



Partial Modification of the Yamada Technique in Myopic Strabismus Fixus Treatment: Case Presentation

Abuzer Gunduz, Derya Kutukde, Selim Doganay

Department of Ophthalmology, Inonu University School of Medicine, Malatya, Turkey

Abstract

A 41-year-old female presented with a history of gradually increasing esotropia (ET) for 23 years. The best corrected visual acuity was 20/63 in both eyes. Refraction values were -18.50 (-1.00*55) in the right eye and -13.25 (-3.00*105) in the left eye. The axial length was measured as 29.35 mm for the right eye and 28.36 mm for the left eye. The patient's ocular motility was very restricted in the left eye with values of (-4) for abduction from the midline, (-3) for elevation and (-4) for elevation in adduction. The patient's left eye had 80 prism diopters (PD) ET and 16 PD hypotropia with the prism cover test. During surgery, an 8 mm recession was first performed to the left eye medial rectus (MR). The SR and LR muscles were then divided into two for 15 mm from their insertions. The temporal half of the SR muscle and the superior half of the LR muscle were sutured together with 6/0 spatulated suture 7 mm away from the limbus at the exact midpoint of the two muscles, at the 1:30 o'clock position (Yamada procedure). A posterior fixation suture was placed on the sclera 7 mm behind the combined end of the two muscles (14 mm from the limbus) with 5/0 Ethibond suture (our modification of the Yamada procedure). Post-operative 1st day, 1st month and 6th month follow-ups were performed. On the 6th month follow-up, there was a marked decrease in the restriction of the patient's left eye movements compared to the pre-operative period and there was 20 PD ET and 8 PD hypotropia in the primary position. Left eye movements were (+4) on abduction, (-2) on elevation and (-2) on elevation at adduction. We determined that we had achieved partial success in such cases with our partial modification of the Yamada procedure.

Keywords: Esotropia, myopia, strabismus fixus

(Rec.Date: Dec 31, 2014

Accept Date: Jan 13, 2015)

Corresponding Author: Abuzer Gunduz, Department of Ophthalmology, Inonu University School of Medicine, Malatya, Turkey
E-mail: abuzergunduz@hotmail.com

Introduction

Degenerative myopia is almost always characterized by a progressive increase in the axial length of eye together with degenerative changes of the retina. The globe is elongated in an egg-shaped manner. Due to the size of the eyeball, the sclera becomes thinner, especially in the posterior pole. Atrophy is present in the choriocapillaris. Atrophy also develops in the outer layers of the retina. The retinal pigment epithelium degeneration leads to hyperpigmentation, pigment clumping and pigment epithelial atrophy. The papilla is wide and thin [1]. Another complication that can occur in cases with degenerative myopia is strabismus. Myopic strabismus fixus (MSF) is a progressive esotropia developing in patients with high myopia.

Although MSF etiology is not completely known, the high myopia has been reported to cause anteroposterior diameter elongation and consequently lead to herniation from the temporal superior and retroequatorial regions [2]. Clinically, wide-angle esotropia, hypotropia and ocular motility restriction occurs.

Wide-angle recession of the medial rectus, recession and resection procedures [3,4], the modified Jensen procedure [5], and the Yamada procedure [6] have been used for the surgical treatment of MSF. We made a new modification to the Yamada technique in this case. We evaluated the surgical results of this modification in this case presentation.

Case

A 41-year-old female presented with a history of gradually increasing esotropia (ET) for 23 years. The best corrected visual acuity was 20/63 in both eyes. Refraction values were -18.50 (-1.00*55) in the right eye and -13.25 (-3.00*105) in the left eye. The axial length was measured as 29.35 mm for the right eye and 28.36 mm for the left eye. The patient's ocular motility was very restricted in the left eye with values of (-4) for abduction from the midline, (-3) for elevation and (-4) for elevation in adduction. The patient's left eye had 80 prism diopters (PD) ET and 16 PD hypotropia with the prism cover test (Figure 1).



Figure 1. Appearance of the case preoperatively in the nine cardinal eye movement directions

SR (superior rectus) and LR (inferior rectus) muscles were markedly displaced in the inferonasal and inferotemporal direction respectively in the left eye in the preoperative radiological image (Figure 2). The patient was accordingly diagnosed with Myopic Strabismus Fixus.



Figure 2. Appearance of extraocular muscles on the coronal computed tomography section, LR; Lateral Rectus, SR; Superior Rectus, MR; Medial Rectus, IR; Inferior Rectus

Surgical procedure; Prior to surgery, the patient was informed consent. 8 mm recession was first performed to the left eye medial rectus (MR) of the patient. After MR recession, SR and LR muscles were divided into two 15 mm from their insertions. The temporal half of SR muscle and the superior half of LR muscle were taken and were sutured with 6/0 spatulated suture 7 mm away from the limbus in the exact middle point of the two muscles, at the 1:30 o'clock position (Yamada procedure) (Figure 3, step 1) [6]. We have modified to the Yamada procedure as a posterior fixation suture was placed on sclera on 7 mm behind the combined end of the two muscles (14 mm from the limbus) with 5/0 Ethibond suture (Figure 3, step 2).

