JMSCR Vol||06||Issue||01||Page 31828-31833||January 2018

www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v6i1.70

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

# Concomitant Esotropias- An Analytical Study

Authors
**Dalia S[1], Anitha.S[2]**
[1]Email: *drsdalia@yahoo.co.in*, +919447142877
[2]Email: *dranithab@rediffmail.com* +919847022762
Corresponding Author
**Dalia S**
Shanti Bhavan, Near South Panchayath Office, Punnapra, Alappuzha, Kerala, India, Pin: 688004

**Abstract**
**Purpose:** *To report the incidence of various clinical types, predisposing factors and associations of concomitant esotropias.*
**Design:** *Prospective randomized population based study.*
**Materials & Methodology:** *100 patients who attended squint clinic of Regional institute of Ophthalmology, Thiruvananthapuram were included in the study.*
**Results:** *Of the 100 cases in our study, Infantile esotropia constituted majority (38%) followed by Basic Esotropias (23%), Partially accommodative (22%) & Accomodative Esotropias (12%). Pattern deviation (37%) Inferior oblique overaction (28%), DVD(21%), Positive family history (20%) were the associations noted. Most common refractive error in study population was Hyperopia (55.17%). Astigmatic shift was noted in 32.76% & Myopia in 12.07%.31% had amblyopia at presentation of which majority (61.29%) improved with occlusion therapy.*
**Conclusion:** *This study provides a population based data on the most prevalent forms, predisposing factors & associations of concomitant esotropias. Knowledge of various clinical types & accurate estimate of predisposing factors & associations are important to decide on treatment.*
**Keywords:** *Concomitant Esotropia, Incidence, Predisposing factors, Associations.*

## Introduction

Concomitant Esotropia is a form of strabismus in which one or both eyes turn inwards & amount of deviation doesn't vary with direction of gaze. Esotropia constitutes 40% of strabismus and can occur constantly or intermittently giving the individual a crossed eye appearance. Various types of Esotropia include Accomodative, Non-Accomodative, Partially Accomodative, Sensory esotropia, Microtropia. Accomodative type can be Refractive or Non-refractive (↑AC/A ratio).Non-Accomodative type can be Infantile esotropia, Esotropia in myopia, Basic & convergence excess variety. Amblyopia can occur as a result of esotropia occurring in childhood. Inorder to relieve symptoms of diplopia, the brain will suppress the image of esotropic eye which when allowed to continue untreated will lead to development of amblyopia.

Early identification of type and associations & advocation of appropriate treatment is mandatory to prevent development or else reduce the density

of amblyopia which is common in Esotropia. Otherwise it will affect the mental & social development of the individual including scholastic performances .This study was envisaged to find out the incidence of various clinical types, predisposing factors & associations of comittant esotropias in a tertiary care hospital.

**Aims of the Study**

1. To study the incidence of various clinical types of Esotropias.
2. To study the predisposing factors and associations.

**Materials and Methodology**

This was a prospective randomized study of concomitant esotropias, held at Regional Institute Of Ophthalmology, Thiruvananthapuram. 100 patients who attended the squint clinic were included in the study.

**Exclusion criteria**

- Cases of esotropias with a paralytic or restrictive component
- Cases which were operated once and traumatic strabismus.

The following was the Examination protocol

The detail history included the relevant symptoms, duration of complaints, antenatal, natal and post natal history, any systemic illness, family history and details of previous treatment history. The clinical examination included a general and systemic examination, examination of visual acuity with Snellen's visual acuity chart in verbal, Cambridge crowding card matching test in pre - verbal children. The ability to fix and follow lights and any resistance to occlusion was recorded in the case of infants. The refraction was carried out under full cycloplegia. Orthoptic assessment included measurement of angle of squint by the Hirschberg test and prism bar cover test for near and distance. Sensory status was assessed using Bagolini's striated glasses and if BSV was present it was graded using Synoptophore slides. Ocular movements were accurately noted and any abnormal movements, DVD, Nystagmus, pattern deviation were noted. AC/A ratio and fusional vergence were recorded in required cases. Anterior segment and fundus were examined in detail to detect any pathology and to assess the type of fixation.

