

Modified Harada-Ito Procedure in Acquired Superior Oblique Palsy with Exotropia

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Abstract

Superior oblique palsy is the most common isolated cranial nerve palsy and is commonly associated with exotropia. Modified Harada-Ito procedure can be used to correct excyclotorsion in symptomatic patients. We report a case of acquired superior oblique palsy with exotropia undergoing modified Harada-Ito procedure. A 33 years old man presented with torsional diplopia. On examination there was 10 degrees of left excyclotorsion on double Maddox rod with 25-diopter of exotropia on primary gaze and 20-diopter on lateral gaze suggestive of lateral incomitancy. He underwent a Fells modification of Harada-Ito procedure with bilateral rectus recession. Three months postoperative, he was orthophoric. Modified Harada-Ito procedure is a successful procedure in overcoming torsional diplopia. It is important to identify lateral incomitancy to prevent overcorrection of the horizontal deviation.

Keywords

Modified Harada-Ito, Superior Oblique Palsy, Exotropia, Strabismus

1. Introduction

Symptomatic diplopia can be very debilitating to the patient. It can interfere with obtaining stable fusion [1]. Harada-Ito procedure was introduced in 1964, to correct excyclotorsion [2]. The original method of correction was to anteriorize the anterior half of the superior oblique tendon without disinsertion [2]. Fells modified this technique in 1974, whereby the anterior half of the tendon was disinserted and moved forward and laterally [3]. Harada-Ito procedure is on the basis that the anterior fibers of the superior oblique contribute to the torsional action while the posterior fibers contribute to the vertical action [4]. The incidence of superior oblique palsy with a horizontal deviation ranges from 36% to 55.6% [2]. We report a case of acquired superior oblique palsy with

exotropia.

2. Case Report

A 33 years old man, presented with torsional diplopia worse on primary and downgaze following a motor vehicle accident. On examination, his visual acuity was 6/6 both eyes. There was presence of left hypertropia and left alternating exotropia at 30 diopters at near, 25 diopters at far and 20 diopters on lateral gaze (**Figure 1**). Bielschowsky 3-step test was positive. Double Maddox rod showed a 10-degree of left excyclotorsion in primary and downgaze. He underwent a right Fells modification of Harada-Ito procedure with bilateral lateral rectus recession.

A conjunctival peritomy was done at the superior temporal area and the superior rectus muscle was identified and retracted to identify the superior oblique muscle tendon. A longitudinal tendon split was performed extending 8 mm and Vicryl 6/0 was woven through the tendon. The lateral rectus muscle was then identified and isolated. The anterior half of the superior oblique muscle tendon was sutured with Vicryl 6/0, 8 mm posterior to the lateral rectus muscle. The lateral rectus muscle was subsequently recessed 5 mm.

Intraoperatively, it was noted that his superior oblique was atrophied. He recovered well and was orthophoric with no postoperative diplopia 3 months post surgery (**Figure 2**).

3. Discussion

Unilateral and bilateral superior oblique palsy can be associated with horizontal deviation and is commonly seen with exotropia [5] [6]. Torsional diplopia poses significant surgical challenge to the surgeon and patient. Harada-Ito procedure is able to address the problem of excyclotorsion.

Our patient underwent the Fells modification of Harada-Ito procedure together with lateral rectus recession to correct his incyclotorsion as well as exotropia. In our case it



Figure 1. Preoperative picture showing left hypertropia and exotropia.

