Original Article

To Evaluate Optometric Management of Hyperopia in Children

Rabia Mobeen and Dania Hussain

Objective: To evaluate optometric management of hyperopia in children. Main outcome measures were:

1. To find out best treatment modality in hyperopia Subjects.
2. Relationship among age, vision and amount of hyperopia.
3. Modification of correction according to ocular motility.

Methods: This institutional based cross sectional study was conducted in College of Ophthalmology & Allied Vision Sciences in the Pediatric Optometry Room of Eye Department of Mayo Hospital Lahore, during the months of January to March 2016. The study included 100 Subjects of both genders having age group birth to 12 years by using non-probability convenient sampling technique. Subjects were subjected to visual acuity, pinhole visual acuity, cover uncover test, Hirschberg's test or torch examination, cycloplegic refraction(using cyclopean eye drops) and PMT if required. A frequently used prescription plan was used based upon the criteria of age, vision, fundus examination, strabismus (esotropia) and ocular motility.

Results: According to the results of this study 62% Subjects accepted the full correction, 30% Subjects accepted partial correction and 8.0% were those who accepted partial correction with full correction on follow up. Vision assessment of children in age groups from birth to 3 years was not possible, 4 to 6 years had visual acuity of 6/36 to 6/24, 7 to 9 years were having 6/36-6/12 and 10 to12 years were having 6/18 to 6/12. Children in age group from birth to 6 years were highly hyperopic (+4.25D to +7.00D or>+7.00D) and from 7 to 12 years were low hyperopic (+0.25D to+4.00D). 66% hyperopes were amblyopic.

Conclusion: It was concluded that the best treatment modality was full correction. Almost all the esotropia with hyperopia were given full correction. Age, vision and amount of hyperopia are highly correlated to each other. Modification of correction should be done according to ocular motility, age and vision.

Keywords: hyperopia, children, management, myopia, refraction.

Introduction

Emmetropia is the state of refraction of eye where in parallel rays of light, with accommodation at rest, are focused directly on retina. So an emmetropic eye doesn't require any internal optical changes to see a clear image for distance vision.[1]

Ametropia, however, is a condition of refraction where in parallel light rays are not focused on the retina, thus producing refractive errors which may be myopia, hypermetropia and astigmatism. In hyperopia the eye does not bend or refract light properly and image formed is unclear. Distant objects look somewhat clear, but close objects appear more blurred.[2] Hyperopia maybe classifies on the basis of anatomical features[3] or on the degree/severity of hyperopia. Anatomically hyperopia maybe Axial (short axial length) or Refractive (refractive system is underpowered) whereas on the basis of severity, the error may range from being low (0.00 to +3.00D) to medium (+3.00 to +5.00D) to high (>+5.00D). Hyperopia may also be classified based on the action of accommodation. Thus in latent hyperopia, accommodation is masked and not revealed by non cycloplegic refraction. Manifest hyperopia is indicated by the maximum plus lens that provide optimum distance visual acuity.

World health organization introduced the global initiative for the elimination of avoidable blindness by the year 2020 known as "Vision 2020". Refractive errors, is one of the priority areas for vision 2020 as they are so common and because corrective spectacles provide a remedy that is cheap, effective and associated with huge functional improvement. Childhood blindness has profound consequence not only for the individual child but also for the family and community. An estimated 1.5 million child are blind worldwide of whom 1 million live in Asia.[4] Pakistan is a placed in middle Easter crescent by WHO and assuming a similar prevalence of childhood

blindness in Pakistan(1/1000) there may be 50-60,000 blind children in Pakistan. Refractive error which may account mostly for low vision and visual handicap are the third largest cause of preventable/curable blindness in Pakistan.[5]

Atkinson in 2006 in a study concluded that children in hyperopic group often show signs of mild development delays. This could potentially be because hyperopia is a soft sign of other developmental anomalies, or because poor early vision itself leads to abnormal development.[6]

Refractive error is the most common eye disorder and uncorrected refractive error is the major cause of visual impairment in world. A vast majority of people especially in developing countries do not even know that it can be controlled. This issue is also related to availability and affordability of refractive and optical services.[7,8]

Refractive correction of normal amount of hyperopia without any strabismus and amblyopia is often unnecessary. Partial correction for hyperopic beginning around the first year of life allows emmetropization to proceed and result in less refractive error at the age of 3 years. Full hyperopic correction should probably be reserved for infants and young children's with esodeviation. The purpose of this study is to evaluate optometric role in prevention of amblyopia and strabismus with early correction of abnormal hyperopia. If this is not done in a proper way then it will lead to amblyopia or irreversible blindness in children. A different prescription plan will be given according to need of subject's visual system which will prevent the irreversible blindness for an entire lifetime.

