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Original Research Article

AUGMENTED LOOP MYOPEXY - A SURGICAL REVIEW IN STRABISMUS MYOPIC FIXUS

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Abstract

As we know that loop myopexy is the preferable surgery for myopic strabismus fixus .We presents our surgical experience in seven eyes of five cases with the relevant clinical findings, surgical procedure and outcome of the augmented Loop myopexy, which was employed to correct the Myopic Stabismus fixus (MSF). The diagnosis of MSF was made by magnetic resonanc tomography (MRI). We found that, this surgery with or without medial rectus (MR) recession, gave us desirable ocular alignment and good cosmetic effect. The median of best corrected visual acuity (BCVA) was 1.39(range 0.18-2.1) and of axial length was 30.23(range 29.22-33.59). The median for esotropia at presentation was 85PD (range 60-90PD), improved to 10PD (range 10-16PD), p= 0.0178. The median hypotropia at presentation was 15PD (range 11-20.5), which improved to 0PD (range 0-4PD), P=0.0679.

Keywords: loop myoplexy, myopic strabismus fixus, medial rectus recession, convergent strabismus fixus, MR recession, LR plicatiion.

INTRODUCTION

Acquired progressive esotropia, hypotropia and with high axial myopia (more than 25 D) with restricted ocular movement in abduction and elevation, is known as "myopic strabismus fixus or convergent strabismus fixus". It was first described by Bagshaw in 1966 [1]. Various theories have been proposed to explain the pathogenesis, like myopic myopathy, displacement of the muscle paths, etc. Reduced number of muscular fibers was reported in the lateral rectus (LR) of MFS by Hugonnier and Magnard in 1969 [8]. Duke-Elder and Wybar (1973) suggested structural changes in the oculomotor muscles as well as a shortening of the optic nerve. Yokoyama and associates found an abnormality in the muscle paths of superior rectus (SR) and lateral rectus (LR) with supertemporal outward dislocation of eye from the muscle cone and abnormalities of orbital connective tissue pulley system, which leads to nasalisation of SR and downward displacement of LR [1,3]. Orbital wall produces mechanical restriction of ocular movement and causes myopathic paralysis of lateral rectus (LR). In a study, using MRI by Demer and Von Noorden (1989), found that rotation was limited due to contact between elongated the posterior aspects of the globe and the bones of the orbital apex [2]. Stretching, thining and dehiscence of the intermuscular septum

between the SR and LR are the other findings in MRI.

Various surgical approaches have been attempted, like MR Sternotomy, recession-resection, in which esotropia often recurs [4]. Loop myopexy surgery was proposed by Yokoyama et al in 2000, which gives the good alignment. Various modifications have been suggested, like Yamada's, partial Jensen's procedure and silicone loop myopexy [5]. Here we are evaluating the outcome of augmented loop myopexy by scleral fixation of suture, LR plication with or without MR recession. Most patients had satisfactory results with good ocular alignment.

Design

This study is a retrospective case series of the seven eyes of five patients undergoing augmented loop myopexy surgery for strabismus fixus.

Patient and Method

Five patients who were diagnosed as MFS based on ocular examination including refraction, prism cover test (PCT) and axial length (AL) measurement with A-scan biometry and orbital imaging. There were 4 men and one woman with a mean age of 42.4 years. Three patients had unilateral and two had bilateral myopic strabismus fixus. Patients had previous history of strabismus surgery were not included in this study. The minimum postoperative follow up was of 6 months.

Operation Method

The procedure was performed under general anesthesia. An intraoperative FDT was performed to assess the tightness of the each rectus muscles, according to the contracture of MR, large recession of the MR muscle was done and plication was performed for lax rectus muscle. In case of plication desired amount of plication is measured from the muscle insertion and plicate with 6-0 polyglactin sutures. Through the fornix based superotemporal approach 8 mm from limbus, looping of SR and LR muscles done and their bellies were sutured together 14 mm behind the limbus, with or without scleral fixation using a 5–0 non absorbable green braided polyester suture. The conjunctiva was closed with 8–0 non-absorbable monofilament nylon suture.