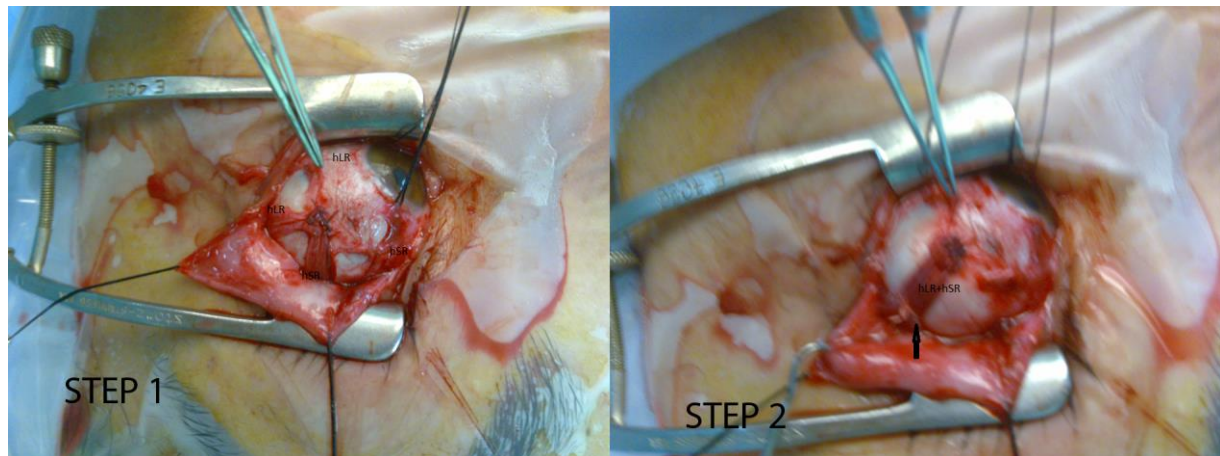


Figure 3. Figure 3; Surgical technique used during surgery, hLR; half tendon Lateral Rectus, hSR; half tendon Superior Rectus, Black Arrow; Posterior Fixation Suture

Post-operative 1st day, 1st month and 6th month follow ups were performed. On the 6th month follow-up, there was a marked decrease in the restriction of the patient's left eye movements compared to the pre-operative period and there was 20 PD ET and 8 PD hypotropia with the prism cover test in the primary position. Left eye movements were (+4) on abduction, (-2) on elevation and (-2) on elevation at adduction (Figure 4).



Figure 4. Appearance of the case on the postoperative 6th month in the nine cardinal eye movement directions

Discussion

Many surgical procedures have been defined in order to stabilize eyes with squint due to high myopia [4-8]. Two types of surgical procedures are preferred in general. These are recession-resection [4] and transposition [7] techniques.

Krzizok et al. [8] used magnetic resonance imaging as an examination method in patients with high myopia. Inferior displacement of the LR muscle was detected in all 9 cases. Recession-resection surgery was performed in all cases. In addition, the Faden procedure where the LR muscle was raised to its physiological meridian and fixated with a posterior fixation suture was used. There were varying degrees of remaining squint from 20 degrees to minor deviation (in the vertical or horizontal plane).

Hayashi et al. [7] reported the MR recession and LR resection procedure to be effective in the early period. They reported the necessity of SR and IR transposition (modified Jensen procedure) and combined MR recession in patients with very restricted abduction.

Larsen et al. [5] in their single case observed great improvement in abduction but no improvement in elevation in their patients who had undergone the Jansen procedure to the SR and LR muscles

Yamada et al. [6] performed MR muscle recession combined with SR and LR hemitransposition in ET cases they diagnosed with myopic strabismus fixus. 10 PD ET was observed in the eye in the postoperative period in one case they performed this procedure and they found the muscle image to be improved in radiological imaging. We aimed to increase the leverage of the transposed muscles by pulling them to the equatorial region of the eye with a minimal modification in our case. Although we obtained better results in the post-operative period in this way, we found the effect to be eventually reduced. On the 6th month follow-up, there was 100% improvement in abduction and 50% in elevation compared to the preoperative period together with 20 PD ET. Our patient had bilateral degenerative myopia and was also followed up to observe any changes in the other eye.

In conclusion, we obtained partial success in these cases with our partial modification of the Yamada procedure. We believe that this surgical protocol should be evaluated in a large case series to obtain more accurate results.

References

1. Rada JA, Shelton S, Norton TT. The sclera and myopia. *Exp Eye Res.* 2006;82(2):185-200.
2. Godeiro KD, Kirsch D, Tabuse MK, Cronemberger M. Yamada's surgery for treatment of myopic strabismus fixus. *Int Ophthalmol.* 2009;29(4):305-8.
3. Sturm V, Menke MN, Chaloupka K, Landau K. Surgical treatment of myopic strabismus fixus: a graded approach. *Graefes Arch Clin Exp Ophthalmol.* 2008;246(9):1323-9.
4. Bagheri A, Adhami F, Repka MX. Bilateral recession-resection surgery for convergent strabismus fixus associated with high myopia. *Strabismus.* 2001;9(4):225-30.
5. Larsen PC, Gole GA. Partial Jensen's procedure for the treatment of myopic strabismus fixus. *JAAPOS.* 2004;8(4):393-5.
6. Yamada M, Taniguchi S, Muroi T, Satofuka S, Nishina S. Rectus eye muscle paths after surgical correction of convergent strabismus fixus. *Am J Ophthalmol.* 2002;134(4):630-2.
7. Hayashi T, Iwashige H, Maruo T. Clinical features and surgery for acquired progressive esotropia associated with severe myopia. *Acta Ophthalmol Scand.* 1999;77(1):66-71.
8. Krzizok TH, Kaufmann H, Traupe H. New approach in strabismus surgery in high myopia. *Br J Ophthalmol.* 1997;81(8):625-30.