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## Management of Lagophthalmos by Custom Made Gold Implants

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**Abstract: Purpose:** To assess the efficacy of custom made gold implants in the management of Iatrogenic lagophthalmos during CNS surgery.

**Material and methods:** Interventional Study, among patients with LMN VII nerve palsy attending Ophthalmology OPD & IPD of Neurosurgery department. Twenty patients with unilateral lagophthalmos due to facial nerve paralysis were included in the present study. Patients of both sexes and at different ages were included. The etiology included was cerebello pontine angle tumor excision that is after iatrogenic facial nerve injury during surgery. Pre operative thorough history taking and informed consent was taken. Pre and post-operative photographs were taken and patients were followed up for at least minimum of 6 months. **Gold Implant:** The gold weights were custom made. Each lid load was a 24-carat gold plate, 16 mm long, and 5 mm in height, fashioned as a rectangle with round borders. The body of the lid load had three holes to facilitate suspension to the tarsal plate. It is smooth in surface and weighted 1.0 to 1.6 g. Pre operatively; the proper weight is selected by taping different weights to the upper eye lid.

**Discussion:** In our study encouraging results were achieved in all cases. The corneal inflammation was resolved and corneas became bright in appearance. Conjunctival congestion was subsided and the eyes became quiet and asymptomatic resulting in final good visual outcome in the patients. The eye inflammation episodes were reduced from 2-3 to 0-1 per month and complete resolution of symptoms was observed in 19 cases (95%). From the aesthetic point of view, 5 patients had noticeable bulge in the upper eye lid which was accepted by all patients. Infection and inflammation were not detected in any of our cases in the follow up period. Only one patient complained of implant migration which necessitated correction under local anesthesia. We believe that upper lid loading is a very good alternative.

**Conclusion:** Gold implant insertion in the upper eye lid is a valuable procedure to treat lagophthalmos. The procedure is safe, effective and with low complication rate.

**Keywords:** Lagophthalmos, Orbicularis oculi muscle, Eyelid, Gold weight implant.

### I. INTRODUCTION

Lagophthalmos is defined as the inability to close the eyelids completely.[1,2] Orbicularis oculi muscle that closes eyelids is innervated by facial nerve (CNVII). Paresis of the orbicularis oculi muscle leads to diminished blink, lagophthalmos, and impairment of the nasolacrimal pumping system. Lagophthalmos may be the result of the residual effect of seventh cranial nerve damage secondary from congenital (moebius' syndrome), acquired (Bell's palsy, vascular lesions), tumors, iatrogenic (during surgery), trauma, infections, or degenerative diseases.[3,4]

The blink reflex and lid closing are critical to maintain the ocular health. Each blink spreads the tear film over the ocular surface and allows a continuous layer of moisture. The inability to close the eyelid produces corneal exposure. Exposure leads to drying of the cornea, which can cause ocular discomfort, reduced vision, corneal ulcers, infection, and perforation. A poor Bells phenomenon, corneal anesthesia, or preexisting dry eye increases the risk of these complications.[5] The prior treatment of lagophthalmos is conservative and symptomatic such as ointments, eye drops, taping, and moisture chambers. Surgical intervention may be required in patients who have failed medical therapy or in whom the facial paralysis is not expected to improve.[6]

Upper lid loading in the treatment of paralytic lagophthalmos brings out the highest patient satisfaction in lid closing during the day and during sleep as well as in the aesthetic appearance of the lid. When implanted into lid margin, the weight will essentially allow earth's gravity to gently pull the eye to the closed position when the muscles relax. In this procedure, a gold weight is inserted in the upper eyelid to allow closure by the force of gravity. The presence of the weights seems to contribute to the mimics and blinking of the eyelids which provides a better aesthetic appearance.

