Ophthalmic Plastic and Reconstructive Surgery
Vol. 20, No. 3, pp 202–206

Gold Weight Implantation: A Better Way?

Robert N. Tower, M.D., and Roger A. Dailey, M.D.

Oregon Health Sciences University, Casey Eye Institute, Portland, Oregon, U.S.A.

Purpose: To introduce an alternative surgical technique for gold weight implantation for the treatment of lagophthalmos. We suggest that unwrapped intraorbital gold weight implantation provides adequate function, better cosmetic appearance, and lower morbidity than conventional implantation with wrapped or unwrapped pretarsal gold weights.

Methods: The charts of a single surgeon were reviewed (1994 to 2003). All patients who underwent intraorbital gold weight implantation were included in the study. The technique was noted to be consistent with intraorbital fixation of a custom 2.2-gm gold weight (MedDev Corporation, Sunnyvale, California). Implants were not wrapped. Efficacy was defined as elimination of exposure keratopathy with preservation of the visual axis. Morbidity was defined as extrusion of the weight, shift of positioning requiring intervention, inflammation/infection of the eyelid, or poor cosmetic appearance.

Results: Of 59 patient charts reviewed, 2 patients had morbidity as defined by our study: One had shifting of the gold weight, necessitating repositioning of the weight; the other had extrusion of the gold weight, requiring its removal. The remaining patients had no complaints or cosmetic concerns. Follow-up examinations found no incidence of exposure keratopathy.

Conclusions: We found intraorbital gold weight implantation, without the use of a wrap, to be simple and effective, with adequate function, an acceptably low postoperative morbidity rate, and an excellent cosmetic outcome.

Derived from the Greek word for hare (lagos), the term lagophthalmos describes the inability to completely close the eye. The ancients believed that the hare slept with its eyes open. The validity of this assertion may prove false; however, for human beings, incomplete closure of the eye can have devastating sequelae for ocular health and corneal integrity. Exposure keratopathy can lead to denudement of the epithelium, progressing to frank ulceration, perforation, and in some cases, blindness, including loss of the eye.

The differential diagnosis for lagophthalmos is lengthy, but the most common causes include Bell palsy, trauma to the seventh cranial nerve (including iatrogenic), neurosurgical procedures involving the cerebellar pontine angle, cerebral vascular accidents, and previous eyelid surgery. If deemed a short, time-limited condition, the physician may elect to treat with aggressive lubrication, taping, and eye moisture shields. However, when the health of the eye becomes compromised, a more permanent surgical solution must be undertaken. These procedures include elevating the lower eyelid, canthoplasty, and medial and/or lateral tarsorrhaphies. Other surgical procedures have been described for the reanimation of the paretic eyelid, including muscle transfers, silicone bands, palpebral wire springs, and eyelid loading techniques.[1–6]

The most common method of surgically treating lag-

Accepted December 1, 2003.

Supported in part by the Research to Prevent Blindness, New York, New York, and in part by the Lester T. Jones Endowed Chair, Ophthalmic Facial Plastic Surgery, Casey Eye Institute, Oregon Health Sciences University, Portland, Oregon.

The authors have no commercial interest in any of the products described.

Address correspondence and reprint requests to Dr. Roger A. Dailey, Casey Eye Institute, Oregon Health Sciences University, 3375 SW Terwilliger Boulevard, Portland, OR 79239–4197. E-mail daileyr@ohsu.edu

DOI: 10.1097/01.IOP.0000123500.19475.B0

ophthalmos is the insertion of a gold weight. Initially described by Illig in 1958, the gold weight uses gravity to gently pull the eye closed when the upper eyelid retractor complex (levator palpebrae superioris/Müller muscle) is relaxed.[2,3] A proper weight is selected by the surgeon to improve closure but still allow the patient to have sufficient excursion to clear the visual axis when the retractor complex is active.

The popularity of gold weight placement among ophthalmic facial surgeons has escalated within the last 15 to 20 years. With growing popularity, various techniques of implantation are being described.[2–9] The goal of implantation is, of course, to improve eyelid closure; at the same time, the surgeon must be mindful of resulting cosmesis, risk of migration or extrusion, and inflammation or infection. Recent reports from a variety of backgrounds describe concerns of extrusion and cosmesis with pretarsal-fixed implants.[2,5–8,10,11] The incidence of complications, including migration and extrusion or infection, ranges from 0.5% to 61%.[8,11,12] A possible solution to these concerns is wrapping the gold implant before insertion; suggested wrapping materials include synthetic Dacron, porous alloplastic materials, autologous fascia lata, temporal galea, and cadaveric pericardium[8,11] (Perry et al., Processed human pericardium barrier for gold weight implantation, 2002 ASOPRS Scientific Symposium, p. 84, October 19, 2002; Sierra et al., The use of pericardium with gold weight implants, 2002 ASOPRS Scientific Symposium, p. 133, October 19, 2002).

