

Management of Postblepharoplasty Chemosis

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Clinically significant chemosis occasionally complicates lower eyelid blepharoplasty. In this report, the etiologic components of postblepharoplasty chemosis are discussed. The time course and duration of chemosis vary according to the underlying cause. Early, late, and prolonged chemosis are managed with different strategies. Diagnostic and therapeutic algorithms for chemosis assessment and management are presented.

Keywords: [blepharoplasty](#), [complication](#), [chemosis](#), [conjunctiva](#)

Topic: [blepharoplasty](#), [chemosis](#)

Subject: [Oculoplastic Surgery](#)

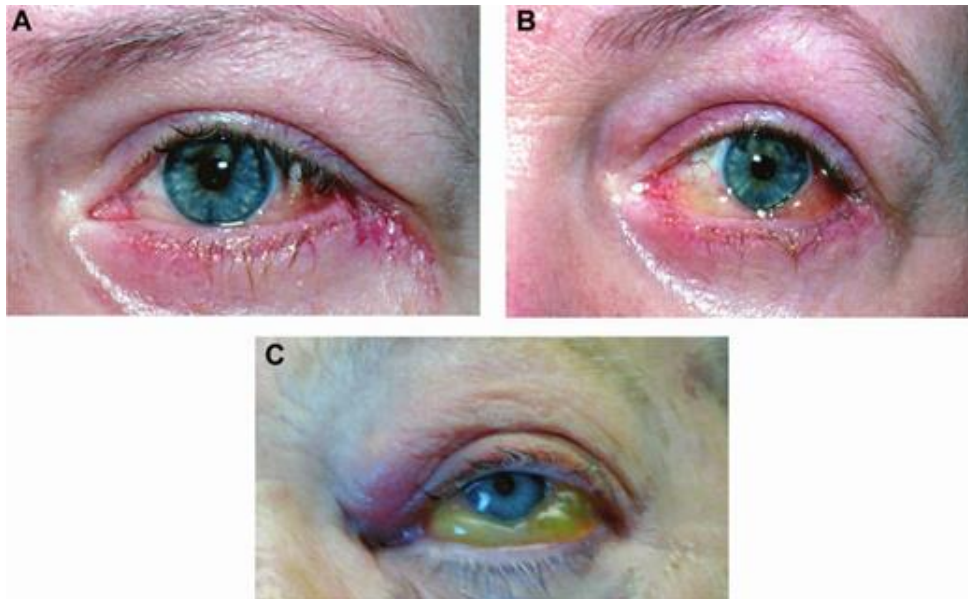
Issue Section: [Special Topic](#)

Conjunctival chemosis, a billowing or blister-like swelling of the conjunctiva, is a condition seen following blepharoplasty, particularly of the lower lid. There are predisposing factors for chemosis, including inflammation, venous congestion, and disrupted lymphatic drainage. Presentation of postblepharoplasty chemosis can vary between patients. Frequently, the most severe cases are seen immediately following surgery; however, severity may increase during the postoperative course in some patients. Chemosis can be classified by the severity of conjunctival inflammation, but in

general, it is most useful to classify the condition by degree of conjunctival prolapse between the eyelid margins, as follows (Figure 1):

1. Mild chemosis: presence of only a slight, “billowing” sheen in the conjunctiva, with slight conjunctival protrusion
2. Moderate chemosis: presence of a more pronounced conjunctival prolapse, but the eyelids can still be closed over the protruding conjunctiva
3. Severe chemosis: presence of conjunctival prolapse to the degree that it impairs eyelid closure or the ability of the eyelids to cover the cornea, even during manual attempts at closure

