American Journal of Ophthalmology Case Reports xxx (xxxx) 101805

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.ajocasereports.com/

Tarsoconjunctival flap for scleromalacia related to treatments for conjunctival melanoma

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ARTICLE INFO

Keywords:
Scleromalacia
Flap
Tectonic
Ocular surface surgery

ABSTRACT

Purpose: To describe the use of a tarsoconjunctival pedicle flap for the repair of scleral melt secondary to treatment of conjunctival melanoma.
*Observation:*A 67-year-old woman developed progressive scleromalacia after multiple treatments for an American Joint Committee on Cancer cT2d category conjunctival melanoma. Prior to referral, she underwent synchronous topical chemotherapy (interferon, 5-fluorouracil, mitomycin). Then, incomplete tumor regression led to excision with adjuvant cryotherapy. Lastly, systemic metastasis treated with systemic immunotherapy provided durable remission. However, her multiple treatments (e.g., topical chemotherapy, resection, cryotherapy) were associated with progressive nasal bulbar scleromalacia treated by conjunctival advancement and amniotic membrane grafts. Sclera reinforcement was achieved after a tarsoconjunctival flap was affixed to the eye to cover, and thus vascularize the scleral defect. The tarsoconjunctival flap provided 5 years of tectonic support.
Conclusions: and Importance: Tarsoconjunctival pedicle flaps can provide scleral integrity for a patient with progressive scleral melting.

1. Introduction

Conjunctival melanoma is rare, but scleral thinning is common.[1] Scleromalacia perforans can be caused by systemic connective tissue disease, inflammatory processes (vasculitis, infection), and trauma. Scleral defects can be associated with perforation and endophthalmitis. These risks prompt the use of conjunctival advancement and scleral patch grafts to cover and seal the sclerostomy. In contrast, tarsoconjunctival flaps are most commonly used for full-thickness lower eyelid defects that extend to more than half the horizontal lid length.[2] Herein, we present a case where a sclera-affixed tarsoconjunctival flap was used to provide vascularized tissue to preserve the integrity of the globe.

2. Case presentation

A 67-year-old-female with a diffuse multifocal conjunctival melanoma had been treated with excisional biopsy, resulting in a 360° epibulbar conjunctival recession, followed by adjuvant topical chemotherapy [interferon and mitomycin 0.04%].[3–6] Upon referral to The New York Eye Cancer Center, systemic staging utilizing whole-body positron emission tomography/computed tomography (PET/CT) revealed no hypermetabolic lymph nodes or metastatic disease (AJCC T3aN0M0).[7,8] Ophthalmic oncology examination revealed a best corrected visual acuity of 20/20 in right eye and 20/50 in the left. Intraocular pressures were asymmetric at 16 and 23-mm Hg, respectively. Slit lamp examination revealed a relatively avascular ocular bulbar surface (Fig. 1, top left). Ultrasound biomicroscopy (UBM) showed no intraocular tumor invasion (uveal thickening or angle blunting). However, tumor control required additional local wide excision with cryotherapy.[9,10] Though local tumor control was achieved, progressive focal scleromalacia evolved (Fig. 1, top middle and top right). Over two years, attempts at scleral repair included conjunctival advancement and scleral patch graft surgery.

In June 2016, the patient developed progressive scleral thinning with impending perforation (Fig. 1, top right). A tarsoconjunctival flap repair with conjunctivoplasty, amniotic membrane grafting and suture tarsorrhaphy was planned.

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https://doi.org/10.1016/j.ajoc.2023.101805
Received 3 October 2022; Received in revised form 7 December 2022; Accepted 13 January 2023
2451-9936/

