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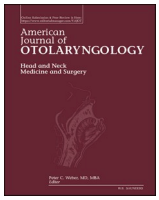

Sutureless transconjunctival insertion of eyelid gold weight

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ABSTRACT

Objective: Surgical intervention for paralytic lagophthalmos has been gold weight implant through supratarsal crease incision for decades. The aim of this study is to propose a modified novel minimally invasive approach that can be described as sutureless and transconjunctival placement of eyelid weights.
Method: Unilateral eyelid gold weights were implanted in six patients due to paralytic lagophthalmos secondary to peripheral facial nerve palsy. The patients were followed for an average of 6 months.
Results: Functional and aesthetically desired results were obtained in all six patients with suture-free transconjunctival placement of the eyelid weight. The patients did not experience any discomfort and avoided the burden of suture removal after the surgery. No complications developed in six patients during the postoperative period.
Conclusion: Sutureless transconjunctival insertion of eyelid weight without external incision and suturing is practical, relatively easy and fast to perform. It preserves attachment of the levator muscle to the tarsus and presents functional results similar to conventional method. Fixing the implant with sutures to the tarsal plate is not needed. Sutureless of this method avoids external wound care, burden of suture removal for both surgeons and patients, and hence, suture related complications are eliminated.

1. Introduction

Peripheral facial nerve paralysis can lead detrimental ocular ailments. The most common ocular findings of peripheral facial nerve palsy are lagophthalmos [1]. Paralytic lagophthalmos consists of incomplete eyelid closure resulting from loss of orbicularis muscle function, decreased blink frequency and lower eyelid ectropion with failure of the tear pumping mechanism, and altering the distribution of the tear film on the ocular surface. This can cause visual sequelae from simple irritation to corneal ulcer perforation [1,2]. In addition, the esthetic results of eyelid and facial paralysis can significantly impact a person's psychological and social well-being [3,4].

The initial treatment attempts of paralytic lagophthalmos are artificial tear drops, lubricating ointments, therapeutic contact lenses, a humid chamber, and closure of the lacrimal points through the placement of plugs, providing comfort and protection of the cornea against trauma and dryness [3]. Although medical treatment may provide temporary relief for some patients, most patients need permanent treatment to avert untoward consequences due to prolonged corneal exposure [4,5].

Gold weight implantation for the treatment of lagophthalmos enables the eyelid closure by gravity [6]. Gold is the most often preferred as metallic weight for paralytic lagophthalmos because of its high density, malleability, low reactivity, camouflage under the thin skin, being less expensive compared to titanium and availability in the market [7]. Conventional technique for gold or platinum weight placement into the upper eyelid over the tarsal plate involves a transcutaneous upper eyelid crease incision [8]. Following this skin incision orbicularis muscle is dissected and elevated, then the implant is fixed with sutures over the tarsal plate, and skin incision is closed with fine sutures [7,8].

A modified technique of sutureless transconjunctival insertion of gold weight was presented in a small group of patients with paralytic lagophthalmos secondary to peripheral facial nerve palsy in this study.

2. Patients and methods

This retrospective study was approved by the Ethical Board for Clinical Research at Bezmialem Vakif University, Faculty of Medicine (Date: Nov.24, 2022 and No: E-86529). Inclusion criteria were patients who were candidates for this procedure due to paralytic lagophthalmos

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from facial nerve palsy refractory to adequate medical treatment. Six patients with sutureless transconjunctival eyelid weight implantation were included in this study. Patients were informed regarding operative interventions and their consent was obtained. All surgical interventions were executed by the first author. Patients were followed for an average of six months. Further details of the patients are presented in Table 1.

