European Journal of Ophthalmology / Vol. 9 no. 4, 1999 / pp. 297-301

Bilateral medial rectus recession in convergence excess esotropia, with and without distance orthophoria

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ABSTRACT: Purpose. *To evaluate the effectivity and safety of bilateral medial rectus recession for the correction of acquired convergence excess esotropia, with and without distance orthophoria.*

Methods. *Thirty-five pediatric patients with acquired convergence excess esotropia were operated with bilateral medial rectus recessions based on the near angle measured through the distance correction. Preoperatively, in 26 patients, full hypermetropic correction did not fully correct the distance angle; these patients were operated for the residual angle for distance and near. In nine patients full hypermetropic correction produced distance orthophoria and these cases also had near orthophoria through a near add; these patients could have used bifocals, but surgery was chosen instead.*

Results. *Postoperatively, 19 of the 26 patients with distance esotropia (73%) and 6 of the 9 with distance orthophoria (66.6%) were successfully aligned. Consecutive exotropia developed in two patients (7.6%) in the distance esotropia group and one (11.1%) in the distance orthophoria group.*

Conclusions. *These results suggest that bilateral recession of the medial recti based on the near deviation is effective in eliminating the near angle in convergence excess esotropia. In patients with distance orthophoria this operation can be used as an initial treatment instead of bifocals. Although the risk of consecutive exotropia was low in this series, a larger number of patients would determine its actual rate more accurately. (Eur J Ophthalmol 1999; 9: 297-301)*

KEY WORDS: Covergence excess, Esotropia, Medial rectus recession

Accepted: September 13, 1999

INTRODUCTION

The treatment for acquired esotropia with convergence excess can be surgical, optical, or pharmaceutical. The surgical approaches include unilateral medial rectus recession (1, 2), bilateral medial rectus recession (3-8) and the placement of posterior fixation sutures on the medial recti with or without recession of these muscles (9-14).

Bilateral medial rectus recessions based on the distance deviation with full hypermetropic correction have proved inadequate to control the near deviation and it is widely accepted that more surgery is needed (3-6, 8). Nevertheless, there is no general agreement about the proposed amounts of bimedial recessions. Some propose the recessions be titrated according to the near angle without taking into account the distance measurement (5, 8), while others use formulas to augment the medial rectus recessions (4, 6).

In cases where bifocals offer distance and near orthophoria, their continuous use is widely accepted as the appropriate initial treatment (15-18), but surgery is increasingly advocated in lieu of bifocals (4,5,7,8).

 1120-6721/297-05$02.50/0

In a retrospective study we analyzed the results of bilateral medial rectus recession based on the near angle through distance correction for the treatment of acquired esotropia with convergence excess.

We also investigated the effectiveness and safety of this operation instead of bifocals in cases with distance orthophoria and in cases with a very high AC/A ratio, where calculating the millimeters of recession according to the near angle leads to excessive recessions for the distance angle. Additionally, we tried to see what percentage of patients were satisfactorily aligned postoperatively with and without glasses.

METHODS

We reviewed the records of pediatric patients with acquired esotropia with convergence excess treated with bilateral medial rectus recession based on the near angle. Thirty-five patients met the criteria for inclusion as follows: 1) acquired esotropia with an increased "clinical" AC/A ratio (near deviation exceeding the distance deviation by 10Δ or more); 2) absence of significant amblyopia (greater than two lines difference); and 3) more than six months postoperative follow-up (Tab. I).

In 26 patients full hypermetropic correction did not fully correct the distance angle and these patients were operated for the residual angle for distance and near. In nine cases full hypermetropic correction produced distance orthophoria and these patients also had near orthophoria through a near add. These patients could have tried bifocal glasses but surgery was selected as first treatment, after discussing with the parents the possible use of bifocals postoperatively in case of undercorrection, or a second operation in case of overcorrection.

In all patients the operation involved recession of both medial recti from 3.5 to 8 mm according to the near angle with full hypermetropic correction. The size of the distance angle did not affect the extent of the operation.

