



TO EVALUATE MOTOR AND SENSORY RESULTS IN PATIENTS WITH SINGLE STAGE MONOCULAR RESECTION-RESECTION PROCEDURE FOR LARGE ANGLE COMITANT HORIZONTAL STRABISMUS - A PROSPECTIVE STUDY.

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ABSTRACT **Purpose:** To evaluate motor and sensory results in patients with single-stage monocular surgery for large angle (40 diopters or more), concomitant, horizontal strabismus.

Material and Methods: In the present study a prospective analysis of 35 cases of large angle strabismus (40 prism diopters or more) was done. Patients included were above 14 years of age with horizontal concomitant squint of 40 prism diopters or more. Surgery involved a two muscle (recession-resection) procedure in a single eye. Follow up was done at first post operative day, one week, one month and three months after surgery to evaluate motor and sensory status. A successful outcome of surgery was taken as deviation within 10 prism diopters of orthotropia/phoria after 3 months.

Results: 27 patients (77.14%) out of total had residual angle of deviation within 10 PD. All patients who had their preoperative angle of deviation within the range of 40-59 PD were successfully aligned with residual angle within 10 PD ($P < 0.001$). None of the patients with preoperative deviation of 70 PD and above, met the successful outcome. 13 patients (37.14%) achieved fusion at near three months postoperatively ($P < 0.001$). 8 patients (22.86%) showed stereopsis of 400 seconds of arc or better three months postoperatively ($P = 0.007$).

Conclusions: Single stage monocular surgery successfully corrected all cases of concomitant horizontal strabismus with preoperative deviation within 60PD but failed to do so for deviations of 70 PD and above. Successful surgical alignment in patients with good vision led to improvement in binocularity postoperatively.

KEYWORDS : Strabismus, concomitant strabismus, horizontal strabismus, recession, resection, fusion, stereopsis

INTRODUCTION:

Prevalence of strabismus ranges from 3-5%.^[1,2] Surgical management of a large angle strabismus has always remained as a challenge. Very frequently, reoperations are required in these cases in order to achieve a successful outcome, which at times involve the other eye also. Monocular surgery avoids exposure of dominant eye to inherent risks of surgical procedure, preserves some muscles if a repeat operation is required, decreases patient morbidity and reduces surgical time.^[3,4] The purpose of this article is to evaluate motor and sensory results in patients with single stage monocular recession-resection surgery for large angle (40 prism diopters or more), comitant, horizontal strabismus. A prospective analysis of 35 such cases was done. And patients were followed after the surgery to assess the outcome.

Ethics: Ethical clearance was taken from the institutional committee

MATERIAL AND METHODS

PATIENTS:

This study included prospective analysis of 35 cases of large angle strabismus above 14 years of age with horizontal comitant squint of 40 prism diopters or more. Patients excluded were those with vertical element of squint, paralytic, restrictive or consecutive squint, nystagmus, ocular inflammatory conditions, evidence of any systemic disease or hormonal imbalance, patients with history of previous squint surgery or botulinum injection for strabismus. In this study, the age of the patients ranged from 15-69 years. Preoperative sensory status of all the patients had shown suppression (unilateral or alternate) and no fusion. Out of 35 patients, 19 patients are males (54.29%) and 16 are females (45.71%). 18 patients (51.43%) were convergent cases and 17 patients (48.57%) were divergent cases. Out of total, 18 patients (11 divergent and 7 convergent) had preoperative best corrected visual acuity of better than or equal to 6/12 in the worst seeing eye. Preoperative angle of deviation of patients ranged from 40-90 PD. 18 patients had preoperative angle of deviation within 40-49 PD.

PROCEDURE:

Detailed history with general physical examination and ocular examination was undertaken. Visual acuity using the Snellen's chart was recorded. Angle of deviation was noted using Hirschberg corneal reflex test, Prism bar cover test, Prism bar reflex test. Sensory status was tested using Worth four dot test for distance and near, bagolini glass test, Randot booklet test, Horizontal lang two pencil test. Written consent was taken from the patient/guardian before subjecting to surgery. Surgery involved a two-muscle recession-resection procedure under local anaesthesia and amount of extraocular muscle surgery to be performed was decided depending upon the factors like type and angle of squint, duration, age of the patient, visual status etc. Follow up was done at first post operative day, one week, one month and three months after surgery. All surgeries were done by a single surgeon.

RESULTS AND STATISTICS:

Successful outcome after surgery with residual angle less than 10 PD was met in all the patients with preoperative angle of deviation less than 60 PD.^[Figure1,2,3] Out of 5 patients having preoperative angle of deviation between 60-69 PD, 3 patients (60%) met the successful outcome and 2 patients (40%) did not. None of the patients in groups with higher angle of deviation (70 PD and above) met the successful outcome.^[Figure4,5,6] Result was found to be highly significant (p value < 0.001).^[table1]

13 patients (37.14%) out of total 35 patients attained fusion at near on worth four dot test, three months postoperatively (p value < 0.001). All patients who attained fusion at near had postoperative residual angle less than 10 PD (p value = 0.013).^[table2]

Out of 13 patients (37.14%) who achieved fusion at near, 12 patients had BCVA better than or equal to 6/12 and 1 patient had BCVA less than 6/12 in the worst seeing eye (p value < 0.001).^[table3]

After 3 months, only 3 patients (8.57%) showed fusion on worth four dot test for distance. Result was found to be not significant statistically (p value > 0.05).

