

CLINICAL STUDY OF CONCOMITANT SQUINT

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ABSTRACT

BACKGROUND

Malalignment in the visual axes of the two eyes is called strabismus. Fusion of both images is replaced either by diplopia or suppression of one image. Squint leads to loss of binocular single vision. Concomitant squint is a type of manifest squint in which the amount of deviation in the squinting eye is same in all gazes. Binocular single vision and ocular movement coordination are not present since birth, but are acquired in the early childhood. This process starts by the age of 3-6 months and is completed up to 5-6 years. Any hindrance in the development of these processes may result in concomitant squint.

MATERIALS AND METHODS

In 100 cases of concomitant squint, patients were included in our study. Detailed history was taken regarding the onset of squint and duration. Past history and family history was also elicited. General examination was done to detect any abnormalities of central nervous system. Routine ophthalmic examination including best corrected visual acuity, cover test performed to detect the type of deviation whether uniocular or alternating and the type of fixation. Angle of deviation was measured by Hirschberg's test and on the synoptophore. Binocular single vision was assessed using Worth's 4-dot test and synoptophore. Cycloplegic refraction and fundus evaluation done in all patients.

Inclusion Criteria- All primary non-paralytic deviations, sensory deprivation strabismus.

Exclusion Criteria- Paralytic strabismus, strabismus associated with neurological disorders, consecutive strabismus and palpebral fissure abnormalities patients.

RESULTS

Majority of cases of concomitant squint were of esotropic type. Most common form of esotropia seen was infantile esotropia. Most common form of exotropia was intermittent exotropia. 19% of cases were secondary to other ocular diseases namely cataract, macular lesion, high myopia, etc. Amblyopia was present in 54% patients and of very dense type, which could not be treated effectively as patients presented themselves late. Degree of deviation in range of 10-20 degrees is commonly seen in both esotropia and exotropia. Hypermetropia constituted most common refractive error in our study.

CONCLUSION

This study is conducted to spread awareness and education regarding concomitant squint and its effect on vision and need for early detection and treatment to prevent loss of sight and loss of binocular vision. Mass screening programmes should be conducted to detect concomitant squint early and treat it. Parents and teachers should be informed of importance of squinting eye and in availing early investigation of its causes and treating it.

KEYWORDS

Concomitant Squint, Esodeviation, Exodeviation, Refractive Error.

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BACKGROUND

Strabismus means- to squint, to turn, to askance. In India, strabismus has several social connotations as it has been variedly considered a taboo or as ill or a sign of good fortune or simply disfiguring. Rarely, it is realised that the presence of strabismus implies some abnormality in the functioning of

visual apparatus. Female patients are brought for treatment at an age when the inherent social implications are obvious and only cosmetic treatment possible. Male patients denied treatment by assuming the squint to be a sign of good fortune. Thus, a squinting eye is always defective and so also a defective eye can always squint.

Aim of the Study

To acquire knowledge about the causes, clinical manifestations and management of concomitant squint, which may add to our therapeutic efficiency and create awareness about the squint among the community in general and the patient in particular.

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MATERIALS AND METHODS

In this prospective study, 100 cases of concomitant squint were studied between October 2016 to March 2017 at Department of Ophthalmology, GVMCH, Vellore. After obtaining informed consent from the patient, squint evaluations was done.

Detailed history was taken regarding the onset of squint and duration. Past history and family history was also elicited. General examination was done to detect any abnormalities of central nervous system. Routine ophthalmic examination including best corrected visual acuity and a thorough orthoptic evaluation was carried out on all patients. Cover test was done to detect the direction of deviation whether uniocular or alternating and the type of fixation.

Angle of deviation was measured by Hirschberg’s test and on the synoptophore.¹ The state of binocular single vision was assessed using Worth’s 4-dot test and synoptophore.² Cycloplegic refraction and fundus examination was done in all patients.

Inclusion Criteria

- Primary non-paralytic deviations.
- Sensory deprivation strabismus.

Exclusion Criteria

- Paralytic strabismus.
- Consecutive strabismus.
- Cases that had undergone previous surgery with residual deviations.
- Strabismus associated with neurological disorders.
- Cases with palpebral fissure abnormalities.

RESULTS

Age-Wise Presentation- Most of the patients presented early in our study. About 35% of the patients were in the age group of 0-5 years.³ 31% were in the 11-20 years group, 20% of the patients were in the age group of 6-10 years, 12% of the patients were in the age group of 21-40 years and 2% accounted for the age group above 40 years.