Preoperatively, all patients had cycloplegic refraction and were given glasses that fully corrected their hypermetropia. Preoperative deviations were determined using the prism and alternate cover test at 6 mm and 33 cm while wearing full hypermetropic correction.

Follow-up ranged from 6 to 87 months (average 26.8 months). Age at surgery ranged from 2.6 to 13 years (average 4.9 years). Refraction ranged from plano to 6.5D of hypermetropia (average +2.83D). Distance-near disparity ranged from 10Δ to 42Δ (average 22.7Δ).

RESULTS

Thirty-five young patients with convergence excess esotropia were operated with bilateral medial rectus recessions based on the near angle. With fully corrected hypermetropia nine patients were orthophoric at distance fixation, and 25 patients had a residual angle at distance.

Patients were considered successfully aligned if at the last postoperative examination they were within 10Δ from orthophoria at distance and near while wearing full hypermetropic correction. Six patients (66.6%) in the distance orthophoria group and 19 (73%) in the distance esotropia group were successfully aligned. One patient with distance orthophoria and two with distance esotropia developed consecutive exotropia. Contrary to expectations, in the three patients who developed consecutive exotropia the preoperative distance-near disparity did not exceed 20Δ.

Of the 25 patients successfully aligned while wearing full hypermetropic correction (71.4%), only four (16%) were able to discontinue glasses postoperatively.

DISCUSSION

The recent literature provides increasing evidence that bilateral medial rectus recession is a safe and effective operation for the correction of acquired convergence excess esotropia (3-8). It is widely accepted that titrating the amount of recession according to the distance angle is inadequate to control the near angle and more surgery is needed (3-6, 8). Some combine the recessions with the placement of posterior fixation sutures (9-14), while others prefer to increase the amount of recessions (3-8).

Posterior fixation sutures are effective in correcting the near angle without producing distance overcorrection, but have not been found to offer better results than augmented medial rectus recessions (12).

TABLE I - PATIENT DATA

Patient No.	Age at surgery (years)	Pre-op Rx (D)		Pre-op deviation (Δ)		Distance-near disparity	Bimedial rectus recession (mm)	Long-term deviation (Δ)		Follow-up (months)	Glasses at last exam
		RE	LE	D-cc	N-cc			D	N		
1	5.3	+6.00	+6.50	30	50	20	6	8	8	87	+
2	3.5	+2.00	+1.75	10	35	25	5	0	0	24	+
3	3.9	+4.75	+4.25	14	30	16	4.5	-20	-15	11	+
4	4.6	+3.00	+3.00	40	50	10	6	0	0	27	+
5	4.2	+3.00	+3.00	18	50	32	6	0	18	32	+
6	4.7	+2.50	+2.50	40	80	40	8	-8	0	24	+
7	5.5	+1.50	plano	30	45	15	5.5	0	0	34	–
8	3.7	+3.00	+3.00	20	40	20	5	0	0	15	+
9	5.5	+3.00	+3.50	15	35	20	5	0	20	27	+
10	4.5	+1.50	+1.50	10	45	35	5.5	0	15	27	+
11	3.6	+2.50	+2.75	45	65	20	7	0	0	24	+
12	13	plano	+1.50	40	65	25	7	12	14	23	–
13	9.3	+3.00	+2.00	10	30	20	4.5	-12	0	68	+
14	4.2	+3.00	+3.00	20	60	40	6	0	16	67	+
15	5.7	+5.50	+4.50	8	50	42	6	2	0	32	+
16	5.7	+1.50	+1.50	35	50	15	6	0	0	37	+
17	7	+5.00	+5.00	20	45	25	5.5	0	0	6	+
18	4.5	+3.00	+3.00	14	40	26	5	0	0	64	+
19	8	+2.50	+2.50	6	30	24	4.5	0	4	32	+
20	3	+1.50	+2.00	20	40	20	5	0	8	48	–
21	5	+1.00	+1.00	20	50	30	6	0	0	6	–
22	5.2	+1.50	+1.50	15	45	30	5.5	4	4	20	+
23	7	+2.00	+2.00	25	40	15	5	8	8	25	+
24	7.8	+5.00	+5.00	10	30	20	4.5	0	8	12	+
25	7.2	+3.75	+3.50	25	35	10	5	0	0	9	+
26	5	+1.00	+1.00	20	30	10	4.5	0	0	6	+
					Distance Orthophoria Group						
27	4.6	+2.00	+2.00	0	20	20	3.5	0	12	62	+
28	5.5	+4.50	+4.00	0	25	25	4	0	0	29	+
29	2.6	+2.50	+3.00	0	35	35	5	0	0	46	–
30	5.2	+2.00	+2.00	0	25	25	4	0	0	23	+
31	7	+3.50	+4.00	0	40	40	5	0	0	6	+
32	6.8	+3.75	+4.00	0	20	20	3.5	-20	-20	15	+
33	6.6	+1.00	+2.50	0	35	35	5	0	8	9	+
34	8	+2.50	+2.75	0	20	20	3.5	0	0	7	+
35	6	+3.00	+2.50	0	25	25	4	0	15	6	+

