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Upper eyelid platinum chain placement for treating paralytic lagophthalmos

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ABSTRACT

For the definitive treatment of lagophthalmos and satisfactory rehabilitation of the affected eye, different surgical strategies have been proposed, including static or dynamic procedures. Although some of these can have good results, lid loading is now the most common technique for treating paralytic long-term lagophthalmos. Among the different types of loading, the use of a platinum chain is preferred to the use of a standard gold weight because platinum has a higher density than gold and is also more biocompatible.

In this paper authors retrospectively analyzed 43 patients with regards to functional and cosmetic results. Questionnaires were also employed to assess changes and improvements in the patients' quality of life. Analysis of the excellent results achieved confirmed that platinum chain lid loading should be considered as a first-line treatment for paralytic lagophthalmos rehabilitation. It is a simple, reliable, and effective technique that significantly improves the health-related quality of life of patients.

1. Introduction

Patients with facial nerve palsy involving the branches to the eye are unable to blink the affected eye and consequently develop paralytic lagophthalmos. Seventh cranial nerve palsy can be related to congenital diseases, as in Mobius and Mobius-like syndromes (Bianchi et al., 2012), or develop after tumor extirpation, trauma, infection, degenerative diseases, or other surgical procedures. The persistence of this clinical condition leads to chronic corneal exposure, which can lead to serious ophthalmological complications, ranging from corneal spots to corneal ulceration and ultimately blindness (Seiff and Chang, 1993).

Conservative treatment includes the use of ophthalmic ointments, eyelid taping, scleral shells, and temporary tarsorrhaphy. Nevertheless, these treatments are inadequate in the long term for patients in whom facial palsy is not expected to improve, and they expose the patient to a high risk of complications (Seiff and Carter, 1998).

For the definitive treatment of lagophthalmos and satisfactory rehabilitation of the affected eye, different surgical strategies have been proposed, including permanent tarsorrhaphy, palpebral springs, eyelid lengthening with fascia lata, dynamic procedures such as temporalis or platysma muscle transfers or, in the case of recent facial palsies, cross-facial nerve grafting (Terzis and Karypidis, 2010).

Although these procedures can have good results, the related morbidity and often unreliable results limit their application to selected cases. In comparison, the placement of an upper eyelid weight is an easy, effective, reliable, and reversible technique that provides complete and comfortable closure of the upper lid, ensuring fast, safe rehabilitation of the affected eye (Kelley and Sharpe, 1992).

Consequently, upper lid loading is now the most common technique for treating paralytic long-term lagophthalmos. Many different types of lid loading and placement techniques have been described (Schrom et al., 2000).

In 1950 Sheenan first described the use of stainless steel mesh. Subsequently, gold lid loading gained popularity thanks to its high density and malleability and the minimal scarring achieved (Tan et al., 2013). More recently, some authors have proposed platinum for lid loading. Platinum is denser than gold, which allows implants to be 10% smaller than gold ones. In addition, platinum is less reactive than gold, reducing the risk of extrusion and adverse reactions to the metal (Berghaus et al., 2003). Moreover, platinum chains can be shaped to fit the natural motion of the eyelid

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perfectly. Currently, platinum chains are our first line of treatment in patients with paralytic lagophthalmos. This study analyzes the impact of this approach on the patient's quality of life (Siver et al., 2009).

2. Materials and methods

2.1. Surgical technique

The ideal weight to use is determined before surgery by sticking a series of weights to the upper lid and evaluating the eye closure and patient comfort. This must be tailored to each patient to predict the effectiveness of the treatment. The ideal weight should allow complete, comfortable eye closure without palpebral ptosis during normal activities.

The procedure can be performed under either general or local anesthesia (lidocaine 1% with epinephrine 1:100,000). An incision is made in the lid crease, followed by sharp dissection through the orbicularis muscle to the surface of the tarsal plate. Once the weight is placed in the correct position, it is secured to the tarsus with a 6-0 nylon suture (Fig. 1). During anchorage placement, extreme care must be taken to avoid conjunctiva or corneal perforation. Finally, standard wound closure is performed (Seiff et al., 1989).

2.2. Patients and methods

We retrospectively evaluated 43 patients treated with eyelid loading using this technique from 1 January 2000 to 31 December 2013.

Due to the retrospective nature of the study, no institutional review board approval was required. The platinum chain implants used in this series were developed by Spiggle & Theis Medizintechnik (Overath, Germany).