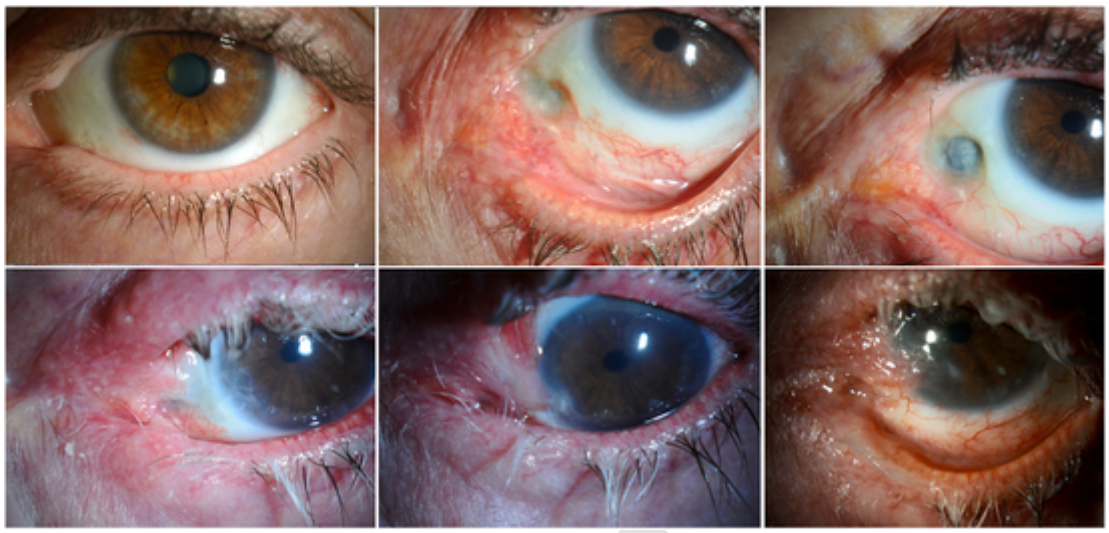

Fig. 1. Slit lamp photography, top shows the progression of scleromalacia **Top, left** shows local tumor control as well as relatively avascular perilimbal sclera secondary to conjunctival resection followed by topical mitomycin. **Top Middle**, early scleromalacia appears 5-years after local control surgery. **Top** Right, 2 years later, both conjunctival advancement, amniotic membrane, and scleral patch fail to control the scleral melt. **Bottom, left** note the tarsoconjunctival flap taken from the ipsilateral upper lid is used to patch the impending perforation. **Bottom,** eye lash poliosis was due to immunotherapy. **Bottom middle and right,** note the progression of the fibrovascular flap towards and onto the cornea.

3. Tarsoconjunctival flap technique

Under general anesthesia, the left upper eyelid was everted, a tarsoconjunctival flap was measured and marked with a tissue dye long enough to extend beyond the measured bulbar scleral defect. The edge was raised with a 0.3 mm forceps and tarsus was carefully separated from its Muller's muscle adhesions. Once the flap was free, it was rotated so that the conjunctival side was facing out and the sticky side was covering the scleral defect (Fig. 2).

The flap was then anchored as to cover the scleral defect with inferior and temporal episcleral absorbable sutures. In that the nasal sclera was very soft and would not hold sutures, the medial conjunctival adhesions were dissected from sclera, sewn to and thus anchor the medial aspect of the graft. A super thick, hand-cut to size, amniotic membrane AmnioGuard (Model AGD, Miami, Florida, USA) was used to fill the tarsal defect, thus acting as a barrier to prevent adhesion of the upper lid to the eye globe.[11] The amniotic membrane suture extended through the lid and was tied externally. The amniotic membrane also extended over the medial cornea and sclera into the inferior fornix.

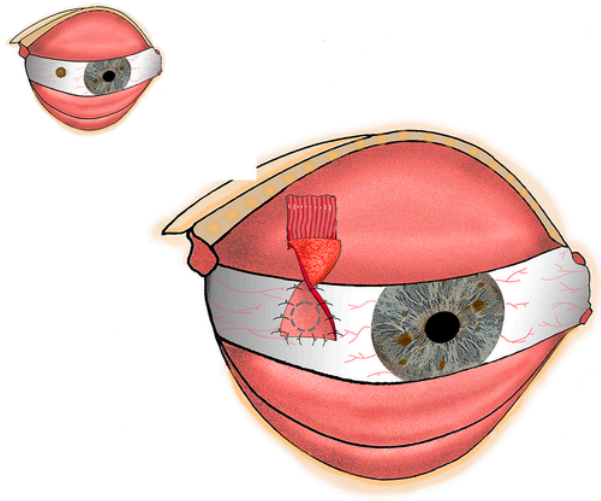

Fig. 2. Illustration of tarsoconjunctival scleral flap shows how it is inverted as to oppose the tarsal surface to the sclera, while exposing the conjunctival surface to the air (Artist credit to Robert Masini, rmasini@nyee.edu).