Gold is the preferred material due to its color, specific gravity, and tissue compatibility.[7,8-11] Gold weight eyelid implants can elicit a gradually progressive inflammatory response. In at least some cases, local corticosteroid injection may suppress the inflammation and permit retention of the implant.[12] Gold weights range from 0.6 to 1.6 g and come in 0.2-g increments. The appropriate weight is chosen preoperatively by taping weights of varying sizes onto the external lid above the tarsus and observing the closing and opening of the lids. Properly chosen, the ideal weight will allow full closing and opening of the lids, while avoiding ptosis in primary gaze. Gold weight implantation is usually well-tolerated. However, astigmatic shift as well as migration and/or extrusion of the gold weight may occur.[13]

Common complications are related to the selection of wrong weight, and insufficient or excessive correction.14 The eyelid implant method of treatment has proven to be very successful, easily accomplished, and one that involve the ophthalmology profession. In this case series the treatment method of the paralyzed eyelid of a patient by a gold weight implant will be explained.

## **II. AIM AND OBJECTIVES**

### **AIM**

- A. To assess the efficacy of custom made gold implants in the management of Iatrogenic lagophthalmos during CNS surgery.

### **OBJECTIVES**

- A. To assess complications associated with custom made gold implant immediately after implantation.
- B. Evaluation of complications of anterior segment after surgery.

## **III. MATERIAL AND METHODS**

### **A. STUDY DESIGN & LOCATION**

Interventional Study, among patients with LMN VII nerve palsy attending Ophthalmology OPD & IPD of Neurosurgery AVBRH, Sawangi, Wardha.

### **B. STUDY DURATION**

1 year (December 2015- December 2016)

### **C. SAMPLE SIZE**

20 Patients

### **D. INCLUSION CRITERIA**

Iatrogenic during CNS surgery

### **E. EXCLUSION CRITERIA**

- a) Bell's palsy
- b) Vascular lesions
- c) Tumors
- d) Trauma
- e) Infections
- f) Möbius' syndrome
- g) Degenerative diseases

#### **IV. PATIENTS AND METHODS**

Twenty patients with unilateral lagophthalmos due to facial nerve paralysis were included in the present study. Patients of both sexes and at different ages were included. The etiology included was cerebello pontine angle tumor excision that is after iatrogenic facial nerve injury during surgery. Pre-operative thorough history taking and informed consent was taken. Pre and post-operative photography were taken and patients were followed up for at least minimum of 6 months.

**Gold Implant:** The gold weights were custom made. Each lid load was a 24-carat gold plate, 16 mm long, and 5 mm in height, fashioned as a rectangle with round borders. (Fig. 1)



Fig. 1 (Gold Implant)

The body of the lid load had three holes to facilitate suspension to the tarsal plate. It is smooth in surface and weighted 1.0 to 1.6 g. Pre operatively; the proper weight is selected by taping different weights to the upper eye lid. The proper weight should close the eye on levator relaxation and does not cause ptosis on levator contraction. An addition of 0.2 gms to the gold weight estimated in the trial is required to achieve a similar closure of the eye by means of the gold implant on the tarsal plate. Intra operatively, the lid load was shaped with a convexity on its anterior surface and a concavity on its posterior surface, which allowed the gold weight inside the eyelid to slide along the globe.

#### **Surgical Technique**

The procedure is done either with local infiltrative anesthesia and intra venous sedation or general anesthesia. An incision about 1 cm long is made in the skin crease in the upper eye lid centered over the pupil. The orbicularis oculi is then slit opened down to the tarsal plate and the pocket is created beneath the muscle over the middle third of the upper eye lid keeping at least 2 mm above the lid margin. The gold plate is inserted in the pocket and fixed in the tarsal plate through its holes with prolene 6-0. The orbicularis oculi and the skin is closed using vicryl 6-0 suture. Eye dressing is used for 24 hours and the patient is discharged in the 1st day post operatively. Oral antibiotics together with antibiotic eye ointment are used for 7 days.

