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ORIGINAL RESEARCH

Evaluation of recession-resection of medial rectus and lateral rectus in management of esotropia

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ABSTRACT

Introduction: Strabismus is characterized by misalignment of eyes where visual axes deviate from bifoveal fixation.Esotropia as a subtype of strabismus is defined as inward turning of one or both eyes. **Aims and objectives:** Outcome in the form of Ocular Alignment and Extraocular Movements after Recession of Medial Rectus and Resection of Lateral Rectus in one eye in cases of Esotropia. **Material and methods:** The present study was conducted on 50 patients with Esotropia visiting Ophthalmology department in Government Medical College, Amritsar. All patients underwent surgical procedure i.e. Medial Rectus Recession (Maximum up to 6 mm) and Lateral Rectus Resection (Maximum up to 10 mm) of one eye. Surgery was done based on Prism Cover Measurement obtained at 6 mts with appropriate optical correction in place. Patients were evaluated at day 1, day14 and at 6 week post operatively. Final Outcome was considered at the end of 6 weeks at which achievement of < 10 prism diopters of esotropia was the success. **Results:** We obtained success (< 10 prism diopters) in 42 out of 50 patients (84%). Out of 42, in 27 cases of the age group 5-10 yrs, , success(< 10 prism diopters) was there even if deviation was up to 80 prism diopters in some cases and in 15 cases of the age group 10-15 yrs , success was there ,where deviation was up to 50 prism diopters. In remaining 8 cases of the age group 16-25 yrs, success could not be achieved. (>=10 prism diopters). **Conclusion:** We conclude that along with the Preoperative Deviation, age is also an important criterion for favourable surgical outcome. Younger the age, better is the surgical outcome.

INTRODUCTION

Strabismus is characterized by misalignment of eyes where visual axes deviate from bifoveal fixation.[1] It can be classified as Esotropia (inward deviation), Exotropia(outward deviation),hypertropia (upward deviation), hypotropia (downward deviation) and cyclotropia (torsional deviation). Esotropia as a subtype of strabismus is defined as inward turning of one or both eyes. It is classified as Comitant esotropia and Incomitant esotropia.

Accomodative Esotropia is differentiated into Refractive and Non Refractive Esotropia. Refractive accommodative esotropia is generally associated with a moderate-to-high degree of hyperopia and a normal accommodative convergence/accomodation (AC/A) ratio. Non Refractive Accomodative Esotropia is associated with a low degree of hyperopia and a high AC/A ratio

Infantile esotropia (Non Accomodative Esotropia) - It is a large angle, constant esotropia where the onset is during first six months of life.[2] It has an incidence of 1-2%.[3] Patients having Infantile esotropia are having features like alternating esotropia, cross fixation, amblyopia, inferior oblique overaction,nystagmus. It represents the most common form of strabismus.[4]Children with infantile esotropia mainly come for the treatment due to parental awareness of unacceptable ocular deviation.

Strabismus can be managed by nonsurgical, surgical or a combination of both.

Nonsurgical methods are Optical correction, Orthoptic treatment, Pharmacological methods.

Optical correction involves refraction and proper prescription including use of bifocals and prisms.

Spectacle correction is chosen as the initial method of treatment for optical correction.In cases where a constant or intermittent esotropia is present, the full hyperopic correction should be given. Cycloplegia should be obtained with either cyclopentolate or atropine eye drops. After spectacle correction,

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children should be re-assessed for several weeks or months. If the esotropia is still present, children should undergo another cycloplegic refraction to ensure they are wearing their full correction.

Orthoptic treatment includes anti-suppression exercises and treatment of amblyopia.

Antisuppressive exercises are done to bring fovea out of suppression, by differential stimulation favoring the non-dominant suppressed fovea. Antisuppressive exercises done by Red filter method, cheiroscopes, synaptophores. Ambylopia treatment is done by occlusion therapy. In Occlusion therapy the amblyopic eye is given a chance to develop as in this the dominant eye is not allowed binocular participation. It involves total occlusion in which there is complete denial of light and form vision and is done for moderate to severe amblyopia. Partial occlusion is done for milder cases of amblyopia. There can be full time occlusion done or can be part time occlusion done based on the age of the child. Conventional occlusion is occlusion of dominant eye. Occlusion is continued till the vision is improving or the vision does not improve after two monthly visits. During follow up vision of normal eye should be assessed for the presence of occlusion amblyopia. Penalization is a type of partial occlusion in which the amblyopic eye is used more and the normal eye is penalized for distance by overcorrecting with plus lenses, for near by using cycloplegics. Home vision therapy has started for anti-suppression and accommodative-convergences modulation.

Strabismus surgery is physical maneuver of extraocular muscles with a goal of therapeutic advantage. Credit of first successful operation for strabismus with a use of horizontal rectus surgery on a living patient in 1839 goes to Johann Dieffenback, a plastic surgeon from Berlin.[3] Main Objectives of Strabismus surgery are:

1. Attaining peripheral fusion to maintain alignment of the eyes.
2. Achieving single binocular vision so that patient can complete his visual tasks.
3. Minimizing anomalous head positions. 4. Restoring appearance as close to normal as possible.

Various surgical techniques have been used for the correction of esotropia. Two-muscle surgery includes either medial rectus recession combined with lateral rectus resection or bimedial rectus recession is done regardless of the size of preoperative deviation.[3]

There are three ways of surgery which are done by adjusting the horizontally acting extraocular muscles.

