Comparative Study of Unilateral Recession Resection Versus Bilateral Recession in Intermittent Exotropia

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Abstract

Aim: To compare the surgical outcome of unilateral recession resection versus bilateral recession in intermittent exotropia.

Material & Method: This was a prospective randomized control study that included 40 patients of intermittent exotropia attending outpatient Department of Ophthalmology, Subharti Medical College, Meerut. Age matched randomization of patients was done in two groups of 20 each. Patients in group A underwent unilateral lateral rectus recession and medial rectus resection while those in group B underwent bilateral lateral rectus recession. Surgery was performed by a single surgeon and the amount of muscle recession or resection was decided on the basis of the degree of deviation. Patients were evaluated at 1st postoperative day, 1 week, 6 weeks and 12 weeks. The postoperative outcome was considered satisfactory if there was esophoria < 10 PD, orthotropia or exophoria < 10 PD. Data was analysed by SPSS version 21.

Results: At the end of 12 weeks, 85% of patients in group A and 80% of patients in group B were within 5 PD of orthotropia. There was no statistically significant difference in the surgical outcome between the two groups (p value = 0.505). One patient in group A had > 10 PD esophoria and one patient in group B had > 10 PD exophoria.

Conclusions: Therefore, unilateral recession resection and bilateral recession are equally effective in the treatment of intermittent exotropia.

Keywords: exotropia, recession, resection, prism dioptre

Introduction

Exotropia is a disorder of ocular alignment characterized by an outward deviation of eyes. It is a common problem encountered by eye care professionals affecting approximately 1% of all children under 11 years of age. Exotropia can be primary or secondary. Primary exotropia includes constant and intermittent exotropia. Intermittent form is the commonest type, accounting for about 50% to 90% of the exotropias. In intermittent exotropia eyes are straight with binocular vision at times and manifest with suppression on deviation at other times. Intermittent exotropia has been further classified by Duane’s into divergence excess, convergence insufficiency and basic type of exotropia. Intermittent exotropia, is usually preceded by a stage of exophoria which manifests when children are tired, sick or after prolonged near work. Untreated poorly controlled intermittent exotropia later progresses to constant exotropia.

Surgery is the preferred treatment for manifest exotropias. The main aim of strabismus surgery is to restore binocular single vision and normal ocular alignment. Other advantages include improvement in abnormal head posture, expansion of visual field, restoration of visual acuity, elimination of diplopia, improvement of ocular motility and psychomotor development.

Traditional treatment for exotropia has been two muscle procedures in intermittent exotropia i.e. unilateral lateral rectus recession and medial rectus resection or bilateral lateral rectus recession. The success rate of unilateral lateral rectus recession and medial rectus resection is 83.3% and of bilateral lateral rectus recession is 48.3%. However, there is not much data available from a semiurban set up in India. Most patients prefer a unilateral surgery and are apprehensive about undergoing a bilateral surgery. Unilateral procedures also expose the patient to less risk of endophthalmitis, perforation and retinal detachment. Hence this study is aimed at comparing the outcome of unilateral and bilateral procedures in intermittent exotropia.

Material and Methods

A prospective randomized control study was conducted in 40 patients of intermittent exotropia attending outpatient Department of Ophthalmology, Subharti Medical College, Meerut during the period of August 2013 to April 2015. Inclusion criteria included patients more than 5 years of age with exotropia between 25-45 PD. Patients with vertical squint, paralytic squint, previous history of squint surgery, associated nystagmus and other ocular diseases like corneal, lenticular or fundal pathology were excluded from the study. An informed consent was taken from all the patients and institutional ethical committee clearance was taken.

Prior to surgery, a detailed history was elicited from all the patients regarding age of onset, progression, symptoms like asthenopia, diplopia and diminution of vision, history of trauma or any previous surgery, family history, any precipitating factor, use of glasses, prisms or orthoptic exercises.

- Visual acuity testing was done using Snellen chart, E chart or broken ring chart. Cycloplegic refraction was done and full correction was prescribed in patients with...
refractive error.
- Degree of strabismus was assessed using Prism Bar cover test both for distance and near.
- Every patient underwent slit lamp examination to rule out any anterior segment pathology.
- Posterior segment was evaluated for any pathology by direct ophthalmoscopy and slit lamp biomicroscopy.