8 patients (22.86%) showed stereopsis on randot stereotest 3 months postoperatively (p=0.007), out of which 4 patients attained 400 arc second, 3 patients attained 200 arc second and 1 patient attained 100 arc second of stereopsis. None of the patients attained stereopsis better than 100 arc second till the end of the 3 months' follow up. All of these patients who attained stereopsis had BCVA better than or equal to 6/12 in the worst seeing eye (p=0.002).^[table-4]

DISCUSSION

In the present study, follow-up done three months after surgery shows 27 patients (77.14%) out of 35 patients have residual angle of deviation within 10 PD and 8 patients (22.86%) have residual angle of deviation of 10 PD or more. All patients who have their preoperative angle of deviation within 60 PD are successfully aligned with residual angle within 10 PD. Whereas none of the patients with higher angle of preoperative deviation (70 PD and above) met the successful outcome. Result is comparable to the other studies.^[5,6,7]

In this study, preoperative sensory status of all the patients had shown suppression (unilateral or alternate) and no fusion. Three months postoperatively, 13 patients (37.14%) have achieved fusion at near and 8 patients (22.86%) have achieved stereopsis of 400 seconds of arc or better. Improvement seen in fusion at near and stereopsis has been found to be statistically significant. Thus improvement in binocularity is noticed in patients postoperatively as in the other studies.^[8,9,10]

In the present study, all patients showing improvement in fusion at near three months postoperatively have residual angle of deviation less than 10 PD. Result has been found to be significant, p value=0.013. Hence successful surgical alignment is associated with postoperative improvement in fusion at near, as supported by other studies.^[11,12]

In this study, all patients showing improvement in stereopsis three months postoperatively have BCVA better than or equal to 6/12 in the worst seeing eye (p = 0.002). 12 out of 13 patients showing improvement in fusion at near three months postoperatively have BCVA better than or equal to 6/12 in the worst seeing eye (p < 0.001). Hence visual status of the patient is associated with improvement in binocularity following successful squint surgery, as supported by the other studies.^[8,13]

CONCLUSION:

Single stage monocular surgery successfully corrected all cases of comitant horizontal strabismus with preoperative deviation within 60PD and did not result in successful outcomes for deviations of 70 PD and above. Successful surgical alignment in patients with good vision led to improvement in binocularity postoperatively.

PURPOSE:

To evaluate motor and sensory results in patients with single-stage monocular surgery for large angle (40 diopters or more), concomitant, horizontal strabismus.

MATERIAL AND METHODS:

In the present study a prospective analysis of 35 cases of large angle strabismus (40 prism diopters or more) was done. Patients included were above 14 years of age with horizontal concomitant squint of 40 prism diopters or more. Surgery involved a two muscle (recession-resection) procedure in a single eye. Follow up was done at first post operative day, one week, one month and three months after surgery to evaluate motor and sensory status. A successful outcome of surgery was taken as deviation within 10 prism diopters of orthotropia/phoria after 3 months.

RESULTS:

27 patients (77.14%) out of total had residual angle of deviation within 10 PD. All patients who had their preoperative angle of deviation within the range of 40-59 PD were successfully aligned with residual angle within 10 PD (P<0.001). None of the patients with preoperative deviation of 70 PD and above, met the successful outcome. 13 patients (37.14%) achieved fusion at near three months postoperatively (P <0.001). 8 patients (22.86%) showed stereopsis of 400 seconds of arc or better three months postoperatively (P=0.007).

TABLE 1 COMPARISON BETWEEN PREOPERATIVE AND POSTOPERATIVE ANGLE OF DEVIATION (AFTER 3 MONTHS)

Preoperative	Postoperative			%age successful outcome within each group
	Angle of deviation (in PD)	No. of patients	Number of patients With R.A. less than 10 PD With R.A. of 10 PD and above	
40-49	18	18	0	100
50-59	6	6	0	100
60-69	5	3	2	60
70-79	2	0	2	0
80-89	3	0	3	0
90 and above	1	0	1	0

R.A. - Residual angle, PD- Prism diopter.

x2=28.194; df= 5

p < 0.001; Highly Significant

TABLE 2 FUSION ATTAINED AT NEAR IN RELATION TO THE RESIDUAL ANGLE (3 MONTHS POSTOPERATIVELY)

Residual angle	Number of patients	
	Fusion at near present	Fusion at near absent
Less than 10 PD	13	14
10 PD and above	0	8
Total	13	22
%age	37.14	62.86

x2=6.128; df= 1

p=0.013; Significant

TABLE 3 FUSION ATTAINED AT NEAR IN RELATION TO THE BEST CORRECTED VISUAL ACUITY (3 MONTHS POSTOPERATIVELY)

Best corrected visual acuity	Number of patients	
	Fusion at near present	Fusion at near absent
Better than or equal to 6/12 in the worst seeing eye	12	6
Less than 6/12 in the worst seeing eye	1	16
Total	13	22
%age	37.14	62.86

x2= 13.836; df=1

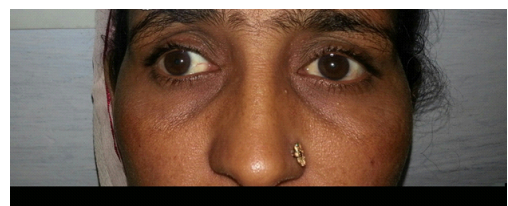
p < 0.001; Highly Significant

Table 4 Stereopsis In Relation To The Best Corrected Visual Acuity (3 Months Postoperatively)

Best corrected visual acuity	Stereopsis	
	Better than or equal to 400 seconds of arc	Nil
Better than or equal to 6/12 in the worst seeing eye	8	10
Less than 6/12 in the worst seeing eye	0	17
Total	8	27
%age	22.86	77.14

x2=9.794; df= 1

p=0.002; Significant



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