



A CLINICAL STUDY OF SENSORY AND MOTOR ADAPTATIONS AMONG CASES WITH STRABISMUS- AN OBSERVATIONAL STUDY

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ABSTRACT

Background: One of the common visual problems faced by young children is having crossed eye. This disorder is called as strabismus. This imbalance forces the normal eye to work hard to cope with the functions of deviated eye, which if left untreated leads to its loss of vision. This study was conducted to assess various pre-disposing factors of strabismus cases and different sensory and motor adaptations among them.

Methodology: This was a observational study including 90 cases with strabismus, who had attended the OPD in a tertiary care center. Detailed history taking and thorough examination was done to know the type of strabismus, presence of refractive error and amblyopia. Various modes of treatment used for strabismus was studied.

Result: Mean age of participants was 14.78 years. Majority of cases had exotropia (55.5%), followed by esotropia (32.2%), paralytic type (5.5%), intermittent (4.4%) and Duane retraction syndrome (2.2%). Amblyopia was present in 12% of the cases.

Conclusion: The understanding of various strabismic pathologies has become extremely important both in terms of their etio-pathogenesis as well as their management. No investigative modality can however replace or surpass a good clinical examination. A comprehensive clinical examination is the key for appropriately managing these disorders. Hence the study was undertaken keeping all the above facts in view.

KEYWORDS :

INTRODUCTION:

The human eye is an organ which allows us to observe and learn more about the surrounding world. 80% knowledge about the outside world we get is by the visual sence. Hence binocular alignment and the binocular co- ordination of the eye movements are the important in human species so as to maintain binocular fusion and stereopsis .Strabismus or squint is abnormality related to the ability of binocular vision.^{1,2,3,4}

One of the common visual problems faced by young children is having crossed eye. This disorder is called as strabismus. This imbalance forces the normal eye to work hard to cope with the functions of deviated eye, which if left untreated leads to its loss of vision deliberated by Hertle RW et al (2000).⁵ Squint or strabismus as ocular anomaly is known to mankind since ancient times as seen in Greek literatures 2000 years ago⁶

Timely diagnosis and appropriate treatment of youngsters can reduce the prevalence of amblyopia and ocular misalignment in later childhood and adult life. Correction of strabismus has also shown improvement in motor co- ordination.⁷

Hence this study was undertaken keeping in mind all the above mentioned factors associated with strabismus.

AIMS AND OBJECTIVES:

This study was conducted to assess various pre-disposing factors of strabismus cases and different sensory and motor adaptations among them.

METHODOLOGY:

This was a observational study conducted from January 2019 to July 2020, in a tertiary care centre, including 90 cases of strabismus. All the cases with strabismus who attended the OPD were included in the study. Patients with prior history surgery for strabismus and those with head injury and in critical condition were excluded from the study. Detailed history was taken from all the study participants regarding squint, difficulty in vision, birth history, family history and

history of previous treatment. Thorough clinical examination was done to check the type of strabismus, visual acuity, refraction and pupillary reactions. Motor evaluation was done by using direct cover test, cover-uncover test, alternate cover test, Hirschberg corneal reflex test, Prism bar cover test, Synoptophore method and extra ocular movements. Sensory evaluation was done through diplopia charting, ARC detection using RAF guage, Worth's four dot test and assessment of grades of binocular vision using synoptophore. Forced duction and force generation test and dilated fundus examination was also done.

RESULTS:

This was a observational study conducted including 90 cases of strabismus out of which 57% were females. Mean age of participants was 14.78 years, youngest being 10 months and oldest was 67 years. On checking distribution according to type of strabismus, it was seen that majority had exotropia (55.5%) followed by esotropia (32.2%), paralytic type (5.5%), intermittent (4.4%) and Duane retraction syndrome (2.2%) [Table-1].

Table-1: Distribution according to type of Strabismus.

Type of strabismus	Number	Percentages (%)
Exotropia	50	55.55
Esotropia	29	32.22
Paralytic	5	5.55
Intermittent	4	4.44
Duane retraction syndrome	2	2.22

Table-2 shows about the distribution according to refractive error in different types of strabismus.

Table-2: Refractive error associated with strabismus

Type of strabismus	Myopia	hypermetropia	Emmetropia
Exotropia	26 (52%)	4 (8%)	20 (40%)
Esotropia	7 (24.13%)	22 (75.86%)	0

Around 11 cases had amblyopia out of which 8 cases with esotropia and 3 cases with exotropia had hyperopia with amblyopia, and 1 case with myopia with amblyopia [Table-3].

Table-3: Amblyopia occurring in strabismus

Amblyopia	Number of cases	Percentage (%)
Present	11	12
Absent	79	88

Table-4 shows about various modes of treatment according to type of strabismus. Among cases with exotropia 40% required surgical treatment, 40% underwent cycloplegic refraction, 8% occlusion therapy and 12% were treated with orthoptic exercises. Among the cases with esotropia, 37.9% required cycloplegic refraction treatment, 31.03% occlusion therapy, 27.58% underwent surgical treatment and 3.4% were given orthoptic exercises.

Table-4: Modes of treatment according to types of strabismus.

