=0.80 and 0.85, respectively) were found.
The ratio of esotropia: exotropia was 1:1.3.

4. Discussion

4.1 Prevalence of refractive error strabismus and Amblyopia in pediatric age group

This is the cross sectional observational study was to determine the distribution and patterns of refractive errors, strabismus and Amblyopia in children seen at a pediatric eye care. The study was conditions in a private hospital in Damman kingdom of Saudi Arabia, from March to July 2013. Total of 1350 aged 1-15 years were seen at this center's pediatric ophthalmology unit. All the children underwent complete ophthalmic examination with cycloplegic refraction.
The predominant refractive error being Hypermetropia which represented 83%. Strabismus and Amblyopia were present in 38% and 9.1% of children. All patient underwent complete ophthalmic examination Refraction, uncorrected VA and best corrected VA using LogMar ETDRs chart. Presence or absence of amblyopia and strabismus was also recorded. All details were entered in a computerized proforma.
Normal VA for the purpose of this study was defined as an uncorrected VA equal to or better than 0.3LogMar in the better eye. Amblyopia was defined as initial BCVA of 0.20 LogMar or worse, and at least two line LogMar differences between the amblyopic and fellow eye, without ocular pathology in either eye.
Diagnosis of strabismus was defined as an intermittent or constant horizontal deviation of 10 or more prism diopters. A vertical deviation of 3 or more prism diopters, or other eye movement disorders.

The children were grouped as

Myopia with a refractive error of more than -0. 50DS and Hypermetropia with a refractive error of more than + 0.50DS.Hypermetropia and myopia were further subdivided into three subgroups based on the spherocylinder power of the refraction, namely:
Mild if less than or equal to 3.00DS, moderate from 3.00 to 6.00DS and high if greater than equal to 6.00DS.
Compound astigmatism was divided into two groups: Compound myopic astigmatism or compound hyperopic astigmatism.
Mild if compound astigmatism was between 0.50 and 1.00DS.Moderate if compound astigmatism was between 1.25 and 2.50DS. Exotropia was the predominant type of strabismus in children with myopia, with no obvious relation between the extent of compound myopic astigmatism and the frequency of strabismus.
Esotropia was substantially more frequent in children with mild to moderate compound hyperopic astigmatism than in children with myopia. (P=0.0001).

4.2 study on association of congenital ptosis with Refractive error strabismus and Amblyopia

Ptosis in Greek means falling. Congenital ptosis is the presence of a droopy eyelids since birth. The ptosis may not be noticeable after birth but is usually noticeable within a few months. It can be unilateral or bilateral.
Severe ptosis can cover the visual axis and lead to interference with vision development and may lead to amblyopia if not corrected.
In this study, strabismus was found in maximum no of children 23 cases of congenital ptosis. Among the strabismus combined exotropia with Hypotropia was found in majority of cases (16.7%).
Patients with congenital ptosis have higher rate of amblyopia due to greater prevalence of strabismus and refractive errors although stimulus deprivation amblyopia is less common.

4.4 Association of Refractive errors, Amblyopia and strabismus in 3 year old premature children

A premature infant is a baby born before 37 full weeks of gestation.

ROP is an eye disease that can happen in premature babies. It cause abnormal blood vessels to grow in the retina and can lead to blindness.

Baby's retinal blood vessels begin to grow at 16 weeks and don't finish growing until after the baby is born. So, an early birth can disrupt this growth or cause abnormal growth. Babies born earlier than 31 weeks of gestation, or who weigh less than 1500grams at birth, are more at risk.

Regression:-Return to a previous state; In ROP, this describes the diminishment or vanishing of abnormal blood vessels.

The incidences of myopia, astigmatism, anisometropia and the severity of myopia increased according to the presence of ROP and treatment. (P=0.03, 0.02, 0.001, 0.04 respectively).

The severity of hyperopia in group 2-2 was higher than those in the other two groups (P=0.01).

Patients in group 1 had better best corrected visual acuity (BCVA) compared with those of the other two groups (p<0.001).

No significant differences in the incidences of strabismus or amblyopia among the three groups (P=0.80 and 0.85) were found.

The ratio of esotropia: exotropia was 1:1.3.

5. Conclusion

Study on the whole signifies the need for early screening of children for refractive errors even from the pre verbal age group to eliminate complications like amblyopia and strabismus. Early ophthalmic evaluation and timely treatment of these conditions may help prevent the irreversible visual impairment.

6. References

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