Methods

This institutional based cross sectional study was conducted in College of Ophthalmology & Allied Vision Sciences in the Pediatric Optometry Room of Eye Department of Mayo Hospital Lahore, during the months of January to March 2016. The study included 100 Subjects of both genders having age group birth to 12 years by using non-probability convenient sampling technique. A study proforma was designed which included the following components. profile,visual acuity/visual acuity with pin hole and with glasses, Cover/uncover test, Retinoscopy, fundus examination, Subjective refraction was done. Subjects were subjected to visual acuity, pinhole visual acuity, cover uncover test, cycloplegic refraction and PMT if required. A frequently used prescription plan was used based upon the criteria of age, vision and ocular motility. The data was analyzed by using SPSS version 20.0

Results

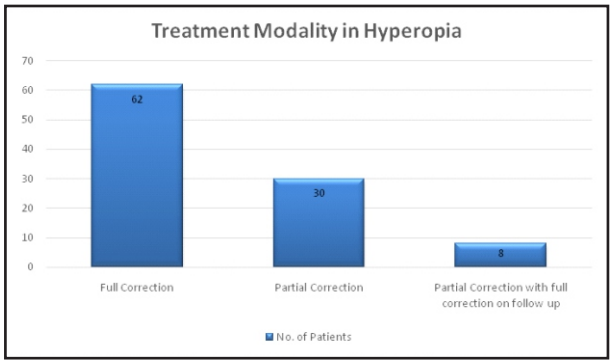

Fig-1: Shows that best treatment modality in hyperopic children was full correction. As 62(62%) out of total 100 subjects accept full correction. 30(30%) subjects accepts partial correction and 8(8%) subjects accept partial correction with full correction on follow-ups.

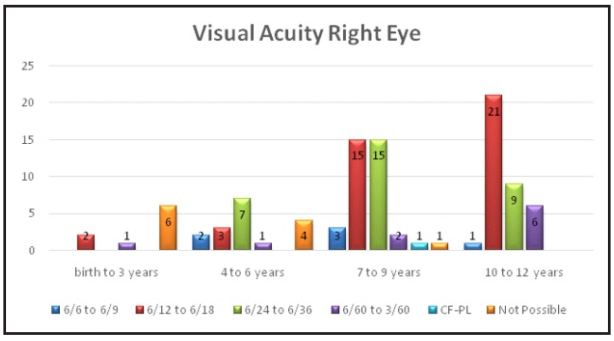

Fig-2: Shows relation between age and visual acuity in right eye. Vision was not possible at birth to 3 years. At 4-9 years children visual acuity was 6/24-6/36. At 10-12years children visual acuity was 6/12-6/18.

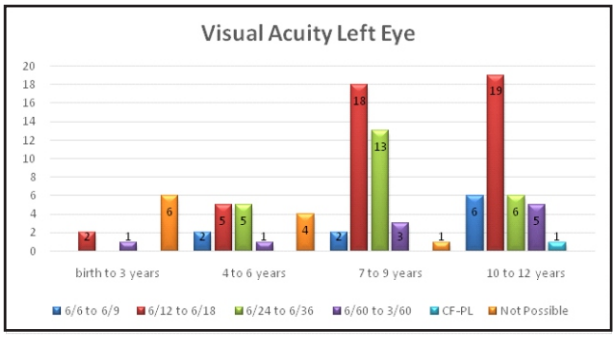

Fig-2: Shows relation of visual acuity in left eye with age. Vision was not possible at birth to 3 years. At 4-9 years children visual acuity was 6/24-6/36. At 10-

12 years children visual acuity was 6/12-6/18.

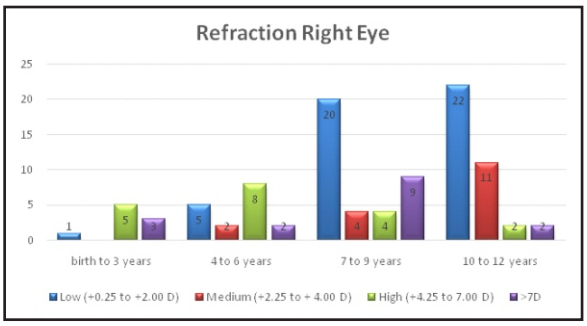

Fig-4: Shows relationship of right eye spherical equivalent with age. Subjects with age birth-6 years were high hyperopes (+4.25Dsto+7.00Ds)>7Ds. Subjects with 7-12 years were low hyperopes(+0.25Dsto+2.00Ds).

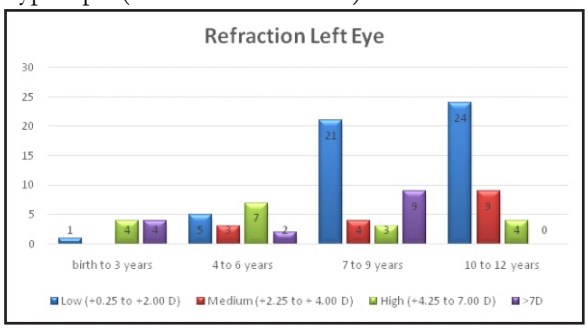

Fig-5: Shows relationship between left eye spherical equivalents with age. Subjects with age birth-6 years were high hyperopes (+4.25Dsto+7.00Ds)>7Ds. Subjects with 7-12 years were low hyperopes (+0.25Dsto+2.00Ds).

