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Original Research Article

Long-term results of anterior transposition of the inferior oblique muscle in superior oblique palsy

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Abstract: To evaluate the long-term surgical outcomes of anterior transposition of the inferior oblique muscle (ATIO) in the treatment of vertical deviations resulting from superior oblique palsy (SOP). We retrospectively studied seven consecutive patients who had undergone ATIO for the treatment of SOP. A follow-up of at least five years after the operation was required to be included in the study. In results the preoperative vertical deviation was 18.4 ± 3.2 degrees in the primary position and 17.0 ± 3.2 degrees in the field of maximum action movement of the inferior oblique muscle. The final postoperative vertical deviation improved to 0.9 ± 3.8 degrees and -2.5 ± 4.8 degrees, respectively. In addition, the improvement in the vertical deviation was stable during the follow-up period. In conclusion our study results suggested that the surgical outcomes of ATIO for the treatment of SOP had been maintained during the long-term follow up period.
Keywords: superior oblique palsy, anterior transposition of the inferior oblique muscle

INTRODUCTION

Superior oblique palsy (SOP) is the most common cause of isolated vertical muscle palsies. Inferior oblique muscle weakening, superior oblique muscle strengthening, contralateral inferior rectus muscle recession and ipsilateral superior rectus muscle recession have been proposed for the treatment of SOP. Inferior oblique muscle weakening procedures include myectomy, recession, denervation and extirpation, disinsertion, and anterior transposition of the inferior oblique muscle (ATIO) [1-3]. Several reports have described the surgical outcomes of ATIO [3-8]. However, there are few reports regarding long-term surgical results of ATIO. Herein, we report long-term results of ATIO in SOP.

MATERIALS AND METHODS

We retrospectively studied seven consecutive patients who had undergone ATIO for the treatment of SOP. The mean operative age of the patients was 6.1± 2.3 years (range: 4-11 years). The inferior oblique muscle was placed to lateral border of the inferior rectus muscle insertion (Figure 1 arrow). The major amblyoscope was used to measure vertical deviations. Postoperative examinations were performed routinely between one day and one week, and then at one month and six month intervals. A follow-up of at least five years after the operation was required to be included in the study group. The mean postoperative follow-up period was 9.4± 3.1 years (range: 5-12 years).

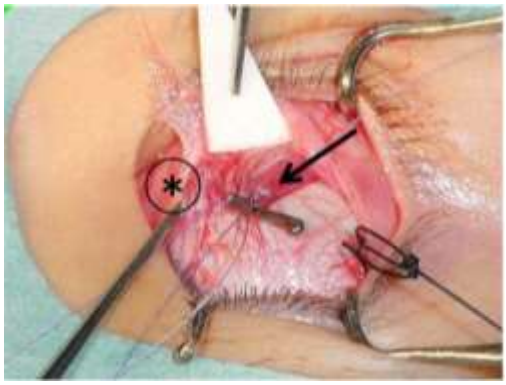

Fig. 1: The site of inferior oblique muscle in ATIO

The inferior oblique muscle (arrow) was placed to lateral border of the inferior rectus muscle insertion (asterisk).

RESULTS

Vertical deviations in primary position preoperatively and during postoperative follow-up are shown in Figure 2 using box plot. Similarly, vertical deviations in the fields of maximum action movement of the inferior oblique muscle (upgaze) and the superior oblique muscle (downgaze) are shown in Figure 3 and Figure 4, respectively.

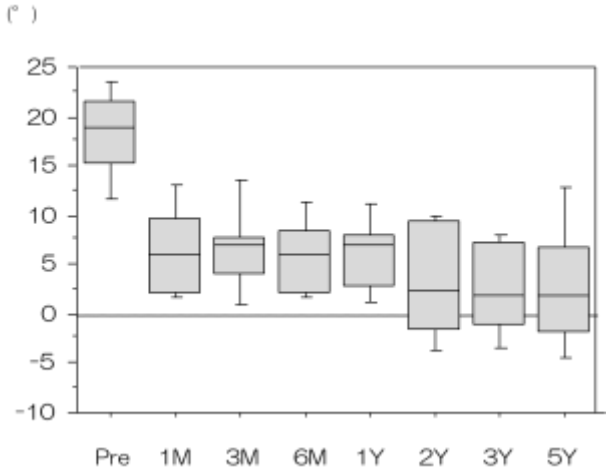

Fig. 2: Preoperative and postoperative vertical deviations in the primary position (box plot)