Types of strabismus	Cycloplegic refraction	Occlusion therapy	Orthoptic exercises	Surgical correction
Exotropia	20 (40%)	4 (8%)	6 (12%)	20 (40%)
Esotropia	11 (37.9%)	9 (31.03%)	1 (3.44%)	8 (27.58%)
Paralytic	00	00	4 (100%)	00
Intermittent	00	5 (100%)	00	00
DRS	2 (100%)	00	00	00

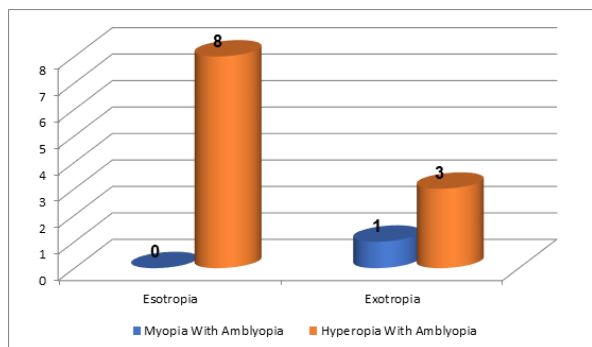


Fig-1: Amblyopia and refractive error associated with type of strabismus

DISCUSSION:

It was a prospective observational study . In this study 91 cases of strabismus were included who had attended the hospital over a period of eighteen months, from January 2019 to July 2020 with minimum period of follow-up of 6 months.

Our study showed that strabismus was common in the age group of 00-05 year (28.57 %). This was different than that found by Azam et al which showed that the prevalence of strabismus was more common among the age group 6-9 years.⁸ The present study showed that exotropia (55.5%) was more common than esotropia (32.2%) among cases with strabismus. This is similar to findings of Tanaka et al which showed that exotropia was more prevalent among Asian and African American populations.⁹ This was also comparable with findings of the study conducted by Al-Tamimi et al.¹⁰

The present study showed that 92% of exotropic cases were myopic and 75.8% cases of esotropic cases were hyperopic. This was similar to findings of Al-Tamimi et al, which showed that exotropia was predominant type of strabismus in children with myopia and esotropia was substantially more frequent in children with mild-moderate compound hyperopic astigmatism than in children with myopia.¹⁰ In this study amblyopia was seen only in 12% of cases and majority of the cases (55.55%) were exotropes, prevalence of amblyopia was less. In our study majority Esotropic amblyopic patients were hypertropic and Exotropic amblyopic patients were more or less myopic or hyperopic. In Indian study done by Menon et al(2005), amblyopia due to hypermetropia was highest (51.65%). Anisometropia amblyopia was second most common (22.1%) after strabismus amblyopia (37.38%),

followed by ametropic amblyopia 12.88%, and meridional amblyopia was 5.56%.¹¹ Mohammad Faghihi et al (2011) in his study showed that the prevalence of amblyopia was 1.9%. Among myopic, hyperopic, and astigmatic students, 3.7%, 27.8%, and 6.5% had amblyopia, respectively . The causes of amblyopia were strabismus in 24.4%. The prevalence of strabismus was 3.1%. Strabismus was significantly more prevalent among hyperopic students (7.9%) compared with myopic ones (3.7%).¹²

In our study ,management of exotropia in cases with cycloplegic refraction was done 40% of cases and surgical correction benefitted other 40 % cases. Rest cases were managed with occlusion therapy(8%) and Orthoptic exercises(12%).

In esotropia cases 37.93% showed good results with cycloplegic correction where as 27.58% showed good results with surgical correction; also occlusion therapy and Orthoptic exercises showed results in 31.03% and 3.44% respectively. Cases with Duane s retraction syndrome was given cycloplegic refraction alone ,intermittent squint cases (4 patients) showed good outcome with occlusion and paralytic squint (5 patients) cases were given orthoptic therapy. In three prospective studies by Watts P et al (2005) and Rowe FJ et al (2009) of children treated with over-minus glasses, some form of improvement (depending on the outcome measure used) was seen in 45 – 70% of patients.^{13,14}

According to Koc F et al(2003) hyperopia occurs in 15% of children with Infantile esotropia. At presentation, they treated infants with ≥2.5 D hyperopia with full spectacle prescription to determine whether the ET is partially or fully accommodative. However, 20% of infants initially controlled with glasses will decompensate and require surgery.¹⁵

Abrams MS et al (2011) found in his study that 61% of 46 small-angle strabismic children 1.5 to 9 years of age, undergoing part-time treatment with Bangerterfoils for amblyopia, developed motor fusion with no additional interventions.¹⁶

Mahoney et al.(2011) reported 20% of accommodative esotropes will be free of spectacles by 10 years after diagnosis. Patients with high hypermetropia, high AC/A ratio(bifocal dependence), and anisometropia are more likely to need glasses long term. Those with low hypermetropia, normal AC/A ratio, and those that undergo surgery are more likely to be successfully weaned from spectacles.¹⁷

CONCLUSION:

“Strabismus” is one of the most challenging in ophthalmology. It’s not very uncommon to encounter patients with strabismic disorders in an ophthalmic outpatient department. These disorders besides causing cosmetic blemish, result in disruption of normal binocular vision, altered stereopsis and amblyopia. Early detection and timely initiation of treatment therefore becomes very important in order to prevent the occurrence of these sequelae. Ocular examination should ideally begin in the new born period and continue up to all subsequent visits of the child.

The understanding of various strabismic pathologies has become extremely important both in terms of their etio-pathogenesis as well as their management. No investigative modality can however replace or surpass a good clinical examination. A comprehensive clinical examination is the key for appropriately managing these disorders. Hence the study was undertaken keeping all the above facts in view.

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