Adjustable recessions in horizontal comitant strabismus: A pilot study

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Aim: To compare the surgical outcome of adjustable with the conventional recession in patients with horizontal comitant strabismus. Patients and Methods: A prospective comparative nonrandomized interventional pilot study was performed on patients with horizontal comitant strabismus. Fifty-four patients (27 in each group) were allocated into 2 groups to undergo either adjustable suture (AS) recession or non-AS (NAS) recession along with conventional resection. The patients were followed up for 6 months. A successful outcome was defined as deviation ±10 prism diopters at 6 months. The results were statistically analyzed by Chi-square test, Fisher’s exact test, and Student’s t-test. Results: A successful outcome was found in 24 (88.8%) patients in AS and 17 (62.9%) in NAS group (P = 0.02). The postoperative adjustment was done in 13 (48.1%) patients in AS group. There was one complication (tenon’s cyst) in AS group. Conclusion: AS recession may be considered in all cooperative patients undergoing strabismus surgery for comitant deviations.

Key words: Adjustable recession, comitant deviation, strabismus

Adjustable suture (AS) is an attempt to overcome the unpredictability and reduce the need for reoperation, which were first described in 1885 and later made popular by Jampolsky in 1975 and others with several modifications.[1]

There are studies that describe the use and advantages of ASs in patients with fusion potential and those who have unpredictable outcomes such as paralytic strabismus, restrictive strabismus, thyroid ophthalmopathy, etc.[2] However, there are few studies discussing its role in comitant deviations.[3,4]

The purpose of this study was to compare the two suture techniques in terms of successful outcome and complications in the treatment of horizontal comitant strabismus.

Patients and Methods

Patients with horizontal comitant strabismus requiring surgery between April 2010 and March 2012 were allocated alternately into two groups to undergo either AS recession using shoelace knot or non-AS (NAS) recession [Fig. 1]. Conventional resection was performed in both the groups. The surgeries were performed by the standard limbal incision.

The patients with age <8 years (likely to be uncooperative for postoperative adjustment procedure), history of previous surgery, nystagmus, and eccentric fixation were excluded.

In the AS group, where indicated the adjustment was done 48 h after the surgery, under topical anesthesia (proparacaine)

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be approximately 70 in each arm as per the nomogram for comparing proportions. For having this sample size, the study duration would be unduly prolonged as we planned to study the surgical effect in a not so common group of patients (unlike cataract). We, therefore, decided to plan this as a prospective interventional pilot study over a 3 years period.

## Results

The result is summarized in Figure 2 and Tables 2-4. A patient of tenon’s cyst which recurred 2 times was reported in AS group.

## Discussion

Our data suggest higher success rate ($P = 0.02$, with 95% confidence interval) in the AS group at the end of 6 months without any significant risks.

We compared the deviation at 6 months as the postoperative drift would have occurred by that time. The success rate improved from 62.9% to 88.8% when AS was used. Various studies are favoring AS surgery show success rates between 60% and 85%. Adjustment was done in 13 (48.12%) patients, other published data shows the rate of adjustment between 39% and 64%.

A major advantage of AS is supra-maximal recessions for large angle squints, which is not possible where one does not have the option of reversing the effect of recessions. This enables managing large angle deviations with single stage surgery. This also gives rise to the observation that large recessions are not associated with complications such as motility limitations, enophthalmos, and palpebral fissure narrowing as reported in the literature. Berland et al. reported maximum recession of 8–9 mm lateral rectus, whereas we performed up to 12 mm lateral rectus and 9 mm medial rectus recessions without any permanent ocular motility restriction.

We also performed the procedure in a small angle deviation of 16 PD in which adjustment of suture was successfully done for over-correction. This indication has not been reported earlier.