Main outcome measures

Patients were evaluated at least on postoperative day 1, months 1, 3 and 6. Postoperative assessment included visual acuity, the prism cover test (PCT)**.**

Results

As mentioned initially, seven eyes in five patients included in this case series, augmented loop myopexy was done. The mean age at surgery was 42.4years (range 26-58years). Two patients underwent bilateral augmented loop myopexy whereas three patients underwent unilateral augmented loop myopexy. Additional procedures which augment the loop myopexy were MR recession, LR plication and fixation of belly sutures to sclera. The range of MR recession performed was 4–6 mm. The range of LR plication performed was 4- 6mm. In one patient, a bilateral loop myopexy with MR recession and LR plication was performed.

The gap between two surgeries was 6 months. Total eyes underwent loop myopexy; MR recession and LR plication were three. Two eyes underwent loop myopexy and MR recession and two eyes underwent loop myopexy with scleral fixation. In two patients a 44 year old man (fifth of the series) and 58 year old man (fourth of the series) had the history of ocular surgery for bilateral retinal detachment. In all, seven eyes, nasalisation of SR and inferior displacement of LR were confermed by MRI orbit. The mean best corrected visual acuity for RE was 0.74 (SD=0.65) and for LE was 1.22(SD=0.91) at presentation. Mean AL for RE was 30.71mm (SD=1.67) and for LE was 30.09(SD=0.40). Mean esotropia at presentation was76.4PD (SD=15.5), which improved to 11.5PD (SD=6.37), Mean hypotropia at presentation

was 15.7PD (SD=7.04), which improved to 2PD (SD=3.05). Mean abduction limitation at presentation was -3.57(range−5 to −2) and mean elevation limitation at presentation was -2.6 (range−4 to 1) which improved cosmetically at the last follow-up.

Discussion

There are various approaches to correct MSF with varying degree of success, either by normalizing the vector force of SR and LR or by make the globe freely in the muscle cone, which can be done by loop myopexy. Yokoyama et al recommended muscle belly union of SR and LR by means of loop myopexy as the treatment for MSF [6]. The advancement of loop myopexy like silicone loop myopexy and augmentation of this process has been possible due to better understanding of the pathogenesis of the extraocular muscle [7]. First times Herzau and Loannakis observed intraoperatively an abnormal path of the LR in MSF. The shifts in position of LR and SR have been further studied by various authors using MRI. In our study diagnosis had been confirmed by MRI. SO, our goal of surgical correction was to re-establish the physiological muscle plane by binding the LR and SR muscles bellies to each other.

The effectiveness of this surgery can be increased by muscle belly union of half tendon of the SR and LR muscles, with or without anchoring to sclera, LR plication and Foster's posterior fixation suture, LR resection. In our study MR recession, LR plication and scleral fixation were the mode of augmentation, which showed improved ocular alignment and motility in our cases. A nonabsorbable suture looped around LR and SR was secured to the sclera to stabilize the muscle path and to avoid risk of suture migration [10].

This technique minimizes the risk of anterior segment ischemia. However, the risk of scleral perforation may be the complication of this procedure due to thin sclera in high myopia [3]. There were two cases underwent sclera fixation with loop myopexy and two cases underwent sclera fixation with MR recession for augmentation of loop myopexy. Intraoperatively we performed MR recession (5 eyes), in case of positive FDT for MR. We performed plication of LR in case of lax LR during FDT. Degree of recession of MR and plication of LR was based on the contracture and laxity of muscle respectively.

Three eyes went under both MR recession and LR placation. All procedures augment the loop myopexy surgery for better effect. Two patients, first of case series (31 year old man) and fourth of case series underwent small incision cataract surgery with intraocular lens implantation after augmented loop myopexy surgery for MFS. Visual outcome of first patient was good but for other patient (fourth of case series) was not good due to macular pathology .During the postoperative 6 months follow up, all patients were cosmetically good at the time of last visit. There was the remarkable improvement in esotropia, hypotropia and ocular movement (Table: 1).

In our cases we did not find any anterior segment ischemia, muscle slip and sclera perforation. This study has also some limitation, like small number of sample size, stastical analysis was done of limited value and it is a retrospective study.

In conclusion, our study does suggest that, diagnosis of patients of high myopia, progressive esotropia and hypotropia should be confirmed by MRI preoperatively. Augmented loop myopexy with scleral fixation and LR plication with our without MR recession were sufficient to correct the ocular alignment. Hence, we can consider this surgical method for myopic strabismus fixus.

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