Age of Onset- Most of the patients complained was that the deviation was present since birth (80%). About 10% of the patients had an onset of deviation in 1-2 years group.⁴

Sex Ratio- The male-female ratio in our study was 1:1.2 (out of 100 patients examined, there were 46 male and 54 female patients).

Laterality- Both the eyes were involved in 65% of the patients, while right eye was involved in 17% and left eye in 18% of the patients.

Precipitating Factors- Congenital cataract was the precipitating factor in 9 patients while 1 patient gave history of birth injury, 2 patients had torticollis.

Family history- 11% of the patients gave a positive history of squint in their siblings/parents.⁴

Deviations

Esotropia accounted for 57%. Exotropia accounted for 43% of the patients.⁵

Esotropia	Number of Patients
Infantile esotropia	27
Accommodative esotropia	13
Non-accommodative esotropia	7
Secondary esotropia	10
Total	57

Table 1. Types of Esotropia

Among the group of esotropia, the majority belong to infantile esotropia type.⁶

Exotropia	Number of Patients
Intermittent exotropia	22
Divergence excess	6
Convergence insufficiency	10
Basic exotropia	6
Constant exotropia	12
Secondary exotropia	9
Total	43

Table 2. Types of Exotropia

In the exotropia group, the intermittent exotropia was most commonly seen.^{7,8}

Among the various types of squint, primary squint was present in 81 patients and secondary squint accounted for 19 patients.⁹

Causes for Secondary Squint

In 9 patients, cataract was the cause for squint. 5 patients had macular lesion, 2 patients had torticollis, 1 patient had birth injury, which led on to squint and 2 patients had high myopia leading on to deviation of eye.

Degree of Deviations

The maximum number of patients in both esotropia and exotropia group presented with 11-20 degrees of deviation.

Degree of Deviations	Esotropia	Exotropia
Less than 10 degrees	1	1
11-20 degrees	43	26
21-30 degrees	11	11
31-40 degrees	2	3
More than 40 degrees	0	2

Table 3. Degrees of Deviations

Defective Vision

66 patients complained of defective vision. The defective vision was due to refractive error, congenital cataract, macular pathology and amblyopia.

Cycloplegic refraction was done and the glasses prescribed to the patient. As many patients came long after onset of squint, they either had strabismic amblyopia or were alternate suppressors without well-developed binocular single vision.

Amblyopia was seen in 54% of the patients, 35 patients had strabismic amblyopia, 5 had anisometropic amblyopia,

3 had ametropic amblyopia and 11 patients had sensory deprivation amblyopia.¹⁰

The refractive status of the patients in the study were as follows- 54 patients were hypermetropic.¹¹

Type of Refractive Error	No. of Patients
Hypermetropia	54
Compound hypermetropic astigmatism	32
Simple hypermetropic astigmatism	1
Myopia	10
Simple myopic astigmatism	1
Compound myopic astigmatism	2

Table 4. Refractive Status

Management

Surgical treatment accounted for 68% of the patients while 25% benefited from optical treatment. In the surgical treatment group, most of the patients were orthophoric in the postoperative period. Many patients did not turn up for regular follow up.^{12,13}

Orthoptic exercises was taught to five patients who improved considerably.

DISCUSSION

Misalignment of the visual axes of the two eyes is called squint or strabismus. It leads inevitably to loss of binocular single vision. Fusion of the two images is replaced either by diplopia or suppression of one image.

Concomitant squint is a type of manifest squint in which the amount of deviation in the squinting eye remains constant (unaltered) in all the directions of gaze and there is no associated limitation of ocular movements. The causative factors differ in individual cases. As we know, the binocular vision and coordination of ocular movements are not present since birth, but are acquired in the early childhood. The process starts by the age of 3-6 months and is completed up to 5-6 years. Therefore, any obstacle to the development of these processes may result in concomitant squint. These obstacles can be arranged into three groups, namely sensory, motor and central.^{1,2}

Sensory Obstacles- Uncorrected refractive errors, media opacities, ptosis, birth trauma and retinal haemorrhage.

Motor Obstacles- Oxycephaly, facial asymmetry, abnormal muscle insertion, fibrosis of muscle tissue, aplasia or hypoplasia of a nerve.

Central Factors- Mental illness (hyperexcitability-convergent squint, hypoexcitability-divergent squint).

It may manifest as esodeviation or exodeviation.³

Esodeviation = esotropia = inward deviation maybe congenital or accommodative (refractive, non-refractive, mixed).