Figure 1



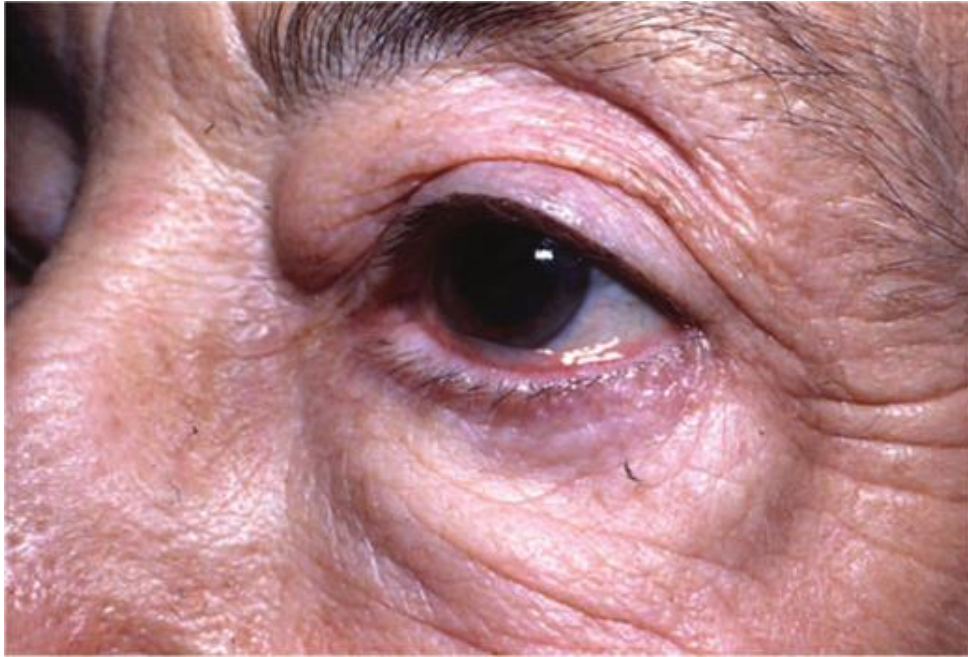
(A) This 70-year-old woman demonstrates mild, acute chemosis 1 week after lower blepharoplasty with canthoplasty. No conjunctival prolapse over the lid margin is present. (B) This 48-year-old woman demonstrates moderate, acute chemosis 1 week after lower blepharoplasty. Conjunctival swelling obscures the meibomian gland orifices focally on the lateral aspect of the lower lid. Eyelid closure is not impaired. (C) This 70-year-old woman demonstrates moderate, acute chemosis 1 week after lower blepharoplasty with canthoplasty. The eyelids cannot close completely due to prominent conjunctival edema.

Chemosis, in any category, is generally accompanied by inflammation at the outset. Late chemosis may or may not involve a persistent inflammatory process since, commonly, secondary mechanical factors in the cornea and eyelids may contribute to its persistence.

Causes and Predispositions

Chemosis occurs as a result of conjunctival response to a variety of inflammatory conditions of the eye or eyelid, including allergy, infection, and trauma (surgical or otherwise). Chemosis may also occur as the result of orbital inflammation due to trauma, infection, or inflammation, including idiopathic orbital inflammation and Graves disease. It is not restricted to humans and occurs in a variety of animals under similar conditions. Since chemosis occurs in a myriad of nonsurgical situations, it is reasonable to maintain that inflammation (as a response to the trauma of surgery) is likely the initial cause of postblepharoplasty chemosis. Other factors have been implicated as well, such as impairment of the eyelid and orbital lymphatic drainage. Lymphatic drainage has been documented in the orbit and eyelids, but the pathways remain inconsistent in present studies.¹⁻⁶ It has also been suggested that chemosis can be stimulated as a result of canthal surgery (canthopexy or canthoplasty). Some series have shown that chemosis can occur as frequently as 11.5% or 12.1% of the time when canthoplasty or canthopexy has been performed and as infrequently as 1% of the time in a series in which there was no canthal anchoring.⁷⁻⁹ This occurrence has not been documented in controlled studies, but there remains a causal possibility. A definite predisposition for postblepharoplasty chemosis exists in certain patients who have preexisting laxity and folding of the conjunctiva (conjunctivochalasis; [Figure 2](#)), poor eyelid closure mechanics, lower lid laxity, or preexisting ocular surface disease.¹⁰

Figure 2



This 68-year-old woman exhibits conjunctivochalasis. Notice the flat ridge of conjunctiva overriding the inferior limbal region of the cornea. No edema is evident.