Periodic post-treatment slit-lamp photography was performed (Fig. 1, bottom left, middle and right). At the last follow-up, 5-years after modified tarsoconjunctival flap the conjunctival melanoma remains controlled with intact globe. Note the progression of the flap beyond the area of scleromalacia onto the devascularized sclera and cornea.

Though local control was achieved in 2009, our patient developed metastatic conjunctival melanoma 7-years after definitive local excision and cryotherapy. Fortunately, due to treatment with systemic immunotherapy, she has been in remission for 6 years (Fig. 3).[12]

4. Discussion

This case illustrates the risks of multiple treatments which are sometimes required to achieve local control of conjunctival melanoma (Fig. 3). In this case, a primary 360-degree conjunctival excision followed by treatment of bare sclera with mitomycin, induced a relative devascularization of the bulbar surface leading to scleromalacia. The risks of mitomycin treatment of bare sclera are known.[13] Both conjunctival advancement and scleral patch grafting provided temporary treatment. However, it was the novel tarsoconjunctival flap that definitively achieved tectonic scleral support.

Tarsoconjunctival flaps have been described to cover exposed orbital implants and to restore globe integrity following autoimmune or traumatic scleral melts.[14–16] A comparison of these studies with our case is shown in Table 1.

This unique case describes a 13-year course of a patient with diffuse, multifocal conjunctival melanoma. Multimodality therapy achieved local tumor control. However, sequelae of treatment were associated with scleromalacia definitively treated with a tarsoconjunctival flap and metastatic disease cured with systemic immunotherapy.

Patient consent

The patient consented to publication of the case in writing. This report does not contain any personal information that could lead to the identification of the patient. Therefore, the case conforms to the Tenet's

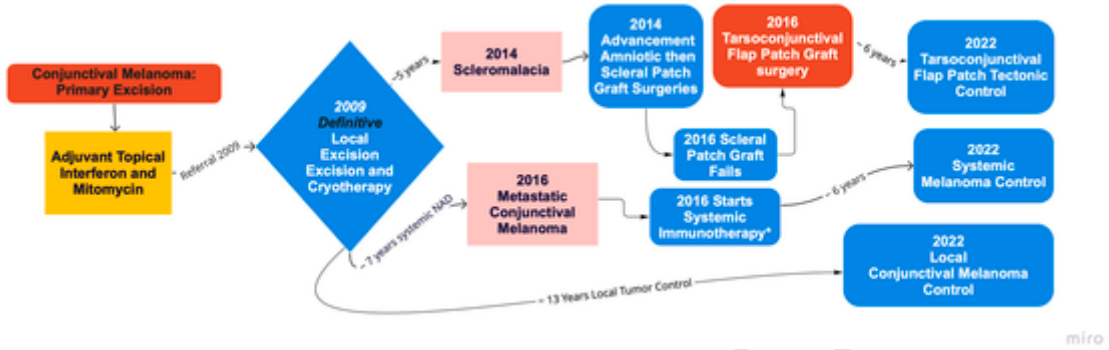

Fig. 3. A schematic time-flow diagram allows perspective of the complicated clinical course, and patient outcomes over 13-years of care.

Table 1
Outcomes of modified tarsoconjunctival flaps.

Author	Patients	Etiology	Follow-up	Outcome
Martin and Ghabrial[14]	4	Exposed orbital implant	3–18	Coverage
Davidson et al.[15]	1	Rheumatoid scleral melt	3	Globe integrity
Hughes et al.[16]	1	Traumatic scleral melt	2	Phthisis bulbi
Our case	1	Conjunctival melanoma	60	Globe integrity

Patients = number. Follow-up = months.

of Declaration of Helsinki and the Health Insurance Privacy and Portability Act. It has been approved for publication by The New York Eye Cancer Center's IRB and Ethics committee.

Intellectual property

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication with respect to intellectual property. In doing so we confirm that we followed the regulations of our institutions concerning intellectual property.

Research ethics

We further confirm that any aspects of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Authorship statement

The manuscript has been read and approved by all the authors. The requirements for authorship have been met, and each author believes that the manuscript represents honest work.

Conduct and approvals

This report conformed to the Tenets of Declaration of Helsinki, the Health Insurance Privacy and Portability Act (HIPAA) of 1996 and was approved by the IRB and Ethics Committees of The New York Eye Cancer Center.

Funding

This research was supported by The Eye Cancer Foundation http://eyecancercure.com.

Declaration of conflict of interest

None.

Acknowledgments

None.

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