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MODIFIED TEMPORALIS MUSCLE TRANSFER FOR PARALYTIC LAGOPHTHALMOS IN LEPROSY PATIENTS

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ABSTRACT:

Background: Leprosy is still a problem in Pakistan. In Head and neck region, it causes facial nerve paralysis. Involvement of orbicularis oculi causes significant disability and restoring its function surgically becomes very important. Temporalis muscle transfer is a popular dynamic procedure for paralytic lagophthalmos. We describe surgical technique and results of modified temporalis muscle transfer to correct this problem obviating the problems associated with classic transfer.

Methods: Medical records of eight patients treated with this transfer from January 2007 to September 2010 in Marie Adelaide Leprosy centre, Karachi were studied. In all patients diagnosis was clinical. Temporalis was functionally intact before surgery was contemplated.

Results: There were seven men and one woman. Mean age at time of presentation was 41.7 years. Mean duration of leprosy was 10 years ranging from 3-30 years. Seven patients achieved satisfactory eye closure with resolution of epiphora and corneal irritation. Only one patient needed revision surgery and was satisfied after revisional surgery. None of patients had contour abnormalities in the region of temporal fossa.

Conclusion: Modified temporalis muscle transfer is less extensive, well tolerated especially in elderly, and can achieve good functional results.

Key words: leprosy**,** lagophthalmos, temporalis muscle.

INTRODUCTION

Leprosy is still endemic in some developing countries. Pakistan is believed to still harbor approximately 20,000 individuals infected with leprosy. Mycobacterium leprae has predilection for peripheral nerves: the superficial branches of the trigeminal and facial nerves are involved in face, resulting in an insensitive cornea and lagophthalmos. Up to 73% of patients with leprosy can have ocular problems and the frequency of ocular complications increases with the increasing age and duration of disease of the patients. Paralytic ectropion of lower lid is due to loss of tone of the orbicularis oculi muscle, resulting in persistent watering. So protective function of lid fails leading the exposed cornea to threat of foreign bodies, which being insensate leads to unnoticed discomfort. As corneal sensation cannot be restored, it is therefore necessary to restore motor function or some sort of protection to cornea otherwise blindness may result.

Various surgical modalities have been developed to treat paralytic lagophthalmos and broadly categorized into static and dynamic procedures. Static include: lateral tarsorraphy, lid loading, palpebral spring, while dynamic include temporalis muscle transfer, and free muscle transfer. Surprisingly, temporalis muscle always remains functional in leprosy and can be used to transfer functioning motor unit to paralyzed eyes. This muscle transfer was first described by Sir Harold Gillies in 1934[8], who detached the origin of muscle and turned it down across zygomatic arch. This classic transfer was further modified by Anderson who turned down the overlying deep temporal fascia to lengthen the transfer. However this classic transfer requires extensive dissection of muscle itself resulting in hollowing of temporal fossa with a visible bulge in area of zygomatic arch.

This turnover of muscle also leads to its decreased excursion. Mclaughlin (1953) mobilized the insertion of the muscle, rather than its origin, by coronoidectomy via an intraoral approach. Breidahl et al in 1996 described a technique for lower half of face in which temporalis was excised just before its insertion into the coronoid thus avoiding coronoidectomy and lengthened the muscle using fascia lata. We describe a technique similar to Breidahl et al in which temporalis insertion is used for transfer for paralytic lagophthalmos with minimal dissection and avoiding coronoidectomy, loss of excursion and unaesthetic hollowness in temporal fossa which occurs when classic transfer is used.

PATIENT AND METHODS

A total of eight patients were operated from January 2007 to September 2010 in Marie Adelaide Leprosy centre, Karachi. Patients with long standing facial paralysis more than 1.5 years duration were operated and included in study. In all patients diagnosis was clinical. Age, gender, duration of Leprosy, type of surgery, availability of follow up and complications were recorded for each patient. Before surgery, temporalis muscle mass and function was assessed and its suitability for transfer was recorded. Preoperatively, patients were educated about procedure and post operative training program.

SURGICAL TECHNIQUE

Surgical anatomy of temporalis muscle is well described. It arises from the temporal fossa and deep temporal fascia and inserts into coronoid process and a portion of ascending ramus of the mandible. It lies deep to deep temporal fascia and anterior to vessels and nerves of masseter near its insertion. Its blood supply is from deep temporal artery; a branch of maxillary artery and enters its deep surface between zygoma and pterygoid muscle. Its nerve, a branch of mandibular division of trigeminal nerve enters its deep surface at junction of upper two thirds and lower one third[12].