The purpose of this study is to introduce a new technique of intraorbital implantation of gold weights that simplifies preoperative evaluation, standardizes surgical intervention, and produces a consistent and satisfactory outcome. We also believe that the function is adequate, with a postoperative complication rate that is very small. It appears from our series that wrapping of gold weights is not required for excellent results. This reduces the cost and the operating time and reducing the potential for any disease transmission.

METHODS

A retrospective chart review of gold weight implantation for the reanimation of paretic eyelids over a 10-year period (1994 to 2003) was conducted at the Casey Eye Institute by the authors. A single surgeon performed all cases with a consistent technique. The implant used is a gold weight with mass of 2.2 g, manufactured by MedDev Corporation (Sunnyvale, California). The study comprised 59 patients (age range, 15 to 92 years). All patients were included who underwent the procedure. Of note, no Asian patients were in the study group. Successful treatment was defined functionally: (1) elimination of exposure keratopathy as determined by slit-lamp biomicroscopy and (2) preservation of the visual axis. Postoperative complications were defined as migration, extrusion, inflammation, infection, and/or poor cosmesis.

Surgical Technique

The patient is placed in a supine position on the operating table. Local anesthesia, with or without intravenous sedation, or general anesthesia may be used. The upper eyelid crease is marked, and the eyelid is injected with 1% lidocaine 1:100,000 epinepherine (Abbott Laboratories, North Chicago, Illinois) in a 50:50 mixture with bupivacaine 0.5% (Abbott Laboratories). The patient is prepped and draped in the usual sterile fashion. An upper eyelid crease incision is made through the skin and orbicularis muscle. The septum is identified and incised in its entire length horizontally near its insertion in the levator aponeurosis. Blunt and sharp dissection then reveal the levator aponeurosis (Fig. 1). Once identified, the gold weight is positioned just behind the septum and held in place with multiple interrupted 7–0 nylon sutures through the holes provided in the implant to the levator aponeurosis (Fig. 2). The septum is closed over the weight with 7–0 nylon sutures, taking care not to shorten the septum or incorporate orbicularis muscle. Either of these pitfalls could produce unwanted iatrogenic restrictive lagophthalmos. The skin edges are approximated with running 7–0 nylon (Figs. 3 and 4).

FIG. 1. Levator aponeurosis exposure. The septum is visualized *(arrow)* at its insertion in the aponeurosis.

FIG. 2. Gold weight in position, supratarsal and preaponeurotic. Once positioned, the implant is sutured to the levator aponeurosis.

FIG. 4. Skin closed with 7–0 nylon suture. Note no exposure upon eyelid closure with patient in upright position.

RESULTS

Fifty-nine patients were included in the study, which was conducted by reviewing charts from a 10-year period. The average follow-up was 28 months (range, 3 months to 8 years). All patients had successful functional outcomes. No exposure keratopathy or visually significant ptosis was found on follow-up. The mean reduction in lagophthalmos was 3.2 mm. There were no patient complaints regarding cosmesis. No infections or clinical evidence of inflammation were noted. Of the 59 cases, only 2 complications were seen. In one case, the implant shifted and was easily refixated (Fig. 5, A and B). In the other case, implant extrusion through the orbicularis oculus with skin erosion (Fig. 6, A and B) prompted its removal under local anesthesia. Both of these complications had confounding factors. In the patient with implant migration, the initial lagophthalmos was a result of multiple surgeries to reconstruct an orbit that had been largely resected because of an ethmoidal sinus squamous cell carcinoma that was also treated with 5000 to 6000 cGy of radiation. The tissue was thin and friable. The patient with extrusion had lagophthalmos secondary to significant trauma and had undergone several previous surgeries to reconstruct her upper eyelid. By the time she was seen in our office for gold weight implantation, the anatomy of the eyelid was understandably distorted. These two patients represent cases with increased risk for complications. In the remaining 57 cases, no patient had any complication with the technique described. Therefore, in the standard patient population, the risks of migration, extrusion, inflammation, infection, or cosmetic problem are negligible.

FIG. 3. Septum sutured closed over the implant.