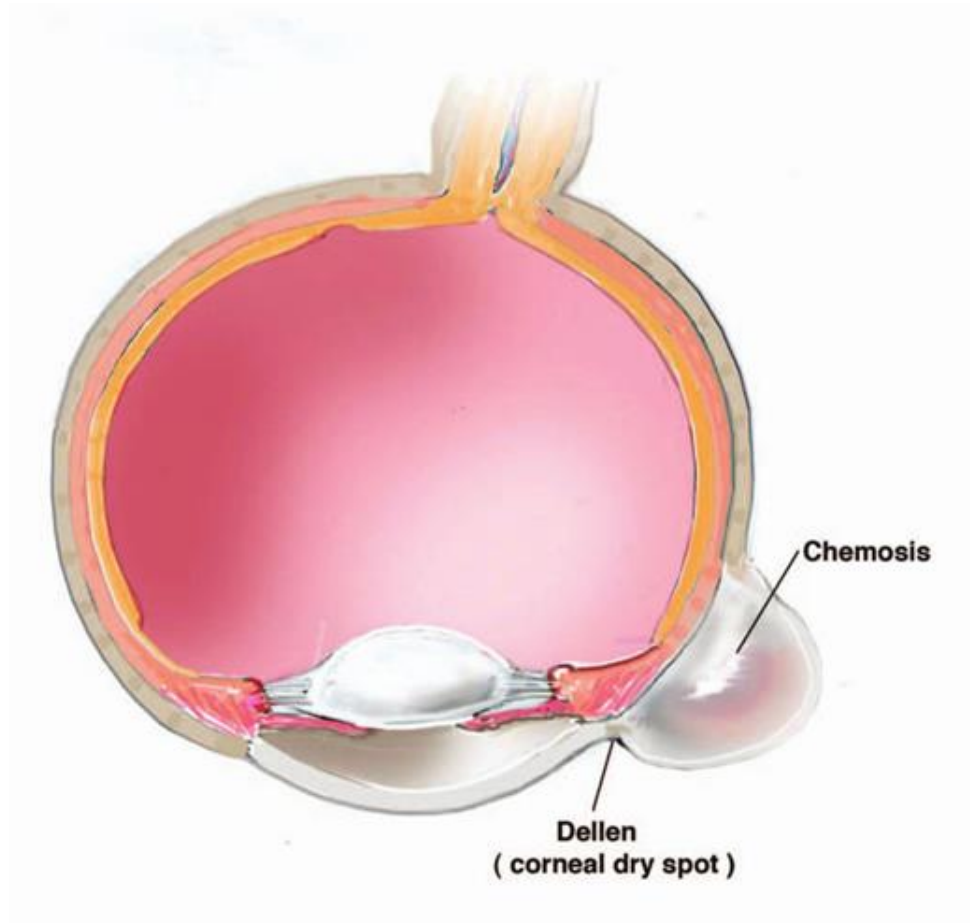
Pathogenesis

Prolongation of Chemosis

Following the onset of conjunctival chemosis caused by the traumatic inflammation from blepharoplasty, the anatomic distortion of the lid-corneal interface may establish a mechanical cycle that prolongs the condition. The swollen conjunctiva becomes dessicated and more inflamed, causing the eyelid to become further separated from the cornea, most notably at the limbus of the eye. This further interrupts the normal tear film dynamics of the ocular surface. The cornea, to maintain its transparency, has a dehydrating mechanism that acts based on tear flow over the limbal area. If the cornea is denied normal tear flow in this area due to separation of the lid from the globe, and possibly due to capillary attraction along the swollen conjunctival interface, the dehydrating mechanism will overcompensate and cause thinning of the cornea and loss of surface epithelium. This process is known