All procedures were done in local anesthesia. Area of skin incision was shaved just prior to surgery and a curvilinear incision made 3-4 cm above ipsilateral ear which ends just in front of helical root. Skin flaps were raised superficial to temporoparietal fascia. Both the superficial temporal and deep temporal fasciae were then incised to expose all the muscle at this level. The temporalis muscle is then followed inferiorly to zygomatic arch and divided including some of its tendinous portion (figure 1). Fascia lata was then harvested using a single distal transverse incision on lateral aspect of thigh with a fascia lata harvester (figure 2). End of the temporalis muscle was then sutured to fascia lata, which was tunneled through the horizontal incision in the lateral canthal area of the affected eye (figure 3). Here, the fascia was divided into two strips (figure 3). The lower strip was tunneled through the lower eyelid and at the medial canthus; the upper one passed through the upper eyelid and brought out at the incision made at the medial canthus. These two eye strips were crisscrossed before fixing and closing the wound (figure 4). The new direction of pull is linear with no twists or folding of the muscle or the fascia. In patients, where temporalis is also used for lower facial symmetry, more fascia lata was harvested initially and separate slings were used for both eye and mouth (figure 5). Temporalis muscle tendon was divided into two parts and fascia lata slings were sutured to one part of tendon and its distal part was passed through sub dermal tunnel and delivered through the nasolabial incision. It was then fixed to dermis of nasolabial incision as tight as possible. Another sling was passed subdermally and attached to oral commissure by a vertical incision in that area.

RESULTS

There were seven men and one woman. Mean age at time of presentation was 41.7 years ranging from 23 to 57 years (Table 1). Mean duration of leprosy was 10 years ranging from 3-30 years. In six patients, temporalis muscle transfer was used for both eyes however in one patient temporalis was found unsuitable unilaterally so lateral tarsorraphy was used in one eye while other eye was addressed by temporalis muscle transfer. In five patients only eyes were addressed while in remaining three patients both eyes and oral sphincters were addressed. After the procedure, patients were taught to control movements of eyes and mouth independently. Seven patients achieved satisfactory eye closure with resolution of epiphora and corneal irritation (figure 6 and 7). Only one patient needed revision surgery and result was satisfactory after revisional surgery. One patient had mild asymmetry of both eyes but did not undergo further surgery as there were no functional problems. None of patients had contour abnormalities in region of

TABLE 1: PATIENT DATA

Case	Age	Sex	Duration of Leprosy	Procedure	complications
1	23	Male	3	Temporalis muscle transfer for both eyes	
2	40	Male	8	Same	
3	37	Male	9	Same	
4	44	Female	4	Same	Revision required
5	57	Male	30	Same	
6	47	Male	10	Same	Mid asymmetry of both eyes
7	40	Male	11	Same	
8	46	Male	5	Temporalis for one eye and tarsorraphy for other eye	

Figure 1: skin incision through superficial and deep temporal fascia to reveal tendon of temporalis

Figure 2: fascia lata harvest

Figure 3: slitting the fascia in two parts after being withdrawn through lateral canthal incision

Figure 4: suturing both slips of fascia at medial canthus

Figure 5: additional fascia lata for elevation of nose and oral commissue and sutured to temporalis

Figure 6: preoperative resting appearance of a patient with paralytic lagophthalmos with obvious right lower lid ectropion.

Figure 7: post operative appearance with closure of both eyes. No temporal hollowing visible

temporal fossa. No complication was observed at donor site of fascia lata.

DISCUSSION

Two techniques which are widely accepted as major treatments for paralytic lagopthalmos following facial nerve palsy are lid loading and temporalis muscle transfer.

Lid loading with gold implants is simpler to perform[6] but results in disruption of the tear film and irritation of the conjunctiva due to delayed closure of the eyelids. Similarly, migration, extrusion and ptosis have also been reported after gold implantation[13]. It can also produce foreign body reactions.

On the other hand, temporalis muscle transfer restores active movement to paralyzed eyelids with high rates of success[12-]. Furthermore no nerve or muscle is sacrificed, scar is hidden in hair bearing area and Fascia lata sling operation can be carried out simultaneously for lower half of face. As already mentioned, Classic Gillies turnover technique has significant disadvantages like un aesthetic hollowing of temporal fossa, an obvious bulge over zygomatic arch, loss of excursion of muscle due to turnover, and extensive difficult dissection thus requiring high surgical skills[12]. McLauglin's technique[11] needed intra oral dissection while our technique as described first by Champion and then by Breidahl et al[12] is completely extra oral and obviates disadvantages of Classic technique. We have used this technique for eye closure unlike Breidahl who described it for lower half of face only. However this technique has some disadvantages too. There is possibility of muscle hernia at donor site of fascia lata in thigh. It involves a trick movement. We have observed that it is not equally effective for both eyes and mouth and if used for both, lower slings usually act as static support. Undue tension of fascial fixation may lead to unaesthetic asymmetrical eyelid fissure.

The major drawback of this study is small sample size and that it was done retrospective. However it does prove that modified temporalis muscle transfer is a useful procedure for paralytic lagophthalmos due to leprosy.

CONCLUSION

Temporalis muscle transfer is a valuable technique of facial rehabilitation in long standing facial palsy in Leprosy. Modified transfer is less extensive and so has less morbidity. It is well tolerated especially in elderly and can achieve good functional results.

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