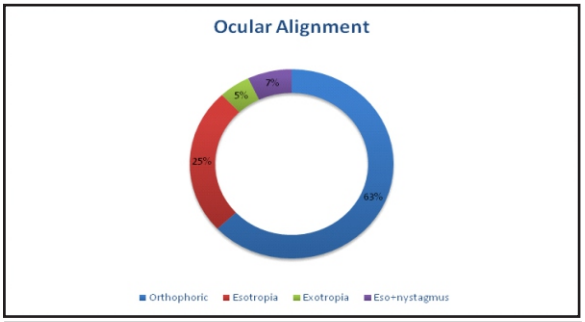

Fig-6: Shows that out of 100 subjects 63 (63%) were orthophoric, 25 (25%) were esotropes, 5 (5%) were exotropes and 7 (7%) were esotropia with nystagmus. **Fig-7:** Shows that out of total 100 subjects, 66(66%) were having amblyopia while 34(34%) were not having amblyopia.

Discussion

The different prescribing approaches between many optometrist and ophthalmologists is, less a matter of professional difference than a difference in concern about associated vision functions such as accommodation, vergence, and stereopsis, as well as concern about the potential impact of uncorrected hyperopia on reading and school performance.[9] Refractive correction in infants and toddlers could potentially optimize development of acuity, oculomotor skills, fine motor skills, cognitive functions and perhaps even social interaction.[10] If the impact of blindness due to refractive error is considered in terms of blind-person-years, a person becoming blind due to refractive error at a young age, and which is not corrected, would suffer many more years of blindness than a person becoming blind from cataract in old age and would place a greater socioe- conomic burden on society. Therefore, this study was conducted to look into general trend of prescribing reduced plus prescription to subject. The main objective of this study was to find out best treatment modality in hyperopic subject and for that purpose a generally used prescription plan was made based on the criteria of age, vision, and ocular mortality. Prescription plan was

1. Full correction. 2. Partial correction.
3. Partial correction with full correction on follow up.
4. Full correction reduced on follow up.
5. Full correction with cycloplegic drops.

Conclusion

It was concluded that the best treatment modality was full correction. 62% Subjects accepted full correction in which 30% were orthophoric age greater than 5 years. 23% were esotropes who accepted full correction. Almost all the esotropia with hyperopia were given full correction. Age, vision and amount of hyperopia are highly correlated to each other. Modification of correction should be done according to ocular motility, age and vision. Refractive blur can have negative effect on sensitive period of neurological development. Results showed high association of amblyopia with hyperopia.

Department of Ophthalmology , KEMU, Lahore.

References

1 Emmetripization. [Online]. 2009. [cited 2011 September 10]; Available from: Http:// en.wikipedia. Org/wiki/emmetropia.

2. Farsightedness. What is hyperopia? Available at URL http://www.geteyesmart.org/eyesmart/diseases/hyperopia.cfm cited on 10/10/2011

3. Benjamin WJ. Borish's clinica refraction. 2nd ed. (Ch.no.1 refractive status of eye.) St.Louis: Butterworth Heinemann Elsevier; 1998. P.10-1.

4. Oduntan AO. Prevalence and causes of low vision and blindness worldwide. S Afr Optom. 2005; 64: 44-5.

5. Durrani J. Blindness statistics for Pakistan. Pak j ophthalmol. 1999; 15: 1-2.

6. Atkinson, Janette, Braddick, Oliver, Nardini, Marko, et al.Infant hyperopia: Detection, Distribution, Changes and correlates-outcomes from the Cambridge infant screening program. Optometry and vision sciences.2006, February 7; 84(2):84-96.

7. Minto H, Awan H, Khan A.A. Situation analysis of refractive services in Pakistan pub sight savers international, 2006 Cited 24/10/2010.

8. Blouza J, Loukil I, Mhenni A, Khayati L, Mallouche N et al.Mangment of hyperopia in children. Journal français d'ophtalmologie. 2007 march; 30(3):255-9.

9. Wedner SH, Ross DA, Todd J, Anemona A, Bailira R, Foster A, Myopia in secondary school in mwanza City, Tanzia.the need for a national screening programme Br ophthalmol.2002;86:1200 1206.

10. Castanes MS. The underutilization of vision screening (for amblyopia, optical anomalies and strabismus) among preschool age children. Binocular vision strabismus. 2003; 18(4):217-32.

Answer Picture Quize

An 80-year-old man presented with a lesion on the left sole that had been increasing in size during the past 2 years. The lesion had become increasingly ulcerated, with intermittent bleeding. The physical examination revealed a well-defined, fleshy, reddish plaque measuring 2 cm in diameter with erosions on the surface and black areas at the periphery. A melanoma with a Breslow depth of 1.1 mm was identified on biopsy. Immunohistochemical examination showed tumor cells that were positive for S-100 protein and HMB-45 and negative for AE1/AE3. On the basis of these findings, a diagnosis of amelanotic melanoma was made. The general absence of pigment in amelanotic melanoma can lead to confusion with more benign skin conditions, including pyogenic granulomas, warts, and ulcers. Prompt investigation is important to avoid a delay in diagnosis. The patient was referred to an oncology clinic for further treatment but did not attend and was lost to follow-up.