DISCUSSION

We have presented a simple technique for reanimating the paretic eyelid by insertion of a gold weight in the orbit rather than in a pretarsal pocket. We have found over the past 10 years that the gold implant placed in this manner is an excellent means of prevention of the unfortunate sequelae of exposure keratopathy. Pretarsal implantation techniques are reported to have certain drawbacks. First, such fixation requires individualizing the weight.[3,5,6] Thus, one must spend time before surgery taping weights of various masses to find the appropriate one. In our technique, we use a standard mass of 2.2 g. Second, the obvious bulk effect of the weight on the tarsus may negatively affect cosmesis.[2,10]

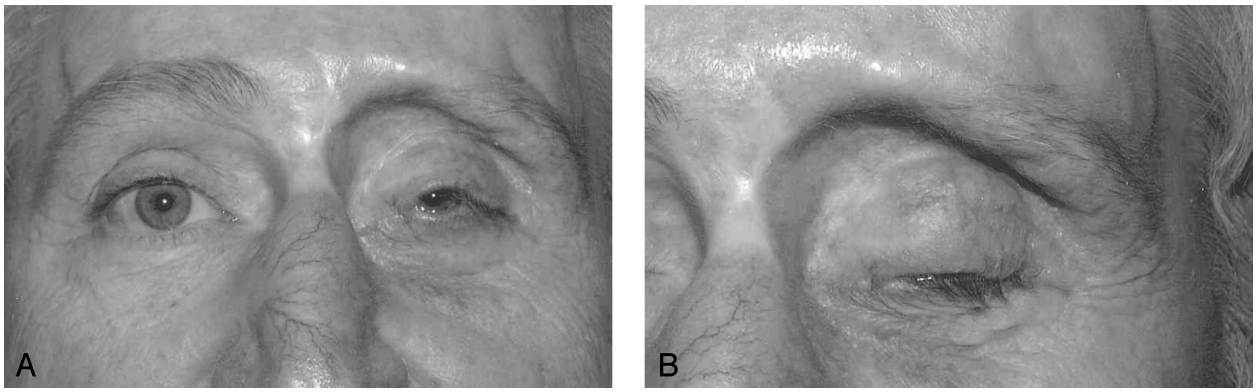

FIG. 5. A, Patient with superiorly migrated implant. B, Close-up of superiorly migrated implant.

Our intraorbital technique negates this concern. Finally, implant extrusion through the skin has prompted some surgeons to use wrapping materials to decrease the incidence[8,11] (Perry et al., Processed human pericardium barrier for gold weight implantation, 2002 ASOPRS Scientific Symposium, p. 84, October 19, 2002; Sierra et al., The use of pericardium with gold weight implants, 2002 ASOPRS Scientific Symposium, p. 133, October 19, 2002).

We have found that the septum, obicularis muscle, and skin combined provide an adequate barrier to prevent extrusion. Hence, our technique of a standard weight placed intraorbitally obviates preoperative weight selection and intraoperative implant wrapping. Also, the intraorbital location reduces the potentially unsightly bulk effect over the tarsus. The technique of placing the implant in an intraorbital space attached to the levator aponeurosis provides excellent results without complication in standard lagophthalmic cases. Gold is biologically inert. None of our patients had inflammation/infection from the implantation. Aesthetic outcomes were equally satisfying, as the shape and thinness of gold are cosmetically subtle. In addition, gold is of the proper coloring to hide well beneath the thin tissue of the septum, orbicularis, and skin (Fig. 7, A and B).

We have had excellent results with patients in a wide age range (15 to 92 years) and consequently a wide range of skin quality (various thickness and elastic characteristics). Not only is intraorbital gold weight implantation an effective treatment for lagophthalmos, it is a time- and cost-effective intervention. We believe that the time and added steps of selecting weights and wrapping them for implantation is not warranted and probably does not add to the stability or effectiveness of the implant. This approach of a standard weight, technique, and placement streamlines an effective treatment for lagophthalmos.

REFERENCES

1. Gilliland GD, Wobig JL, Dailey RA. A modified surgical technique in the treatment of facial nerve palsies. *Ophthal Plast Reconstr Surg* 1998;14:94–8.
2. 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;104:1624–34.

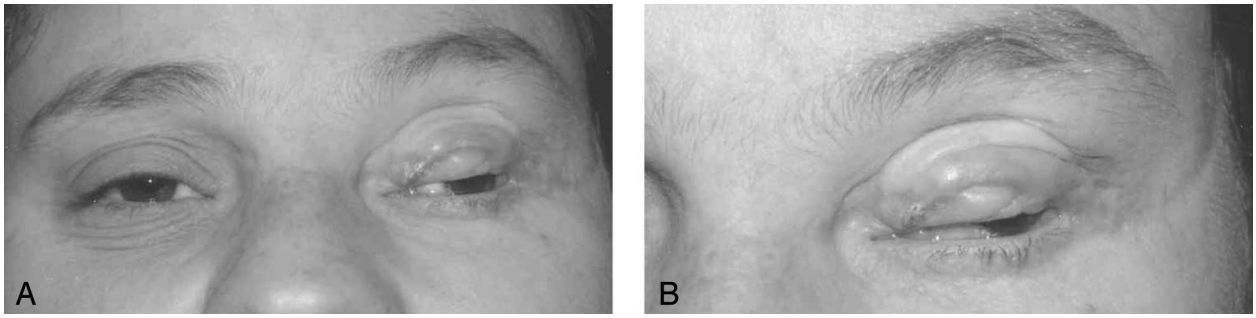

FIG. 6. A, Patient with extruding implant, 2 years after insertion. B, Close-up of extruding gold implant.