After detailed ocular examination, age matched randomization of patients was done in two groups of 20 each. Patients in Group A underwent unilateral lateral rectus recession and medial rectus resection while those in Group B underwent bilateral lateral rectus recession. Surgery was performed by a single surgeon under Local Anaesthesia in adults and under General Anaesthesia in children. The amount of muscle recession or resection was decided on the basis of prism bar cover test. Patient's were evaluated at 1st postoperative day, 1 week, 6 weeks and 12 weeks. Any postoperative complications were noted. The postoperative outcome was considered satisfactory if there was esophoria < 10 PD, orthotropia, exophoria < 10 PD. Data was analysed by SPSS version 21. The data was expressed as percentages and difference between the proportions in the two independent groups was observed by Chi Square Test.

**Results**
A total of 40 cases of intermittent exotropia were included in the study. The mean age of patients in the study was 18.7±4.5 years. (Table 1) There were 15 males and 25 females. (Table 2) The two groups were comparable for age (p value = 0.11) and sex distribution (p value = 0.74). The most common symptom in both the study groups was cosmetic disfigurement followed by asthenopia. (Table 3)

27.5% of patients (6 in Group A and 5 in Group B) had a deviation of 45PD while 10% patients (2 in each group) had a deviation of 25PD. (Table 4) In eyes with unequal bilateral lateral rectus recession, larger amount of recession was done in the non dominant eye as compared to the dominant eye. The deviation was recorded on day 1, 1st week, 6th week and 12th week. (Tables 5-7)

17 patients in Group A and 16 patients in Group B were orthotropic at the end of 12 weeks. Only 1 patient in Group A and 2 patients in Group B had < 10 PD exophoria while 1 patient in both the groups had < 10 PD esophoria at the end of 12 weeks. None of the patient in Group A and only 1 patient in Group B had > 10 PD residual exophoria. On the contrary, 1 patient in Group A and none in Group B had > 10 PD esophoria at the end of 12 weeks.

Thus, there was no significant difference between the two groups among the patients at the end of 12 weeks indicating similar outcome of unilateral lateral rectus recession and medial rectus resection and bilateral lateral rectus recession.

### Table 1: Showing age distribution in two groups

| Age in yrs | Group A | Group B |
|------------|---------|---------|
| <10 yrs    | 0       | 1       |
| 10 – 14    | 4       | 5       |
| 15 – 19    | 5       | 4       |
| 20 – 25    | 8       | 9       |
| >25        | 3       | 1       |

### Table 2: Showing sex distribution in two groups

| Sex        | Group A | Group B |
|------------|---------|---------|
| Male       | 7       | 13      |
| Female     | 13      | 12      |

### Table 3: Showing pre-operative symptoms

| Symptoms           | Group A      | Group B      |
|--------------------|--------------|--------------|
| Cosmetic Problem   | 20 (100%)    | 20 (100%)    |
| Asthenopia         | 13 (65%)     | 14 (70%)     |

Preoperative angle of exodeviation was assessed by Prism Bar Cover Test (PBCT) and the amount of muscle recession or resection was decided on that basis.

### Table 4: Showing preoperative angle of deviation by PBCT

| Angle by PBCT | Group A | R&R (mm) | Group B | BLR Recession (mm) |
|---------------|---------|----------|---------|--------------------|
| 25PD          | 2       | 4&2      | 2       | 3&3                |
| 30PD          | 5       | 4&3      | 5       | 4&3                |
| 35PD          | 3       | 5&3      | 5       | 4&4                |
| 40PD          | 4       | 6&3      | 3       | 5&4                |
| 45PD          | 6       | 6&4      | 5       | 5&5                |

### Table 5: Showing outcome of Squint surgery in Group A by PBCT

| Day            | Orthophoric | <10PD Exo | <10PD Eso | >10PD Exo | >10PD Eso |
|----------------|-------------|-----------|-----------|-----------|-----------|
| Day 1          | 13 (65%)    | 2 (10%)   | 3 (15%)   | 1 (5%)    | 1 (5%)    |
| Week 1         | 14 (70%)    | 2 (10%)   | 2 (10%)   | 1 (5%)    | 1 (5%)    |
| Week 6         | 15 (75%)    | 2 (10%)   | 1 (5%)    | 1 (5%)    | 1 (5%)    |
| Week 12        | 17 (85%)    | 1 (5%)    | 1 (5%)    | 0         | 0         |

