ABSTRACT

OBJECTIVE: To determine the post surgical stability of ocular alignment in constant exotropia.

DESIGN: Retrospective observational clinical analysis.

SETTING AND PERIOD: Department of ophthalmology, Unit-III. Liaquat University Eye hospital, Hyderabad from January 2003 to December 2008.

METHODS: This study was conducted on patients of all ages with socially noticeable exodeviation undergoing strabismus surgery. Anterior segment slit lamp examination and if possible posterior segment examination with 90 D and 78 D fundoscopes was performed. Angle of deviation was measured in prismatic diopters (PD). Surgical intervention was carried out under general anesthesia. Single surgery was performed on each registered patient. Postoperative follow-up was done at 3 days, 15 days, 3 months and 6 months.

RESULTS: Thirty five patients underwent surgical correction of exotropia. Twenty seven (77.1%) completed post-operative follow up of six months. 66.6% subjects retained orthophoria after surgery. 18.6% patients experienced residual deviation and 14.8% exhibited consecutive deviation at sixth month post-operative follow up.

CONCLUSION: The timely surgical correction of exotropia successfully restores visual alignment, binocular function and a high degree of patient's satisfaction.

KEY WORDS: Exodeviation; surgical management; orthophoria.

INTRODUCTION

Strabismus is an ophthalmic syndrome characterized by a deviation of visual axis from bi-foveal fixation. It is a common problem in ophthalmology. The global prevalence of strabismus ranges from 3% to 5%. According to one racial survey, the strabismus was detected in 2% to 4% of white population, 0.6 % in Asians and Africans. In a study from Sydney Australia the prevalence of strabismus was found in 48 patients (2.8% of total population). In one local survey among Afghan refugees in Pakistan, the squint was detected in 1.4% subjects. In another local study from Peshawar in 2004 the over all prevalence of strabismus was 2%. Exotropia is more common than esotropia in Asians and Africans. In white population exodeviation is known to be rare in comparison to esodeviation. The patients suffering divergent axis deviation for longer periods without treatment frequently develop amblyopia.

The management of exotropia follows proper assessment, treatment of amblyopia, correction of refractive errors and surgery. The first surgery on strabismus was performed by a general surgeon Johann Friederich Dieffenbach in 1839. The ocular alignment of visual axis by surgical intervention in exodeviation becomes necessary when conservative treatment does not favor. The surgical intervention can help patient towards realigning the deviated eye ball, improvement of Diplopia, restoration of three dimensional visions, and widening of visual fields.

Different authors have suggested the techniques for surgical correction of exotropia. Bilateral lateral rectus recession is recommended for the subjects having good visual acuity in both eyes. Lateral rectus recession and medial rectus resection in one eye is performed in exodeviation associated with amblyopia.

We decided to evaluate the surgical approach and success rate of exodeviation because the previous data is not available or imprecisely documented in this region.
SUBJECTS AND METHODS
This is a retrospective clinical analysis conducted on the patients of both sexes presenting for the first time at a tertiary eye care centre. The study involved all cases of constant concomitant exotropia operated within the study period. All the subjects suffering constant concomitant exotropia with deviation under 75 PD without any associated vertical deviations were included.

The patients with history of paretic or restrictive extra ocular muscle element, nystagmus, angle deviations of more than 75 PD, prior strabismus surgery and consecutive deviation, with evidence of intraocular disease and any neurological involvement were excluded from this study. Initial examination was performed in out patient department by two permanently posted senior ophthalmologists and four medical officers. After getting informed consent, the subjects were assessed for:

a- General History including age, sex, residency, occupation, use of corrective lenses, eye affected. The children within ten years were enquired for the past photographs to exclude developmental element.

b- Best-corrected visual acuity, for dominant (fixating eye) and squinting (non-fixating) eye, using Snellen’s chart and E-chart for illiterate children,

c- Slit lamp biomicroscopy, and applanation tonometry,

d- Dilated indirect ophthalmoscopy by 90D and 78D fundoscopes.

e- Ocular movements including versions and ductions in co-operative patients,

f- Measurement of deviation in prismatic diopter for both distance and near vision with and without correction as;
- The deviation was measured by prism and cover test for near (33 centee meters) and far (6 meters) distance using MSD Berens No. 14 prism bar and a fixation target in the subjects having good bilateral visual acuity. The deviation by modified Krimsky test was measured in patients with poor vision or dense amblyopia and children less than five years whom the measurement for distance was not possible.

g- The error of refraction was studied by skiascopy under cycloplegia using cyclopentolate 1% eye drops in children, and tropicamide 1% eye drops in adults. In children the element of accommodative component of more than 2.0 diopters was excluded preoperatively through skiascopy.

h- Pre-operative amblyopia (difference of horizontal recti muscles as;

The muscle was exposed by a limbal conjunctival incision with two radial relieving incisions. Muscle was then separated from its attachments by round edge curved conjunctival scissors and undermined with muscle hook. Two whip stitches were taken with 6/0 poly gelactin 910 absorbable sutures at the upper and lower edges of muscle near its insertion during recession, and away from insertion in muscle cone during muscle resection.