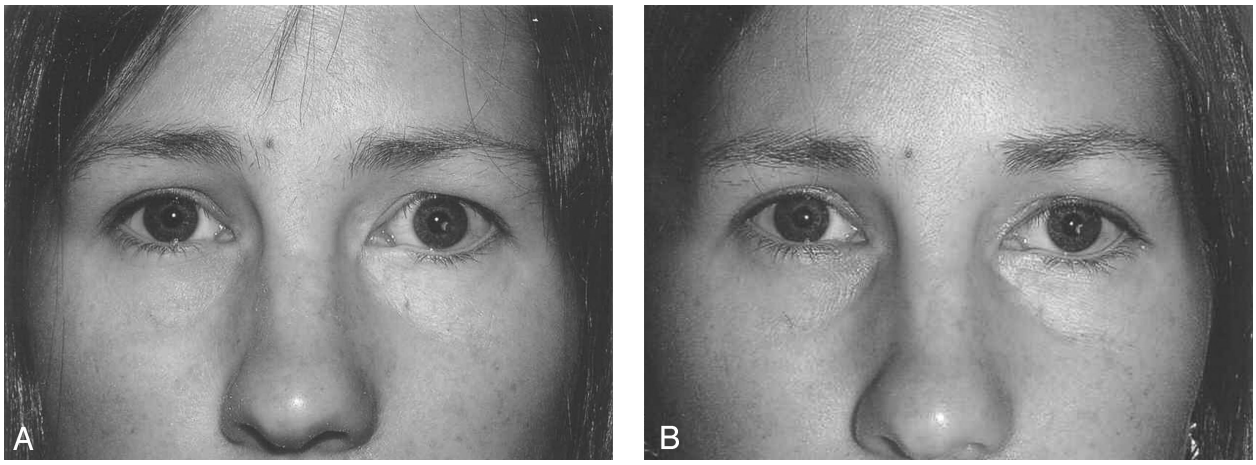

FIG. 7. A, Preoperative appearance. B, Ten days after surgery.

3. Gilbard SM, Daspit CP. Reanimation of the paretic eyelid using gold weight implantation. *Ophthal Plast Reconstr Surg* 1991;7:93–103.
4. Townsend DJ. Eyelid reanimation for the treatment of paralytic lagophthalmos: historical perspectives and current applications of the gold weight implant. *Ophthal Plast Reconstr Surg* 1992;8:196–201.
5. Gladstone GJ, Nesi FA. Management of paralytic lagophthalmos with a modified gold-weight implantation technique. *Ophthal Plast Reconstr Surg* 1996;12:38–44.
6. Misra A, Grover R, Withey S, et al. Reducing postoperative morbidity after the insertion of gold weights to treat lagophthalmos. *Ann Plast Surg* 2000;45:623–8.
7. Harrisberg BP, Singh RP, Croxson GR, et al. Long-term outcome of gold eyelid weights in patients with facial nerve palsy. *Otology Neurotology* 2001;22:397–400.
8. Tremolada C, Raffaini M, D'Orto O, et al. Temporal galeal fascia cover of custom-made gold lid weights for correction of paralytic lagophthalmos: long-term evaluation of an improved technique. *J Craniomaxillofac Surg* 2001;29:355–9.
9. Choo PH, Carter SR, Seiff SR. Upper eyelid gold weight implantation in the Asian patient with facial paralysis. *Plast Reconstr Surg* 2000;105:855–9.
10. Kersten RC, Kulwin DR, Locastro AJ. Reanimation of the paretic eyelid [letter]. *Ophthal Plast Reconstr Surg* 1992;8:305–6.
11. Jacob JT, Pendleton K, Broussard E, et al. Porous alloplastic material encasement of gold weights for the treatment of paralytic lagophthalmos. *Ophthal Plast Reconstr Surg* 1999;15:401–6.
12. Bair RL, Harris GJ, Lyon DB, et al. Noninfectious inflammatory response to gold weight eyelid implants. *Ophthal Plast Reconstr Surg* 1995;11:209–14.