3. Surgical technique

At the beginning the ideal weight of the gold planned to be implanted was quantified meticulously. To determine the proper weight, each patient was sat in an upright position and dummy weights ranging from 0.8 g to 1.8 g were incrementally put on the upper lid allowing full closure. Suitable weight of the implant for each patient was determined before the operation by experimenting with different dummy weights on the upper eyelid. Tailored size and weight of gold implant for each patient was ordered from the local goldsmith with experience in providing our patients' medical needs. All of the patients were treated under general anesthesia due to nature of concomitant operations, such as 5–7 nerve transfer, facial nerve decompression or interpositional nerve grafting. This surgical operation per se can also be performed utilizing local anesthesia, by applying two drops of 0.5 % Tetracaine hydrochloride or 0.5 % Proparacaine hydrochloride on to the ocular surface. Local anesthetics were not given to our patients because of application of general anesthesia for their comprehensive operations. Upper eyelids were marked with surgical pen by dividing three regions, namely medial, central and lateral. Gold weight was planned to be placed to the lateral part of the medial region and medial part of the central region. Gold weights were sterilized by autoclaving on the day of surgery. Operations began by injecting approximately 0.5–1 ml of 1 % Lidocaine with 1:100.000 Epinephrine to the upper eyelid into the pretarsal space to minimize bleeding and hydrodissection. Silastic shields were carefully placed underneath the eyelids over the globe to refrain from any untoward consequences. The upper eyelids were then carefully turned outward using forefingers or a Desmarres retractor. Small vertical incisions were made no longer than 5 mm at the line where the lateral end of the implant was to dwell. The incisions were placed over the inner tarsal plane from the eyelid margin towards to the superior tarsal border on the palpebral conjunctiva. Pretarsal pockets were dissected medially using Westcott scissors in accordance with length and width of the implant. Sterilized gold weights, curved according to the shape of eye globe with two or three holes on the corners were inserted into the dissected pocket over the tarsal plate. Without closing with sutures, the upper eyelids were then carefully turned backward and implants were verified to be in the correct position. Antibiotic ointment was placed on the eye and steri-strip bands were applied on the upper eyelids. The procedure can be performed in less than 10 min and quicker than traditional technique (Supplemental Video).

4. Results

Six patients (4 males and 2 females) with paralytic lagophthalmos due to facial nerve palsy were admitted in this study. The mean ages were 49 years (range 14–68 years). The postoperative follow-up period for these patients ranged from 3 to 11 months, with an average of 5.83 months. All patients achieved complete eyelid closure. They all had ocular symptoms improvement and all stopped the use of lubricating eye drops, and no patient had residual lagophthalmos. Functional and aesthetically desired results were obtained in all patients with sutureless transconjunctival placement of the eyelid gold weight (Fig. 1). Inferior cantoplasty was required for lower eyelid tensioning in our oldest patient. Patients who underwent this technique did not experience any postoperative pain and no postoperative suture removal was needed. There were no infections, implant migrations or malposition's, or any other complications, and none required revision surgery in the mean 6-month postoperative period.

5. Discussion

Paralytic lagophthalmos due to peripheral facial nerve palsy is a physically and psychologically devastating condition that can cause ocular discomfort, pain, and optical loss consequent from exposure keratopathy [9]. Operative interventions can be recommended such as tarsorrhaphy, insertion of eyelid springs, and gold weight implants [10]. Upper eyelid weight implantation through the transcutaneous incision for paralytic lagophthalmos to facilitate ocular closure and protect corneal pathology has been an established treatment for decades. In spite of reports of success of the conventional supratarsal crease approach, this technique requires an incision of the skin and may jeopardize levator muscle function, and septum. Supratarsal external approach may require prolonged surgical time, broader dissection, has potential to weaken the eyelid and result in instability of the implant over time. Placement of stitches may result in potential misplacement of the implant as well as a focus for infection and inflammation induced by the stitch material [11]. Despite the high patient satisfaction with the gold weight implant, the incidence of complications reported in the literature varies between 0.5 and 61 %, with migration and extrusion of the gold weight as the main occurrence [8]. These complications did not happen in our small group of patients.

All these concerns have urged Pereira et al. from Brazil to develop an innovative transconjuctival posterior technique of gold weight implantation and reported in Portuguese 15 years ago [12]. Transconjunctival approach to positioning eyelid weights eliminate an external incision and internal and external sutures. From a posterior palpebral conjunctival approach, the pretarsal space can easily be accessed and migration of the implant is prevented due to maintaining pretarsal structures in full integrity and limiting the dissection pocket as large as the implant. Precisely dissected pretarsal pocket may result in more accurate and consistent placement. Sutureless feature, both externally and internally, may be a clear advantage for eradication of suture-related inflammation or infection following operation [11]. These authors found the postoperative course is comparable to the conventional approach without suture removal necessity. However, due to being published by a less conspicuous journal in non-English language this advantageous surgical method has not gained attention for years. Recently, this surgical method has been revitalized by Elahi et al. [11]. They emphasized that sutureless transconjunctival placement of eyelid weights better preserves the structural integrity of the eyelid and potentially reduces the risk of migration or extrusion [11]. These authors made a 5 mm high centrally positioned vertical incision through the tarsal conjunctiva and

Table 1
Data from patients undergoing gold weight implantation: cause of facial paralysis, concomitant surgical procedures, and follow-up time.