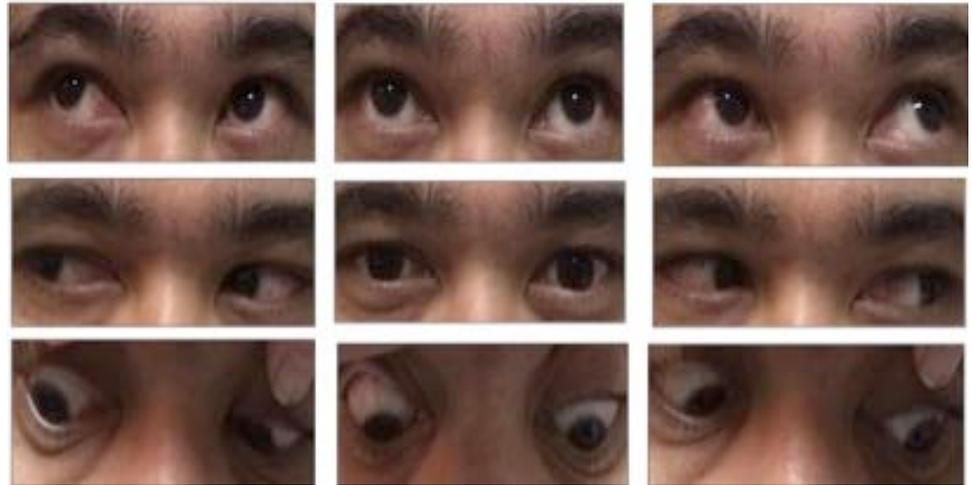


Figure 2. Three months postoperative showing orthophoric at primary gaze.

was important to identify the existence of lateral incomitancy; which is a smaller exodeviation in the lateral gaze though the abduction is full. Lateral incomitancy is more common in patients with superior oblique palsy as the abducting power of the superior oblique is reduced [7]. It has been reported that the incidence of superior oblique palsy with horizontal deviation ranges from 36% to 55.6% [8] [9]. We found that our patient had a smaller deviation (20 diopters) on his lateral gaze. In cases with lateral incomitancy, there is tendency to overcorrect or undercorrect the amount of lateral rectus muscle recessed.

Lee *et al.* [7] in their study to evaluate surgical normogram for lateral rectus recession in patients undergoing inferior oblique recession for superior oblique palsy found that reducing the amount of lateral rectus recession by 1 to 2 mm was a successful method to prevent overcorrection. Moore *et al.* [9] found that 20% or more reduction of exodeviation in lateral gaze may be overcorrected if the measurements are solely based on primary gaze measurements.

Helveston *et al.* [5] found that in cases with minimal exodeviation, correction of the torsional component only is adequate. Study by Lee *et al.* [7] noted that large angle deviation between 20.4 to 26.4 diopters should be corrected with combined horizontal muscle surgery. Our patient had an exodeviation of 25 diopter at far and thus bilateral lateral rectus recession was done together with the correction of the torsional component. We reduced the amount of lateral rectus recession by 1 mm, that is 5 mm and found that the patient was orthophoric post operatively.

We performed the Fells modification of Harada-Ito procedure on our patient using non adjustable suture. A study by Fells [3] found that though Harada-Ito was an effective method to correct excyclotorsion; disinserting the muscle was most useful for correction of extorsion in downgaze.

A study by Nishimura *et al.* [10] found that the adjustable Harada-Ito was a successful surgery and only 8% of patients had a regression between 2 to 12 months post surgery. This was attributed to the failure of loosening of the antagonist muscle. However,

there have been other postulations as to the cause of regression due to loosening of scleral suture and incomplete healing process between the sclera and the superior oblique tendon [11]. Another study by Bradfield *et al.* [12] found that all patients who had 10 degrees or below of torsion preoperatively obtained surgical success after the modified Harada-Ito procedure. Their study also found that the mean torsion correction with the Harada-Ito procedure was 10.3 degrees (95% CI, 8.3 - 12.4). In our patient the degree of excyclotorsion was 10 degrees but the follow up period was only for 3 months and hence a longer study period is needed to determine the longterm success of the surgery. Intraoperatively, we found that the superior oblique muscle was atrophied. Though atrophied muscle is mainly seen in congenital superior oblique palsy; long standing acquired superior oblique palsy shows a similar picture [13]. This is due to denervation atrophy [14] resulting from loss up to 80% of muscle bulk because of wasting of individual muscle fibers [15].

4. Conclusion

Fells modification of Harada-Ito surgery is a successful procedure in overcoming torsional diplopia. It is important to evaluate the presence of lateral incomitancy in patients with associated horizontal deviations to prevent overcorrection.

Statement of Consent

The patient has given full consent for publication of this case report.

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