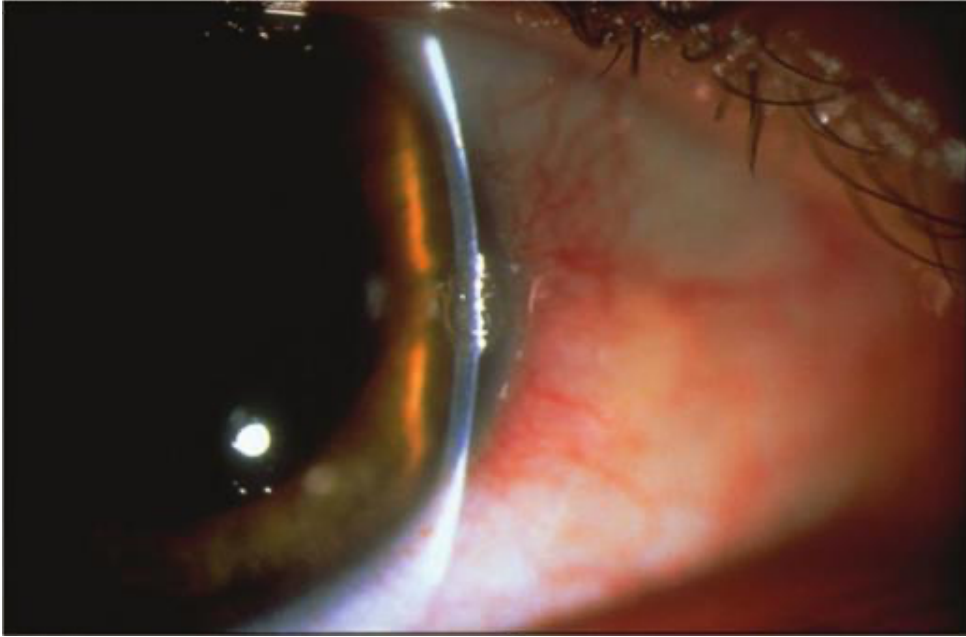
as dellen formation.¹¹⁻¹³ Dellen formation further stimulates a local inflammatory response that, in turn, feeds back into the process and worsens the chemosis. It is important to break this feedback cycle using lubrication or patching to achieve resolution of chemosis (Figures 3–5).¹⁴⁻¹⁶

