The AIRO Lower Eyelid Spacer for Paralytic Ectropion

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Introduction

Protection of the ocular surface is conferred by four key mechanisms: Bell's phenomenon, the tear film, corneal sensation, and eyelid closure. Damage to cranial neve VII, the facial nerve, whether iatrogenic, traumatic, ischemic, or idiopathic causes ipsilateral facial paralysis and, in particular, paralysis of the orbicularis oculi muscle and eyelid closure. The resultant paralytic ectropion and lagophthalmos can lead to exposure keratopathy and a poor aesthetic. Definitive management of paralytic ectropion is surgical, and the goals of surgery are to improve comfort and aesthetic appearance, decrease drop and ointment dependence, and improve lagophthalmos. There are a variety of surgical options to address paralytic ectropion, including canthoplasty, tarsorrhaphy, suspension techniques with fascia lata or auricular cartilage, and placement of lower eyelid spacer implants. The Su-Por AIRO lower eyelid implant is a novel implant for paralytic lower eyelids made of thin profile porous polyethylene which has an ability to biointegrate.

Methods

A prospective nonrandomized interventional case series was conducted on patients who had the Su-Por AIRO lower eyelid implant between September 2017 to December 2017 on consecutive patients with unilateral paralytic ectropion. Written informed consent was obtained prior to surgical intervention. All patients underwent AIRO lower eyelid spacer implantation and canthoplasty by a single surgeon (MAB). Patients were followed at approximately 1 week, 1 month, 3 months, and 6 months postoperatively. The primary outcomes were change in symptoms, in margin-reflex distance 2 (MRD 2) and in lagophthalmos from preoperative to last follow up. Secondary outcomes were intraoperative complications, implant exposure or infections, and need for reoperation. There were no exclusion criteria.

Surgical Technique

After local anesthetic is injected in the lateral canthus and lower eyelid, a 4-0 silk traction suture in placed in the lower eyelid margin and tied. A corneal protector is placed. The suture clamped to the drape superiorly so the eyelid is on stretch. A subciliary incision is created with a 15 blade. Sharp dissection is carried out through the orbicularis fibers and then inferiorly in a suborbicularis plane to create a pocket for the implant. The septum is incised to reveal the three lower eyelid fat pads with care to identify and avoid the inferior oblique muscle. A canthoplasty is performed in standard fashion. The implant is placed in the paralytic lower eyelid anterior to the fat pads, posterior to the orbicularis, and inferior to the tarsus under no tension. No suturing is required to fixate the implant. The skin is closed with a combination of interrupted 6-0 vicryl and running 6-0 prolene.

Results

Four patients underwent AIRO lower eyelid spacer implantation and canthoplasty during the study period and were followed for an average of 4.6 months (range: 0.7 to 6.3 months). Mean age was 68.6 years with 3 female. Three patients had iatrogenic facial nerve palsy, and one had a nonresolving Bell's palsy. Three patients had previous surgery for paralytic ectropion: one patient had lower eyelid fascia lata suspension and subsequent repeat ectropion repair and fascia lata suspension; the second patient had lower eyelid fascia lata suspension and ectropion repair; and, the third patient had ectropion repair and midface lift. Two underwent right-sided AIRO implantation, and two underwent left-sided AIRO implantation.

Mean preoperative MRD 2 was 4.75 (range: 3 to 6 mm), and mean preoperative lagophthalmos was 3.75 (range: 4 to 6 mm). Mean postoperative MRD 2 was 3.75 (range: 3 to 5 mm), and mean postoperative lagophthalmos was 0.0625 (range: 0 to 0.25 mm). There were no intraoperative complications. There were no instances of implant exposure or infection. No implants were palpable once placed in the lower eyelid. All patients were more comfortable postoperatively and had decreased drop and ointment dependence. No patients required reoperation for paralytic ectropion (Figures 1-4).

Discussion

Surgical management of paralytic ectropion is multifaceted, and surgeons have employed a variety of different procedures to address the lower eyelid malposition and increase patient comfort. Often these are used in combination with gold or platinum weight implantation in the upper eyelid, with the goal of eliminating lagophthalmos and preventing exposure keratopathy and corneal decompensation.

A different porous polyethylene implant, the MedPor lower eyelid spacer, has been used previously for paralytic ectropion and lower eyelid retraction. Although initial reports showed good success,[1] this implant fell out of favor due to high incidence of implant exposure in one study; the implant exposed through the skin in 5 eyelids of 32 patients within 16 weeks of implantation.[2] Overall, one third of patients (11 of 32) in this study required surgical revision. This implant was placed through a subciliary incision deep to the orbicularis and sutured to the inferior tarsus, and inferiorly it extended to the orbital rim or beyond the rim. A minority of patients in this series had paralytic ectropion (12 of 32); the rest had lower lid retraction from a variety of other mechanisms. Those patients with facial nerve palsy actually did better postoperatively, with 75% with a "good final outcome". A Chinese study also showed good functional results and no exposures for MedPor lower eyelid spacer placement combined with canthoplasty in 32 patients with paralytic ectropion.[3]

In our study, the Su-Porlower eyelid AIRO implant shows promising early success, with improved patient comfort, less eye drop dependence, improved MRD 2 and improved lagophthalmos in all patients without implant-related complications. The AIRO lower eyelid implant is a useful addition to canthoplasty alone because it provides a more robust structure to the paralytic lower eyelid than can be achieved by eyelid shortening alone. The AIRO implant is not fixated to the tarsus, nor does it rest on the inferior orbital rim. We believe that exposure of the fat pads allows for better vascular ingrowth into the implant and stability which also resists migration, exposure, and problems in downgaze.

Future prospective studies and longer follow up are necessary to evaluate the long term success of the Su-Por AIRO lower eyelid spacer implant.

Conclusions

The Su-Por AIRO lower eyelid spacer is advantageous in its thin profile design and ability to biointegrate. In paralytic eyelids that require spacer, the use of the AIRO lower eyelid spacer avoids having a donor site and associated morbidity. Through narrower indications and altered surgical technique than prior lower eyelid spacers, the AIRO lower eyelid implant shows initial success in improving margin-reflex distance 2 and lagophthalmos in patients with paralytic ectropion. Since this pilot study, more implants have been successfully placed by the primary surgeon.

References

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