D-cc: Preoperative deviation at distance with correction
N-cc: Preoperative deviation at near with correction
D: Postoperative long-term deviation at distance
N: Postoperative long-term deviation at near

Sometimes the results of posterior fixation sutures are inferior to augmented medial rectus recessions (9, 14). Since medial rectus recession is easier, less traumatic and more readily reversible, it is gaining popularity among strabismus surgeons. However, the proposed amounts of recession are still debated.

O'Hara and Calhoun (5) and Arnoldi and Tychsen (8) propose basing the amount of recessions on the near deviation while viewing through the full hypermetropic correction, and report success rates of 58.6% and 60.8% respectively. Kushner et al (4) propose symmetrical medial rectus recessions augmented according to a formula taking account of the near deviation. Wright et al (6), for patients with esotropia associated with high hypermetropia (3.00D or more), propose an augmented formula where the amount of bilateral medial rectus recession is based on the average of the near deviation with and without correction. West and Repka (7) compared the results of recessions based on the distance angle or on the near angle. They found that recessions based on the distance deviation were effective for distance and near angle, whereas recessions based on the near deviation reduce the need for continuously wearing spectacles but with a risk of overcorrection. Kutschke et al (20) perform prism adaptation for the near angle and operate for the full amount of esotropia at prism response.

We operated 35 patients with convergence excess esotropia by bilateral medial rectus recessions based on the near deviation through full hypermetropic correction. Twenty-five (71.4%) were satisfactorily aligned. Seven (20%) were undercorrected and three (8.5%) overcorrected. These results are comparable to those of O'Hara and Calhoun (5) and Arnoldi and Tychsen (8).

It would be logical to assume a higher incidence of distance overcorrection in cases with a very high AC/A ratio, where calculating the millimeters of recession according to the near angle leads to excessive recessions for the distance angle. Our study did not substantiate this fear since in the three patients who developed consecutive exotropia the preoperative distance/near disparity did not exceed 20D.

Bilateral medial rectus recessions are sometimes advocated in lieu of bifocals (4, 5, 7, 8, 12). This is based on the observation that bilateral medial rectus recessions affect the near more than the distance angle, but in order to prove the safety of this operation its effectivity and safety must be investigated on the subgroup of patients with convergence excess and distance orthophoria, since only these patients can be considered candidates for bifocals (16-18). These patients can also be orthophoric or esophoric for near through the near add, which gives them a chance to get rid of their bifocals some time in their life (17).

In the O'Hara and Calhoun (5) series 9 of the 29 patients with esotropia at near, who were operated for their near angle, had distance orthophoria preoperatively. Six out of these nine were successfully aligned, two were undercorrected and only one developed distance overcorrection. These results show there is little risk of distance overcorrection. Our subgroup of nine patients with distance orthophoria confirms this low risk since only one patient was overcorrected.

It has been claimed that some patients operated with bilateral medial rectus recessions based on the near deviation can get rid of their hypermetropic glasses (5,7). In the West and Repka (7) series 13 of the 25 patients (52%) operated for their near angle were able to stop using hypermetropic glasses. In our series only four of the successfully aligned patients (16%) discontinued glasses postoperatively; three had hypermetropia lower than +2.00D and only one had RE +2.50D, LE +3.00D.