### Table 6: Showing outcome of Squint surgery in Group B by PBCT

| Day            | Orthophoric | <10PD Exo | <10PD Eso | >10PD Exo | >10PD Eso |
|----------------|-------------|-----------|-----------|-----------|-----------|
| Day 1          | 12 (60%)    | 2 (10%)   | 3 (15%)   | 2 (10%)   | 1 (5%)    |
| Week 1         | 14 (70%)    | 2 (10%)   | 2 (10%)   | 1 (5%)    | 1 (5%)    |
| Week 6         | 15 (75%)    | 2 (10%)   | 1 (5%)    | 1 (5%)    | 1 (5%)    |
| Week 12        | 16 (80%)    | 2 (10%)   | 1 (5%)    | 1 (5%)    | 1 (5%)    |

### Table 7: Showing comparison of two groups by PBCT at 12 weeks

|                | Group A | Group B | P value |
|----------------|---------|---------|---------|
| Orthotropic    | 17 (85%)| 16 (80%)| 0.505   |
| <10PD Exo      | 1 (5%)  | 2 (10%) | 0.34    |
| <10PD Eso      | 1 (5%)  | 1 (5%)  | 0.18    |
| >10PD Exo      | 0       | 1 (5%)  | 0.48    |
| >10PD Eso      | 1 (5%)  | 0       | 0.48    |
Discussion

The aim of successful treatment is to restore single binocular vision or acceptable cosmesis when fusion cannot be expected. Several surgical approaches have been used successfully to treat exotropia. The procedure of choice for intermittent exotropia is considered to be bilateral lateral rectus recession in divergence excess type and unilateral lateral rectus recession and medial rectus resection in basic type.\(^{10}\)

In our study the mean age of the patients was 18.7 years which was similar to the study conducted by Myogo et al.\(^{11}\) The high average age at the time of surgery could be attributed to lack of awareness and fear of surgery. The earliest age at which surgical intervention should be done in intermittent exotropia has been subject of much debate. The optimum age for surgery is when the child is able to undergo orthoptic assessment or when the functional and cosmetic symptoms become evident.\(^{12,13}\)

In our study, there was a female preponderance similar to that observed in study by Cass and Gregerson.\(^{14}\) As females are more concerned about cosmetic appearance, it may be a reason for more female patients undergoing squint surgery. Family history of exotropia was reported in only 6 patients (15%) which is similar to the incidence reported by Burian and Spivey.\(^{15}\) The most important symptom with which the patients came to us was cosmetic reason (100%) followed by asthenopia (67.5%). At 12 weeks, 19 patients (95%) were relieved of symptoms.

In our study, the average pre-operative deviation in Group A was 34.25 PD and 38 PD in Group B. Thus both the groups were mutually comparable (p value = 0.217). At the end of 12 weeks, 17 patients (85%) in group A and 16 patients (80%) in group B were within 5 PD of orthotropia. There was no statistically significant difference between the two groups (p value = 0.505). One patient in Group A had >10 PD esophoria and one patient in Group B had >10 PD exophoria.

The results of our study matched with those of Fiorelli and co-workers\(^{16}\) who found no significant difference between the surgical results of lateral rectus recession and monocular recession resect procedure. Similar results were also reported by Chio and associates,\(^{17}\) Kim KE et al\(^{18}\) and Livir Rallatos G.\(^{19}\) However, Wang L et al\(^{20}\) reported that for basic type of intermittent exotropia in children, recess- resect surgery had a significantly higher success rate than bilateral lateral rectus recession. The pattern of overcorrection in recession-resect group and undercorrection in bilateral recession group was similar to that seen in our study.

On the contrary, our results did not match with Kushner\(^{21}\), Audrey et al\(^{21}\) and Jeoung JW et al\(^{22}\) who proposed that recession resection produced significantly better results than bilateral lateral rectus recession in exotropia. To conclude, we recommend unilateral recess- resect surgery as it is difficult to motivate patients to undergo surgery in the dominant eye. Moreover, it preserves some muscles if a repeat surgery is required and avoids the exposure of the dominant eye to the inherent risks of surgical procedure. Limitations of this study are a small sample size and a short follow up of 12 weeks postoperatively.
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