**Observation & Results**

**Table 1** Age Distribution

| Age Group | No.of cases | Percentage |
|---|---|---|
| Upto 5 years | 51 | 51 |
| 5 to 15 years | 46 | 46 |
| Above 15 years | 3 | 3 |

In this study maximum number of patients were below 5 years of age ie; 51 patients (51 cases). This was followed by 5-15 years age group which made 46% of the study group. Only 3 patients (3%) had an age of presentation above 15 years. Minimum age of presentation was 6 months and maximum was 24 years

**Table 2** Sex Incidence

| Male (%) | Female (%) | Total |
|---|---|---|
| 44 | 56 | 100 |

Male: Female ratio is 1: 1.3. Slightly higher incidence was found in female population with 56 patients being females and 44 males.

**Table 3** Age of onset of Deviation

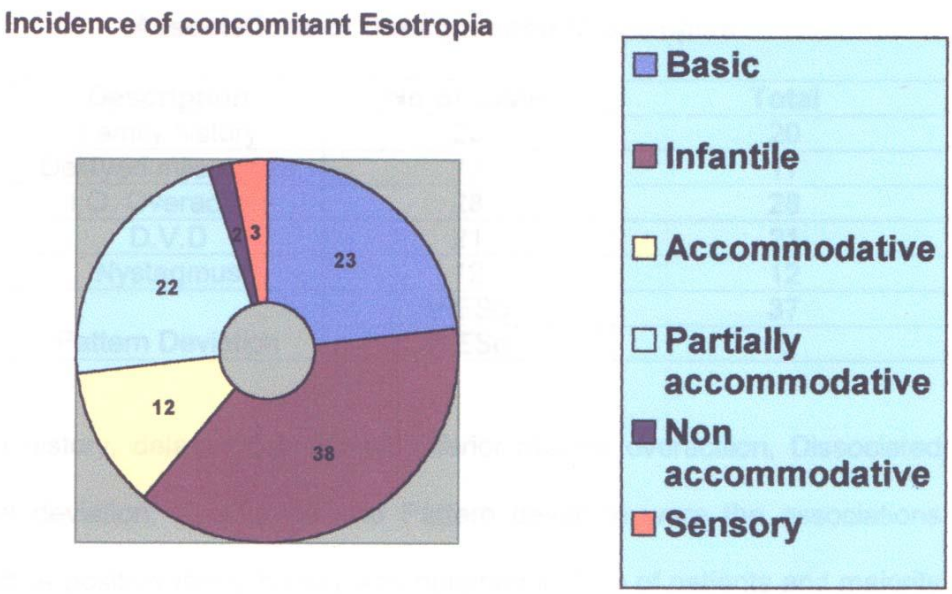
| Description | <6 months | 7months to 2 year | 2 to 5 years | more than 5 year |
|---|---|---|---|---|
| Basic Esotropia | 14 | 2 | 4 | 3 |
| Infantile Esotrooia | 10 | 26 | 0 | 0 |
| Accommodative Esotropia | 10 | 13 | 12 | 1 |
| Sensory Esotropia | 3 | 0 | 0 | 0 |
| Non Accommodative Esotropia | 1 | 1 | 0 | 0 |

The age of onset of deviation was inferred from history. In case of infantile Esotropia, majority of patients had a history of onset from 6 months to 2 years ie; 26 patients (72.22%). Among patients

with accommodative Esotropias, the age of onset was almost even in the groups below 5 years of age. (33.33% in each group). 60.87 % of patients with basic Esotropias had onset below 6 months of age. All patients with sensory Esotropias had onset before the age of 6 months.

**Table 4** Incidence of types of Esotropia

| | TYPES | PERCENTAGE | No |
|---|---|---|---|
| **Incidence of Concommittant Esotropia** | Basic | 23 | 23 |
| | Infantile Esotropia | 38 | 38 |
| | Accommodative Esotropia | 12 | 3 |
| | | | 3 |
| | | | 6 |
| | Partially Accommodative | 22 | 22 |
| | Non accommodative (Convergence Excess) | 2 | 2 |
| | Sensorv | 3 | 3 |
| Total cases | | | 100 |




Infantile Esoptropia constituted the highest incidence with 38 cases (38%} followed by Basic Esotropias 23 cases (23%) and partially accommodative Esotropias 22 cases (22%). 13 cases of the partially accommodative variety were infantile Esotropia with an accommodative component. Of the accommodative variety which constituted 12%, 3 cases each were of purely refractive and non- refractive (with high AC/A ratio) type and 6 cases of the mixed type having both refractive component and increased AC/A ratio. Non accommodative convergence excess group had 2 cases (2%) and sensory Esotropia 3 cases (3%). 2 of these patients on fundus examination showed healed macular choroiditis, the other one was a 12 year boy who had surgery for congenital cataract at the age of 11 /2 years and was left aphakic with no post operative rehabilitation for about 7 years. Secondary IOL implantation was done 2 years before presentation to our clinic.