Exodeviation = exotropia = outward deviation⁴ maybe childhood- onset or due sensory - deprivation or due to convergence - insufficiency.

The results of our study was almost similar with various other studies of squint. In our study, majority of patients

were in the age group of 0-5 years accounting for about 35%, but there was a significant delay between age of onset and age at presentation. This has an important bearing on the prognosis and the final result following treatment. Earlier the presentation, better is the final outcome following either medical or surgical management.

In our study, females outnumbered males, these maybe due to cosmetic purpose and males would have not come for treatment thinking it as a sign of good fortune. In our study, positive family history of squint was seen in 11%, which also gives a clear picture stating strabismus runs in family. In our study, 9 patients who presented with squint had congenital cataract on examination and 7 patients had minor degree of deviation as they presented bit early and after performing cataract surgery, they had mild visual improvement with stabilisation of amount of deviation. Patients with refractive error as the aetiology for strabismus was prescribed appropriate glasses after cycloplegic refraction. In our study, 54% of the cases had amblyopia since the duration between age of onset and age of presentation was long. Hence, patients with anisometric amblyopia were given glasses and occlusion therapy given.¹²

In our study, common refractive error noted was hypermetropia, which coincides with the common type of refractive error being hypermetropia in general population, which is also similar to Tan S. M et al study followed by compound hypermetropic astigmatism type of refractive error. Esodeviation was present in 57% of individuals and in that infantile esotropia accounted for 27%. This coincides well with the age distribution since 35% of patients wherein the age group of 0-5 yrs. 43% of patients had exotropia and among them intermittent exotropia was the common type. Esotropia usually appears soon after the child becomes interested in near objects and such children in 90 percent of cases are hyperopic. Exotropia generally appears later than esotropia and the persons concerned are quite frequently myopic.

Among the various types of squint, 81% of the patients had primary squint and 19 patients had secondary squint. Among the secondary causes for squint, 9 patients had cataract, 5 patients had macular lesion, 2 patients had torticollis, 1 patient gave history of birth injury and 2 patients had high myopia leading on to deviation of eye. In our study, 69 patients had deviation of 11-20 degrees of which 43 patients was esotropic and 26 patients had exotropia.⁷ Only 2 patients had deviation more than 40 degrees and 2 patients had deviation less than 10 degrees.

In our study, management was surgical only or surgical with optical correction in majority of cases. Only cosmetic correction could be given in majority of cases. Functional improvement was poor due to late case presentation. Occlusion and orthoptic exercises were done for only few patients as they were older than the ideal age of occlusion. Both esotropic and exotropic individuals were treated. Most of the patients were orthophoric in their postoperative period. Many patients did not turn up to regular followup. Those who came for follow up maintained their

orthophoricity. Patients who were taught orthoptic exercises also showed good improvement in their degree of deviation.

Early and correct use of glasses cured large number of squints. In some cases where squint was present for more than 6 months, some type of muscle operation is necessary and should be done.¹³ 4 to 10 years of age is an ideal time to operate. Surgery done in the age group of 10 to 20 years results is generally satisfactory from 20 to 30 years. The eyes can be straightened, but one is not so sure, they will remain straight. After 30 years, it is doubtful if any operation should be advised for the correction is frequently not permanent. Earlier, the operation is performed better the prospect of binocular vision.¹⁴ In children, fusion training offered good restoration of binocular vision when begun 2 to 3 weeks following operation using an amblyoscope.

CONCLUSION

To summarise, concomitant squint is more common in children. Majority of cases of concomitant squint were of esotropic type. Most common form of esotropia seen was infantile esotropia. Most common form of exotropia was intermittent exotropia. Females outnumbered males, which could be due to greater importance given to cosmesis in female children. Amblyopia was present in many patients and of very dense type, which could not be treated effectively as patients presented themselves late. Myopia increased the risk of exotropia. Hyperopia was associated with increased risk of esotropia in a dose-dependent manner.

Following Measures are Suggested-

There should be spread of awareness and education regarding concomitant squint and its effect on vision and need for early detection and treatment to prevent loss of sight and loss of binocular vision.

Mass screening programmes to detect concomitant squint early and treat it. Also, poor vision be detected at earliest and treated to prevent secondary squints. This could perhaps be done by incorporating it in school health programs and through mass media.

Parents and teachers should be informed of importance of squinting eye and in availing early investigation of its causes and treating it.

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