At 6 months resurgery for residual or consecutive deviations was advised in 10 (37.0%) patients in NAS group and in 3 (11.1%) in AS group ($P = 0.02$). In addition, one patient in AS group underwent removal tenon’s cyst. The mean deviation at 6 months was lesser in AS group ($P = 0.04$). This observation supports the primary outcome. It also demonstrates that the group of patients who did not achieve a satisfactory outcome in the AS group did not have serious complications such as muscle or suture slippage, which would cause very large deviations disturbing the significance in the means.

Looking at the study retrospectively, the difference in means is significant with the sample size (although the power of the study is less than the desired 80%). Furthermore, the clinical relevance of the results motivated us to publish the results early, as a pilot study. We expect subsequent reports with larger samples to reduce the dispersion and overlaps; and make the results more plausible statistically.

The main limitations of the study include a small sample size and some heterogeneity introduced as we were dealing...
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with both esotropia and exotropia, nevertheless, the results are encouraging enough to advocate a larger usage of ASs in concomitant deviations.

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Conflicts of interest
There are no conflicts of interest.

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Table 2: Descriptive data for the groups

| Variables                              | AS group (n=27) | NAS group (n=27) | P    |
|----------------------------------------|----------------|-----------------|------|
| Gender                                 |                |                 |      |
| Male:female                            | 16:11          | 17:10           | 0.78 |
| Mean age at the time of surgery in years | 18.5±6.5       | 19.1±5.9        | 0.74 |
| Patients with ET (n) (%)               | 8 (29.6)       | 9 (33.3)        | 0.65 |
| Mean angle for ET (PD)                 | 42.37±16.06 PD | 47.22±12.52 PD  | 0.49 |
| Patients with XT (n) (%)               | 19 (70.3)      | 18 (66.6)       | 0.74 |
| Mean angle for XT (PD)                 | 48.15±12.27 PD | 50.83±11.91 PD  | 0.50 |
| Mean preoperative deviation (PD)       | 46.4±13.4 PD   | 49.6±12.0 PD    | 0.36 |
| Patients undergoing resection (n) (%)  | 23 (85.1)      | 25 (92.5)       | 0.66 |
| Mean postoperative deviation at 6 months (PD) | 10.2±7.5 PD | 15.8±7.0 PD | 0.04 |

Table 3: Postoperative data comparing both the groups

| Variables                              | Number of patients (%) | Significance |
|----------------------------------------|------------------------|--------------|
| Adjusted                               | AS group (n=27)        | NAS group (n=27) | P    |
| Deviation±10 PD                        |                        |              |      |
| Day 2 (preadjustment)                  | 14 (50.0)              | 16 (59.3)    | 0.78 |
| Day 2 (postadjustment)                 | 24 (85.7)              | 16 (59.3)    | 0.01 |
| Successful outcome (6 months) ET (success/n) | 7/8 (87.5)          | 6/9 (66.6)   |      |
| XT (success/n)                         | 17/19 (94.7)           | 11/18 (61.1)|      |
| Total                                  | 24 (88.9)              | 17 (62.9)    | 0.02 |
| Motility restriction                   |                        |              |      |
| Day 2 (preadjustment)                  | 2 (6.7)                | 0            |      |
| Day 2 (postadjustment)                 | 0                      | 0            |      |
| 6 months                               | 0                      | 0            |      |
| Complications                          | 1 (3.3)                | 0            |      |

Table 4: Details of adjustments in the AS group

| Variables                              | Number of patients (%) |
|----------------------------------------|------------------------|
| Total patients in AS group             | 27 (100)               |
| Adjusted                               | 13 (48.1)              |
| Pulled up (recession reduced)          | 11                     |
| For overcorrection only                | 9                      |
| For overcorrection + motility restriction | 2                     |
| For motility restriction only          | 0                      |
| Loosened (further recessed)            | 2                      |
| For residual deviation                 | 2                      |
| Mean deviation preadjustment           | 19.16 PD (P=0.001)     |
| Postadjustment                         | 4.83 PD                |

PD: Prism diopters, AS: Adjustable suture, NAS: Nonadjustable suture, ET: Esotropia, XT: Exotropia