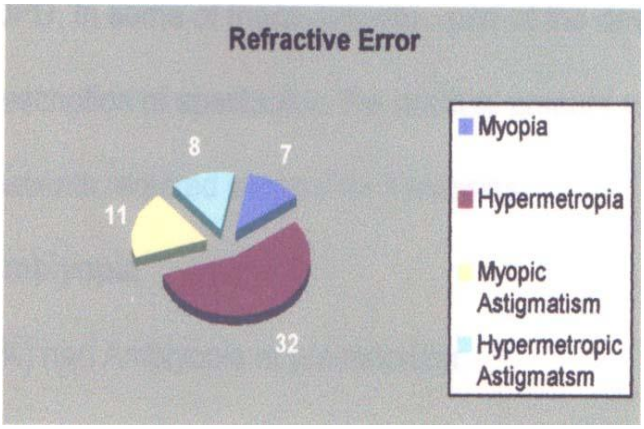
**Table 5** Associations of Concommittant Esotropias

| | | |
|---|---|---|
| Family historv | 20 | 20 |
| Description | No of cases | Total |
| Delayed milestones | 17 | 17 |
| I. 0. Overaction | 28 | 28 |
| D.V.D | 21 | 21 |
| Nystagmus | 12 | 12 |
| Pattern deviation | VESo | 37 |
| | AESo | 6 |

Family history, delayed milestones, Inferior oblique overactiion, Dissociated vertical deviation, Nystagmus and Pattern deviation were the associations studied. A positive family history was obtained in 20% of patients and majority of them in first degree relatives. H/o delayed milestones were there in 17% of patients. Some of these patients has H/O birth trauma. neonatal seizures, mental retardation. There was one case of cerebral palsy. Inferior oblique overaction of Grades 1-4 was present in 28% of patients. 21 patients had Dissociated vertical deviation of which 3 patients manifested DVD within 6months following surgery. Nystagmus of manifest latent type was present in 10 cases and manifest type in 2 cases with a total of 12 patients (12%). Alphabet pattern was present in 43 cases (43%) with 37cases (86.04%) being V-Eso and 6 cases (13.95%) A-Eso. 28 patients with V-pattem had inferior oblique over action.Type of surgery was modified in these cases. There was a twin both of which had Infantile Esotropia with associated Nystagmus, DVD, IO Over action and V-pattern.

**Table 6** Association of refractive errors

| Refraction | | No:of cases |
|---|---|---|
| Myopia | | 7 |
| Hypermetropia | | 32 |
| Astigmatism | Myopic | 11 |
| | Hypermetropic | 8 |
| Total | | 58 |




Of the 100 case studied 58 patients (58%) had associated refractive error. Of these hypermetropia constituted the largest group with 32 patients (55.17%), among these 3 cases were purely refractive and 6 cases of mixed accommodative type. 22 cases belong to the partially accommodative type. The purely refractive types were highly hypermetropic of the range of +7.000. Astigmatic shift in refraction was noted in 19 cases (32.76%), with Myopic astigmatism in 11 cases (18.97%) and Hypermetropic astigmatism in 8 cases (13.79%). There were 7 cases with Myopia (12.07%), of which 4 cases were of the Basic type with moderate to high Myopia. Correction of refractive error partly or fully corrected the deviation in these cases.

**Discussion**

Strabismus is reported to be present in 4% of general population. In this study we prospectively evaluated 100 cases of concomitant Esotropias presented to the Squint clinic at Regional Institute of Ophthalmology, Thiruvananthapuram. The number of cases of Esotropias and Exotropias of the commitant variety were almost of equal incidence in our clinic.

About half of the cases of Esotropias presented before 5 years of age, majority of the rest were below 1O years of age. This shows a changing trend towards the better, because previously squint used to be a condition of late presentation, diagnosis and treatment beyond the age of attainment of binocularity. With more of public awareness and school screening programmes cases can be detected earlier.

Male: Female ratio was 1:1.3. Several authors have commented on the preponderance of females in population of patients with Eso deviation. In the study published by Krzystkowa and Pajakawo 67% were females[1.]