#### **RESULTS**

- A. The present study included 11 males (55%) and 9 females (45%).
- B. The age of the patients ranged between 40 and 55 years.
- C. Lagophthalmos was due to facial nerve paralysis due to cerebello pontine angle tumor excision in all cases. The gold weights used ranged between 1.0 and 1.6 g, however the most commonly used weight is 1.2 g. (12 cases) followed by 1.4 g. (5 cases).
- D. Careful dissection is necessary as the orbicularis oculi muscle is thin and atrophic due to facial nerve paralysis. Once it is identified it is slit open down to the tarsal plate.
- E. The pocket is created beneath the muscle and over the tarsal plate. In all cases we found no difficulty in creating the pocket and fixing the gold plate with to the tarsal plate. Closure of the orbicularis oculi using vicryl 6-0 and the skin with vicryl 6-0 is done.
- F. Post operative oral antibiotics and eye ointment are used for 7 days.
- G. Patients are followed up for a minimum of 6 months. In addition to upper lid loading, four patients had lateral tarsal strip suspension for the lower eye lid.
- H. There was a reduction in the eye inflammation episodes from 3-5 to 0-1 per month. Complete resolution of symptoms was observed in 19 cases (95%).
- I. No extrusion or infection were observed in the period of study, however 5 patients had noticeable bulge in the upper eye lid and one patient had implant migration causing disfigurement of the upper eyelid.
- J. The implant migration was easily managed by repositioning of the gold plate under local anesthesia.
- K. Exploration of the previously placed gold implant possessed no further difficulty than the original procedure. None of the patients developed ptosis or eye complications after the gold plate insertion in the period of study. The results are shown in following figures 2 & 3 and one complication is shown in figure 4.



L. Fig.2 (Pre-op)



Fig. 3 (Post-op)



Fig.4 (Complication)

## DISCUSSION

Lagophthalmos is a serious condition affecting the eye both aesthetically and functionally. Exposure with consequent dryness of the cornea will cause ocular discomfort, reduced vision, corneal ulcers, infection, and perforation. A poor Bell's phenomenon, corneal anesthesia, or pre-existing dry eye increases the risk of these complications. The management of lagophthalmos is divided into non-surgical and surgical methods. Nonsurgical methods provide comfort and protect the cornea from trauma and drying. Ophthalmic drops, ointments, protective taping, occlusive moisture chambers, soft contact lenses and scleral shells are the mainstays of non-surgical therapy, but these methods are cumbersome, can obscure vision, and are most helpful in patients with acute facial paralysis in whom recovery of orbicularis oculi function is expected. Surgical rehabilitation of the upper eye lid includes methods to correct the lagophthalmos as tarsorrhaphies, canthoplasties, palpebral springs, eyelid magnets and upper lid weights. Upper lid weight such as gold, platinum, and platinum/iridium alloy weights are implanted into the upper eyelid to permit an increase in the effects of gravity to close the upper eyelid, or at least to allow for a reduction of lagophthalmos with an improvement in its symptoms. Placing a weight on the upper eyelid to increase the effects of gravity to close the upper eyelid is a very useful procedure for the patient with eye symptoms resulting from exposure and drying of the cornea. This surgical procedure has been established as a treatment for lagophthalmos. A gold weight is now accepted as the most suitable material; it combines the desirable characteristics of high density and malleability with the ability to be camouflaged beneath the thin skin of the upper eyelid. In our study encouraging results were achieved in all cases. The corneal inflammation was resolved and corneas became bright in appearance.

Conjunctival congestion was subsided and the eyes became quiet and asymptomatic resulting in final good visual outcome in the patients. The eye inflammation episodes were reduced from 2-3 to 0-1 per month and complete resolution of symptoms were observed in 19 cases (95%). From the aesthetic point of view, 5 patients had noticeable bulge in the upper eye lid which was accepted by all patients. Infection and inflammation were not detected in any of our cases in the follow up period. Only one patient complained of implant migration which necessitated correction under local anesthesia. We believe that upper lid loading is a very good alternative.

## CONCLUSION

Gold implant insertion in the upper eye lid is a valuable procedure to treat lagophthalmos. The procedure is safe, effective and with low complication rate.

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