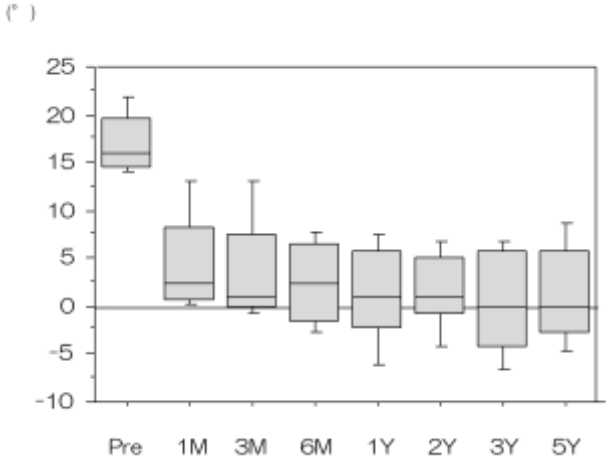

Fig. 3: Preoperative and postoperative vertical deviations in the upgaze (box plot)

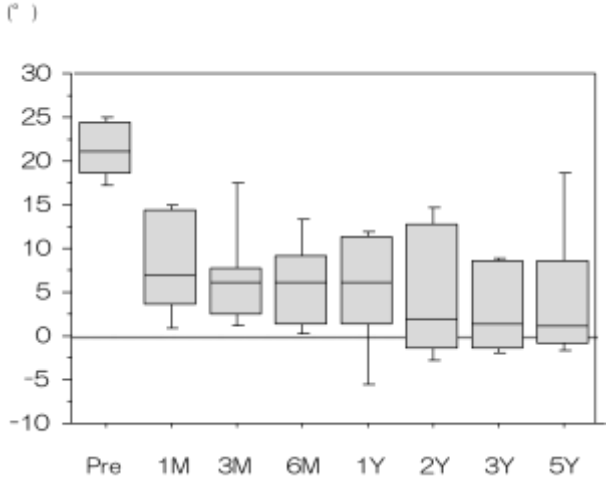

Fig. 4: Preoperative and postoperative vertical deviations in the downgaze (box plot)

In addition, the preoperative and final postoperative vertical deviations are shown in Table 1. Surgical effects at two and five years postoperatively are also shown in Table 2.

Table 1: Preoperative and final vertical deviations

	primary position mean±SD (range)	upgaze mean±SD (range)	downgaze mean±SD (range)
preoperative deviations	18.4± 3.2° (11～24°)	17.0± 3.2° (14～22°)	21.3± 4.5° (17～25°)
final deviations	0.9± 3.8° (-5～6°)	-2.5± 4.8° (-5～9°)	2.3± 3.5° (-3～7°)

Table 2: Surgical effects of ATIO

	primary position mean±SD (range)	upgaze mean±SD (range)	downgaze mean±SD (range)
surgical effect 2 years	14.9± 3.4° (11～21°)	15.6± 3.6° (9～19°)	16.0± 6.0° (8～25°)
surgical effect 5 years	15.7± 5.9° (5～22°)	15.8± 4.4° (7～19°)	16.1± 7.7° (0～25°)

DISCUSSION

In the treatment of SOP, when there is secondary over action of the inferior oblique muscle, myectomy, recession, disinsertion or ATIO have been recommended to weaken the inferior oblique muscle [1-3]. Several reports have described the surgical outcomes of ATIO [3-8]. Chang *et al.;* [4] retrospectively reviewed the records of 33 patients who underwent ATIO for the treatment of unilateral long-standing SOP. According to their report, the mean reduction of vertical deviation in the primary position was 10 prism diopters (PD). In their report, the mean follow-up was 19 months (range: 1–81 months). Farvardin *et al.;* [5] reported that mean reduction of vertical deviation was 15 PD in the primary position. However, vertical deviation was evaluated before and 6 months after surgery. Yanyali *et al.;* [6] reported the mean reduction of vertical deviation in ATIO was 18.5± 3.9 PD. In their report, the mean follow-up was 18.8± 10.2 months (range: 6–40 months). In addition, they described that ATIO was significantly more effective than disinsertion of the inferior oblique muscle in the reduction of vertical deviations in the primary position. In our present study, the mean postoperative follow-up period was 9.4± 3.1 years. The improvement in the vertical deviation was stable during the follow-up period.

CONCLUSION

We emphasized that ATIO for the treatment of SOP had been maintained good surgical result. Further investigation in a larger cohort of patients is needed to confirm our results.

Disclosure: The authors declare no conflicts of interest.

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