Of the 100 cases in our study, Infantile esotropia contributed the majority forming 38% of cases followed by Basic esotropias 23% and partially Accommodative 22%. Among the Accommo-dative esotropias which constituted 12% of study, half of the cases were of the mixed variety. This is different from the incidence in western countries. According to the report of study conducted at College of Medicine, Johnson city, U.S.A. more than half of the cases (52.9%) had some form of

Accommodative element. This was followed by Non Accommodative type (10.5%). Infantile Esotropia constituted only 5.4% in their study[2]

Overaction of inferior oblique muscles is a common enigma in the field of ocular motility. 28% of the patients in the study had inferior oblique overaction of varying grades. All these patients had V-Pattern associated. A total of 43% in the study had pattern deviation of which 37% had V-Esotropia. Review of literature shows the prevalence of A and V pattern in strabismus population ranged from 12.5% {Knapp) to 50% {Urist)[3.]. According to 1964 American Academy of Ophthalmology and Otolaryngolgy panel V-Esotropia was the most common anomaly[4]. Similar results {30%) was also reported by Dr. Kumar Periyasamy et al. Mangalore, India[5]. Ethnic difference in patients from various localities may account for the difference in prevalence observed. 21% Patients in the study had Dissociated vertical deviation of which 3 patients manifested the deviation within 6 months following surgery. Review of literature have shown that incidence of DVD is higher in cases of congenital Esotropia varying from 76% {Parks)[6] to 90% (Lang). 20% Patients had a positive family history. Studies have shown the incidence of hereditary strabismus to vary from 30- 70%. The inclusion of Exotropias and hereditarily transmitted restrictive strabismus in the study group might have caused the difference. Nystagmus of Manifest latent type and CNS abnormality with delayed milestones were the other associations found which were of lower incidence. Lang in his study reported 50% of patients with Nystagmus mostly of the Latent type. A disturbance of co-ordination between vestibular and optic control of the oculo motor system is thought of to be of etiologic significance for latent Nystagmus and DVD [7]

Most common refractive error in the study population was Hypermetropia (55.17%), with 3 patients of the purely refractive type being highly Hypermetropic. Astigmatic shift was found in 19 cases (32.76%) and Myopia in 7 cases (12.07%). Danders theory of relationship between Accommodation and convergence in its expanded form and its critics mainly by Adler is accounted for this. Costenbader in a survey of 500 children with congenital deviation, described 5.6% Myopes, 46.4% mild Hyperopes (upto +0.20 Sph), 41.8% moderate Hyperopes (+2.25 to +5.00 O Sph) and 6.4% high Hypermetropes ( more than +5.000 Sph)[8,9]

At presentation, majority of patients (66%) had an angle of deviation more than 40pd. This might be one of the factor which contributed to earlier age of presentation by many, because our population is more cosmetically aware.

## Conclusion

- Male : Female ratio in the study is 1:1.3.
- Majority of cases presented before 10 years of age
- Infantile Esotropia was the commonest variety of Concomitant esotropia followed by Basic and Partially accommodative esotropias. Fully accommodative and Sensory Esotropias were of relatively lower incidence.
- Inferior Oblique over action with pattern deviation, DVD and positive family history were the common associations of Infantile Esotropias.
- V- Eso was the most frequent alphabet pattern noted.
- Commonest refractive error was Hypermetropia followed by Astigmatism and Myopia.

## Bibliography

1. Krzystkowa. K and Pajakowa J - The sensorial state of strabismus in orthoptics,1972; Excerpta Medica Foundation, p.72.
2. Study at College of Medicine, Johnson city, USA. Urist. M, Horizontal squint with secondary vertical deviations, Archives of Ophthalmology,1951.

3. Brenin.G –The pathophysiology of A & V patterns, Trans Am. Acad. Ophthalmology 1964.
4. Study of Inferior Oblique overaction—Dr. Kumar Periyasamy and Dr. Giridhar Kammath , Mangalore, India. Park.M.M: Discussion of paper by Von Noorden, Isaza. Salman S.D. and Noorden, G.K.Von : Nystagmus in strabismic patients. 1970
5. Burian.H.M: hypermetropia and Esotropia, J Pediatric Ophthal .1972.
6. Costenbander.F.D: Clinical course and management of Esotropia, Strabismus Ophthalmology symposium 2, St.Louis, 1958.
7. Costenbander. F.D : Infantile Esotropia, Trans Am.Ophthalmol. Society,1961.
8. Wrigth Kenneth; Pediatric Ophthalmology and strabismus, St.Louis, Mosby. Pollard. Z.F: Accomodative Esotropia, Arch. Ophthalmology, 1976.
9. Pediatric Ophthalmology and strabismus-American Academy of Ophthalmology. Parsons Diseases of the Eye. Duke Elder's Practice of refraction.