Figure 3



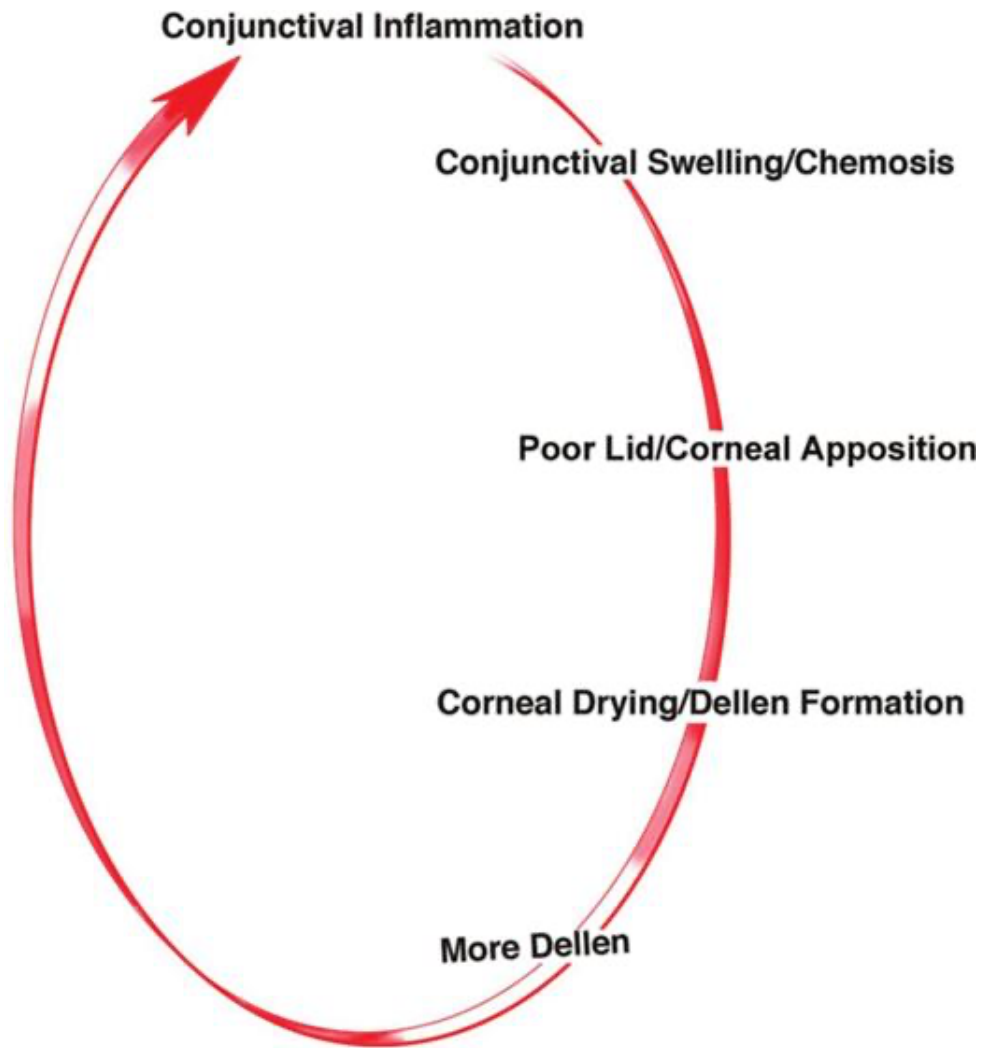
The anatomic elements of dellen formation. Conjunctival chemosis causes a focal area of dryness in the adjacent limbal cornea due to multiple factors, including osmotic drag of the tear film away from that region focally.

Figure 4



A slit lamp photomicrograph demonstrates dellen formation of the cornea adjacent to conjunctival chemosis in this 40-year-old woman. A thin beam of light illuminates focal irregularities in the corneal surface.

Figure 5

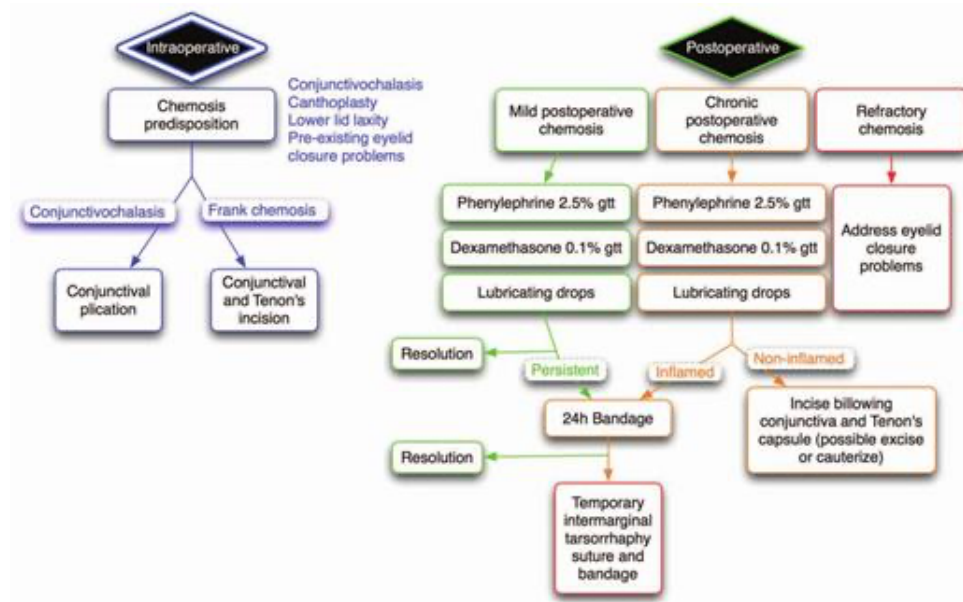


The sequence of events producing a positive “feedback” cycle of chemosis and dellen formation.