In conclusion, our results suggest that bilateral medial rectus recession is effective in reducing the near angle in acquired esotropia with convergence excess. In patients with distance orthophoria this operation can be used as initial treatment instead of bifocals. The risk of consecutive exotropia was low in this study, but a larger number of patients would establish its actual rate more accurately. We did not find this operation significantly reduced the need for hypermetropic glasses.

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REFERENCES

1. Zac TA. Results of large medial rectus recession. J Pediatr Ophthalmol Strabismus 1986; 23: 17-21.
2. Procianoy E, Justo DM. Results of unilateral medial rectus recession in high AC/A ratio esotropia. J Pediatr Ophthalmol Strabismus 1991; 28: 212-4
3. Rosenbaum AL, Jampolsky A, Scott AB. Bimedial recession in high AC/A esotropia. Arch Ophthalmol 1974; 91: 251-3.
4. Kushner BJ, Preslan MW, Morton GV. Treatment of partly accommodative esotropia with high accommodative convergence accommodation ratio. Arch Ophthalmol 1987; 105: 815-8.
5. O'Hara MA, Calhoun JH. Surgical correction of excess esotropia at near. J Pediatr Ophthalmol Strabismus 1990; 27: 120-3.
6. Wright KW, Bruce-Lyle L. Augmented surgery for esotropia associated with high hypermetropia. J Pediatr Ophthalmol Strabismus 1993; 30: 167-70.
7. West CE, Repka MX. A comparison of surgical techniques for the treatment of acquired esotropia with increased accommodative convergence/accommodation ratio. J Pediatr Ophthalmol Strabismus 1994; 31: 232-7.
8. Arnoldi KA, Tychsen L. Surgery for esotropia with a high accommodative convergence/accommodation ratio: Effects on accommodative vergence and binocularity. Ophthalmic Surg Lasers 1996; 27: 342-8.
9. Spielmann A, Laulan J. Actions of recessions and resections when associated with Cuppers' Fadenoperation in esotropia. Statistical results. In: Reinecke RD, ed. Strabismus. New York: Grune and Stratton, 1978; 355-69.
10. Reynolds JD, Hiles DA. The posterior fixation suture for the abnormal distance/near relationship. In: Reinecke RD, ed. Strabismus II: Proceedings of the Fourth International Strabismological Association. New York: Grune and Stratton, 1984; 593-8.
11. Roth A. Le traitement chirurgical des esotropies avec l'incomitance loinprès. Proc VIIIth Congr Eur Soc Ophthalmol. Lisbon 1988; 215-8.
12. Leitch RJ, Burke JP, Straghan IM. Convergence excess esotropia treated surgically with fadenoperation and medial rectus muscle recessions. Br J Ophthalmol 1990; 74: 278-9.
13. Damanakis AG, Ikonomopoulos N, Alatsaki M, Arvanitis P. Effect of posterior fixation sutures on the accommodative element of partially accommodative strabismus. Ophthalmologica 1994; 208: 71-6.
14. Klainguti G, Strickler J, Pressett C. Surgical treatment of partly accommodative esotropia with and without convergence excess. Klin Monatsbl Augenheilkd 1996; 208: 352-5.
15. Ludwig IH, Parks MM, Getson PR. Long-term results of bifocal therapy for accommodative esotropia. J Pediatr Ophthalmol Strabismus 1989; 26: 264-70.
16. von Noorden GK, Morris J, Edelman P. Efficacy of bifocals in the treatment of accommodative esotropia. Am J Ophthalmol 1978; 85: 830-4.
17. von Noorden GK. Binocular Vision and Ocular Motility. 5th ed. Mosby 1990; 458-60.
18. Spielmann A. Les Strabismes. 2nd ed, 1991; 216-7.
19. von Noorden GK, Avilla CW. Nonaccommodative convergence excess. Am J Ophthalmol 1986; 101: 70-3.
20. Kutschke PJ, Scott WE, Stewart SA. Prism adaptation for esotropia with a distance-near disparity. J Pediatr Ophthalmol Strabismus 1992; 29: 12-5.