The muscle was cut near its insertion during recession and away from insertion during muscle resection and allowed to retract. Sutures were brought out of conjunctival incision and left loose with one edge at 12 O’clock and other at 6 O’clock position in opposite directions. The recession was measured with a caliper from the muscle

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<th>TABLE - I : GENERAL CHARACTERISTICS OF PATIENTS WITH CONSTANT EXOTROPIA: (N=35)</th>
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<th>TABLE – II: CLINICAL ANALYSIS AS PER SURGICAL PROCEDURE: N = 27</th>
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<td>Monocular MRS&amp;LRC</td>
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N = Total number of patients; Sq = Squint; MRS = Medial Rectus Resection; LRC = Lateral Rectus Recession; Pts = Patients.
insertion posteriorly and the muscle was sutured directly on sclera by piercing sclera with both the upper and lower suture needles facing each other. The needles were passed gently through half thickness sclera under resistance without penetrating deep into uveal tissue. The smooth passage of a needle through sclera without resistance is the sign of uveal penetration. As the sutures were tied the retracted muscle pulled and brought forward to become adherent with the site of attachment. In case of muscle resection the retracted muscle was sutured at its anatomical insertion. Conjunctiva was closed with interrupted absorbable sutures. The antibiotic mixed steroid eye ointment (neomycin with betamethasone) was applied and the eye bandaged for 24 hours.

6 to 8 mm recession was performed on lateral rectus and 5 to 7 mm resection was planned on medial rectus muscle. The surgical procedures thus carried out were:

Procedure No: 1 - Monocular medial rectus resection and lateral rectus recession,
Procedure No: 2 - Bi-lateral lateral rectus recessions,
Procedure No: 3 - Bi-lateral lateral rectus recessions combined with medial rectus resection in the more squinting eye.

On every post operative out patient follow up visit complete orthoptic assessment was done, including visual acuity, measurement of angle of deviation along with patients photograph. The final best-corrected visual acuity and angle of deviation was documented on sixth month post-operative follow up. All patients were requested to complete postoperative follow up criteria of this study.

RESULTS
A total of eight thousand and five hundred patients (approximately) visited out patient department within the study period. One hundred and three (1.21%) subjects presented with strabismus (esotropia and exotropia). Out of which forty seven patients (45.6%) with exodeviation full filled the study criteria. Twelve subjects refused to under go surgical intervention, while remaining thirty five were selected for surgery. The documentation of successful surgery (orthophoria) was done as an immediate post-operative esotropia of 15 PD or less, residual and consecutive squint as angle deviation more than 15 PD at sixth month post-operative follow up. The general characteristics of selected patients are shown in table- I.

Out of thirty five subjects, eleven (31.4%) had exodeviation less than 30 PD. Seventeen (48.6%) patients had exodeviation more than 30 PD and less than 50 PD. Seven (20.0%) subjects presented with exodeviation more than 50 PD and less than 75 PD (Figure-I, II). Five patients had developed amblyopia.

Nineteen (54.2%) patients were operated by monocular medial rectus resection and lateral rectus recession. Six (17.2%) subjects were operated by bilateral lateral rectus recession, and remaining ten (28.6%) by bilateral lateral rectus recession combined with medial rectus resection.

Eight subjects were lost to follow up while remaining twenty seven out of thirty five
patients who underwent strabismus surgery attended post-operative out patient visits for six months.

The surgical success of patients (Figure-III, IV) operated through different procedures and those who exhibited residual and consecutive deviation is summarized in table-II.

Four (14.8%) subjects out of twenty seven developed suture related foreign body granuloma, which resolved within few weeks during the course of treatment. Two patients who underwent three muscle surgery experienced limitation in ocular movements. All the patients who exhibited residual and consecutive deviations were advised secondary surgical intervention after six months of follow up.

DISCUSSION

In this study our aim of performing strabismus surgery was to realign deviated eye ball by various surgical techniques. We performed monocular recession and resection of horizontal recti as this method is a recommended procedure for the patients suffering monocular concomitant squint and amblyopia. This technique avoids manipulation of a dominant eye and reduces surgical time. Some times it becomes hard enough to get the eyes visually aligned by operating on one eye due to larger deviations. At this stage second surgery on dominant eye or binocular strabismus surgery involving more than two horizontal recti is the most widely used approach. This technique also avoids limitation in ocular movements. In this series we obtained compromising results of 68.3% 10, Aslanis et al in 2006 with successful results of 69.0%. and Livir-Rallatos et al in 2002 having 71.0% outcome.15 As exotropia is more prevalent in Asians and if untreated can result in to many untoward effects, we ought to pay more attention on timely surgical management and follow up.

CONCLUSION

Monocular surgery is quite instrumental for exotropia of less than 50 prism diopters. It can also be satisfactorily performed in exotropia associated with amblyopia. Operating on three muscles successfully restores primary visual alignment, low incidence of ocular movement deficits and a high degree of patient satisfaction.

REFERENCES