Patients	Age	Sex	Cause of facial paralysis	Duration of paralysis at the time of the surgery	Concomitant surgical procedures	Follow-up time
1	59	M	Bell's palsy	14 months	5–7 nerve transfer	6 months
2	68	M	Bell's palsy	2 months	Facial nerve decompression	3 months
3	58	M	Bell's palsy	2 months	Facial nerve decompression	11 months
4	32	F	Facial nerve schwannoma	9 months	Interpositional grafting	5 months
5	62	F	Bell's palsy	50 days	Facial nerve decompression	4 months
6	14	M	Extratemporal trauma	2 months	Interpositional nerve grafting	5 months

Fig. 1. Sutureless transconjuctival gold weight implantees. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

tarsal plate. They dissected the pretarsal space with Westcott scissors to both sides due to centrally positioned incision. Elahi et al. did not elaborate clearly in their article where the vertical incision should be in relation to the final weight position. In order to place the implant via mid-incisions, tissue must be dissected on both sides of the incision for the access of the implant and an excessively large pocket must be opened that may lead migration. In our modified technique, the vertical incision was not made in the middle, but was made at the lateral end of the implant placement. Gold weight implant was inserted through this laterally performed incision. Thus, the gold weight was placed by opening a single pocket, just large enough for the actual size of the implant. This will minimize tissue trauma, obviate its migration and positively affect postoperative recovery. Lower eyelid laxity can also be addressed at the same surgical session with upper eyelid gold implantation as in our oldest patient.

6. Conclusion

Sutureless and transconjunctival placement of eyelid weights without external incision and sutures is practical. Its execution is fast and technically and relatively easy. It has functional results similar to conventional methods. Transconjuctival approach can preserve the

structural integrity of the eyelid and attachment of the levator muscle to the tarsus due to precise dissection. Fixing the implant with absorbable sutures to the tarsal plate is not needed. This minimally invasive surgical technique can potentially reduce operative time and the risk of migration or extrusion. Sutureless feature of this method avoids external wound care, burden of suture removal for both surgeons and patients, and hence, suture related complications are eliminated. This novel transconjunctival approach included small number of patients, comparative lengthy studies are needed to corroborate the superiority over the conventional approach and sustainability of its effectiveness.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amjoto.2023.103874.

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CRediT authorship contribution statement

Orhan Ozturan: Applied the technique, Alper Yenigun: Wrote the technique.

Erol Senturk: Ethics committee applied, Fadlullah Aksoy: Made the final checks.

Declaration of competing interest

None.

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References

[1] Snyder MC, Johnson PJ, Moore GF, Ogren FP. Early versus late gold weight implantation for rehabilitation of the paralyzed eyelid. Laryngoscope 2001;111 (12):2109–13.
[2] Nellis JC, Ishii M, Byrne PJ, Boahene KDO, Dey JK, Ishii LE. Association among facial paralysis, depression, and quality of life in facial plastic surgery patients. JAMA Facial Plast Surg 2017;19(3):190–6.
[3] Choi HY, Hong SE, Lew JM. Long-term comparison of a newly designed gold implant with the conventional implant in facial nerve paralysis. Plast Reconstr Surg 1999;104(6):1624–34.
[4] Joseph SS, Joseph AW, Douglas RS, Massry GG. Periocular reconstruction in patients with facial paralysis. Otolaryngol Clin North Am 2016;49(2):475–87.
[5] Henstrom DK, Lindsay RW, Cheney ML, Hadlock TA. Surgical treatment of the periocular complex and improvement of quality of life in patients with facial paralysis. Arch Facial Plast Surg 2011;13(2):125–8.
[6] Tower RN, Dailey RA. Gold weight implantation: a better way? Ophthalmic Plast Reconstr Surg. 2004;20(3):202–6.
[7] Bhatti AF, Page K, Orlando A. Modification of the gold-weight implant for insertion into the upper eyelid in facial palsy. Ann Plast Surg 2005;55(6):689–92.
[8] Yu Y, Sun J, Chen L, Liu L. Lid loading for treatment of paralytic lagophthalmos. Aesthet Plast Surg 2011;35(6):1165–71.
[9] Wagh VK, Lim WS, Cascone NC, et al. Post-septal upper eyelid loading for treatment of exposure keratopathy secondary to noncicatricial lagophthalmos. Orbit 2016;35:239–44.
[10] Hazin R, Azizzadeh B, Bhatti MT. Medical and surgical management of facial nerve palsy. Curr Opin Ophthalmol 2009;20:440–50.
[11] Elahi E, Afshin EE, Guthrie AJ, Lo C. Sutureless transconjunctival insertion of eyelid weights: a novel technique. Ophthal Plast Reconstr Surg 2022;38(1):87–9.
[12] Pereira FJ, Eing F, Marquardt FA, Cavalheiro R, Cruz AA. Posterior approach to gold weight implant. Arq Bras Oftalmol 2008;71(5):701–5.