The patients included 23 females and 20 males, ranging in age from 22 to 68 years. The right eye was involved in 24 cases, the left in 19. The most common clinical presentation was lagophthalmos with some corneal disease. At the time of surgery, 39 patients (90.6%) were using nocturnal patches to complete eye closure and all were using ointments or artificial drops to manage dry-eye. The etiology was acoustic neuroma resection in 15 patients (34.8%), cerebellopontine angle tumor resection in 9 (20.9%), Bell's palsy in 7 (16.2%), congenital palsy in 5 (11.6%), parotid tumor resection in 5 (11.6%), and the replacement of gold implants in 2 patients (4.7%) who were previously treated after acoustic neuroma resection.

In all, 23 patients were treated under local anesthesia; the eyelid load was placed during general anesthesia during facial animation procedures in the remaining 20 cases. The eyelid load weight ranged from 0.8 to 2.0 g. In 21 cases (48.8%), associated inferior eyelid suspension with fascia lata was performed to complete the peri-ocular complex rehabilitation.

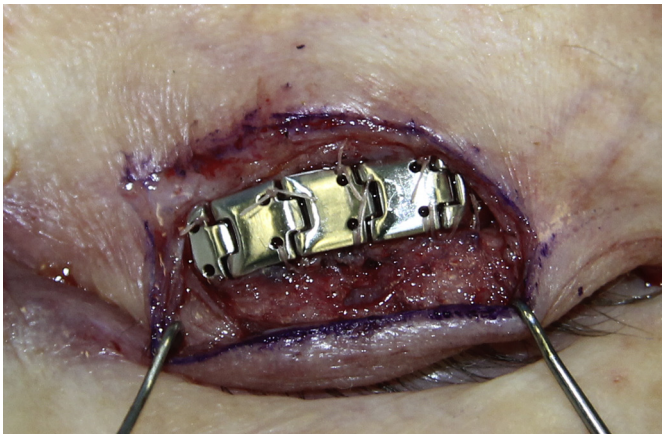

Fig. 1. Intraoperative picture showing load placement on the tarsal plate and its securing with sutures.

The patients were evaluated 1, 2, and 3 weeks and 2 months postoperatively from functional (complete eye closure, resolution of corneal disease, and vision) and esthetic (evidence of capsule formation, bulkiness of the implants, and scars) perspectives. Data were gathered using a questionnaire that included the patient esthetic score and patient satisfaction.

Keratitis resolution was scored from 0 to 2 as persistence of keratitis (0) and partial (1) or complete resolution (2) of symptoms. Tearing was scored from 0 to 3 as the persistence of excessive (0) or frequent (1) tearing, or partial (2) or complete (3) symptom resolution. Pain during surgery was evaluated only in patients who underwent local anesthesia as severe (0), moderate (1), mild (2), or absent (3). The cosmetic results were assessed by the patients as poor, acceptable, good, or excellent.

The patients were also asked to evaluate the improvement in eye-comfort, the postoperative use of ocular ointments and artificial drops, and the need for nocturnal patches to improve eyelid closure during the night. Finally, the overall general satisfaction of the patients was assessed as poor, acceptable, good, or excellent.

3. Results

Follow-up ranged from 5 to 118 (mean 49) months. On average, the procedure took 20 min and no intraoperative complications such as bleeding or eye injuries were observed. All patients had improved eyelid closure with consequent enhancement of esthetic and visual function. The data are summarized in Tables 1–5 and Figs. 2 and 3. No patient developed implant migration or postoperative infection. Interestingly, none of the patients developed allergy, capsule formation, or extrusion. All of the patients treated under local anesthesia experienced the lowest grade of pain. The biggest disadvantage seen was moderate difficulty with eyelid opening, especially during the first 3 weeks postoperatively. Subsequently, this tendency decreased progressively.

All of the patients reported high satisfaction in terms of the esthetic outcome (Figs. 4–7). From a functional perspective, the most important element was the great improvement in the keratitis, with complete resolution in 40 patients (93%) and partial resolution in 3 (7%).

Extremely satisfactory results were achieved for improving eye comfort in terms of both dry-eye syndrome and excessive tearing. The use of artificial drops progressively decreased in all patients and at the 2-month evaluation only two were still using ointments occasionally. None of the patients required eye patching at night by 3 weeks postoperatively, with a consequent dramatic improvement in their quality of life.

Table 1
Keratitis resolution, 0: persistence of keratitits; 1: partial resolution; 2: complete restoration.

Keratitis resolution	0	1	2
N (%)	0	3 (6.9)	40 (93.1)

Table 2
Tearing improvement, 0: excessive tearing; 1: frequent dropping; 2: good restoration; 3: complete restoration.

Tearing improvement	0	1	2	3
N (%)	0	3 (6.9)	10 (23.2)	30 (69.9)