- Unilateral Surgery: weakening(recession) of the medial rectus and strengthening(resection) of lateral rectus.
- Bilateral: Weakening of medial rectus in both eyes (Symmetrical recession).
- Three or more muscle surgery: a combination of recession and resection.

The age at which surgery is to be conducted may vary. If surgery is performed before the age of two then it is „early" surgery and if it is after the age of two it is described as „late" surgery**.**[5]

A fine surgical outcome is a slight esotropia, as overcorrection may lead to diplopia.It is rare to achieve complete restoration of binocularity. It is the belief of many authorities that best chance for the development of binocular vision is, when the age is two years and ocular alignment is within 10 diopteres.[6]

AIMS AND OBJECTIVES

Outcome in the form of Ocular Alignment and Extraocular Movements after Recession of Medial Rectus and Resection of Lateral Rectus in one eye in cases of Esotropia.

MATERIAL AND METHODS

The present study was conducted on 50 patients with Esotropia visiting Ophthalmology department in Government Medical College, Amritsar.

All patients underwent surgical procedure i.e. Medial Rectus Recession (Maximum up to 6 mm) and Lateral Rectus Resection (Maximum up to 10 mm) of one eye.

Surgery was done based on Prism Cover Measurement obtained at 6 metres with appropriate optical correction in place. Patients were evaluated at day 1, day14 and 6 week post operatively. Final Outcome was considered at the end of 6 weeks at which achievement of < 10 prism diopters of esotropia was the success.

Inclusion criteria

- Patients with Esotropia of all Age groups
- Patients with Esotropia irrespective of the duration of the squint.

Exclusion criteria

- Patients with any congenital malformation.
- Patients with Paralytic strabismus.
- Patients with Phoria.
- Patients with History of Previous Ocular Surgery.
- Patients with History of Systemic Disease.
- Patients not willing to give consent for study

RESULTS

Table I: Showing Age Wise Incidence

Age(Years)	No. of Patients	Percentage
5-10	27	54.0%
10-15	15	30.0%
16-25	8	16.0%

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Total	50	100.0%
Mean Age of surgery (Mean±S.D.)	10.82±5.28	
Sex (Male/Female)	23M/27F	
Pre-op. angle range PD (Mean±S.D.)	51.80±9.57	
Age when Squinting was first noted(years) (Mean±S.D.)	2.50±2.41	
How Many Patching Before Surgery	26.67%	
Positive Family H/o Squinting	2.8%	
Patient using glasses before surgery	36.0%(18/50)	
Didn't where glasses before surgery	64.0%(32/50)	
Preoperatively in which fusion was present	38.0%(19/50)	
Preoperatively in which fusion was not present	62.0%(31/50)	
Fusion after surgery	42.0%(21/50)	
Post-op. success (Mean±S.D.)	84.0%(41/50)	

We obtained success (<10 prism diopters) in 42 out of 50 patients (84%). Out of 42, in 27 cases of the age group 5-10 years, success(<10 prism diopters) was there even if deviation was up to 80 prism diopters in some cases and in 15 cases of the age group 10-15 years, success was there,where deviation was up to 50 prism diopters.

DISCUSSION

The majority of studies reported no effect of sex.[2,3] In our study 23/50 (48.1%) were male and 27/50 (51.9%) were female. There was no effect of gender.

Binocular single vision was present in 38% patients preoperatively and 42% patients postoperatively. Though cosmesis has been improved in most of the patients after strabismus surgery, binocular single vision and stereopsis improved in very minimal percentage of patients as the surgery was done after the age of visual maturation in most of the cases. This accentuates the need for strabismus surgery within the years of cortical plasticity.[5]Gerth C et al(2008)[7] looked at the effects that the timing on surgery for IE has on cortical visual motion processing (by measuring visually evoked potentials) and concluded that early surgery (which is defined by the authors as at or before 11 months of age) promotes the development of cortical visual motion processing compared to surgery after this age

In our study post-operatively, 2 additional candidates developed fusion, with a total of 21/50 (42.0%) candidates in the fusion group post operatively compared to 19/50 (38.00%) in the preoperative period. In a study conducted by Gupta AK et al (2021)[8]two additional candidates developed fusion, with a total of 19/46 (41.30%) candidates in the fusion group post operatively compared to 17/46 (36.95%) in the preoperative period.

The mean age of surgery in our study was 10.82±5.28 years with most common age range for surgery being 10 years and above in 54.0% (27/50).

Angle of deviation as well as history of optical therapy and patching should be taken into account for better outcome after the surgery as these nonsurgical modality of treatment aid in reducing deviation, maintaining alignment, fusion and preserving binocularity to some extent.

Prospective cohort studies have found that surgical alignment is associated with better stereopsis (which is considered the 'gold' standard in binocularity) in patients who received treatment within the first 24 months of life (early).[9,10] Wright KW et al (1994)[11] proposed even earlier surgery, between the age of 2.5 and three months, resulting in good binocularity. However, some authors who believe that very early surgery is less advantageous do so because of the difficulties of accurate evaluation of the eye position and a high incidence of attaining spontaneous remission at an extremely early age.[2,12,13]

CONCLUSION

We conclude that along with the Preoperative Deviation, age is also an important criterion for favourable surgical outcome. Younger the age, better is the surgical outcome.

Early diagnosis and appropriate treatment before attainment of visual maturity is advocated for attaining binocular single vision and thus prevent amblyopia in cases of esotropias.

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