Treatment

A comprehensive algorithm for chemosis management is presented in [Figure 6](#).

Figure 6



A comprehensive algorithm for chemosis management.

Preoperative

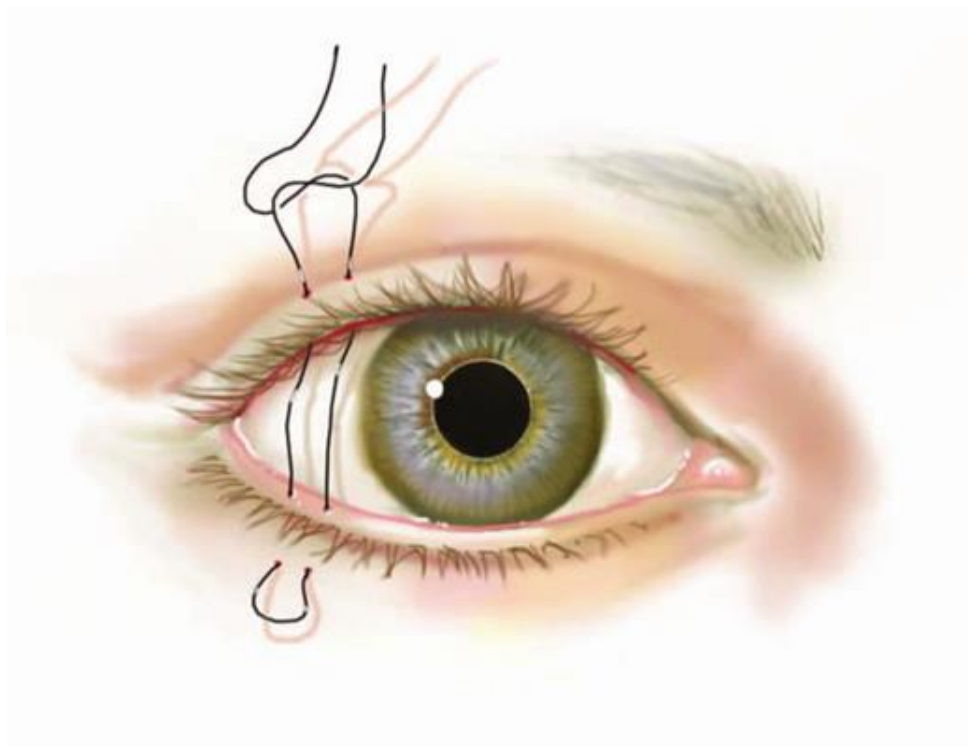
Recognition and correction of preexisting ocular surface disorders, conjunctivochalasis, poor eyelid closure mechanics, and lower lid laxity must be taken into consideration as part of the surgical plan to avoid or minimize postoperative chemosis. Prophylactic treatment with anti-inflammatories such as topical steroid eye drops, systemic steroids, or COX-2 inflammatory inhibitors (Celebrex; Pfizer, New York, New York) may reduce inflammation and possibly reduce or avoid chemosis in the postoperative patient.

Intraoperative

Sometimes, chemosis can be observed forming intraoperatively, particularly in patients with preexisting conjunctivochalasis, and should be addressed at that time. Intraoperative intermarginal suture placement may be useful in some cases of mild swelling; a tarsorrhaphy suture may suffice (Figure 7). In other, more severe cases, simple surgical procedures to halt the chemosis may be performed intraoperatively. Plication of redundant conjunctiva can be

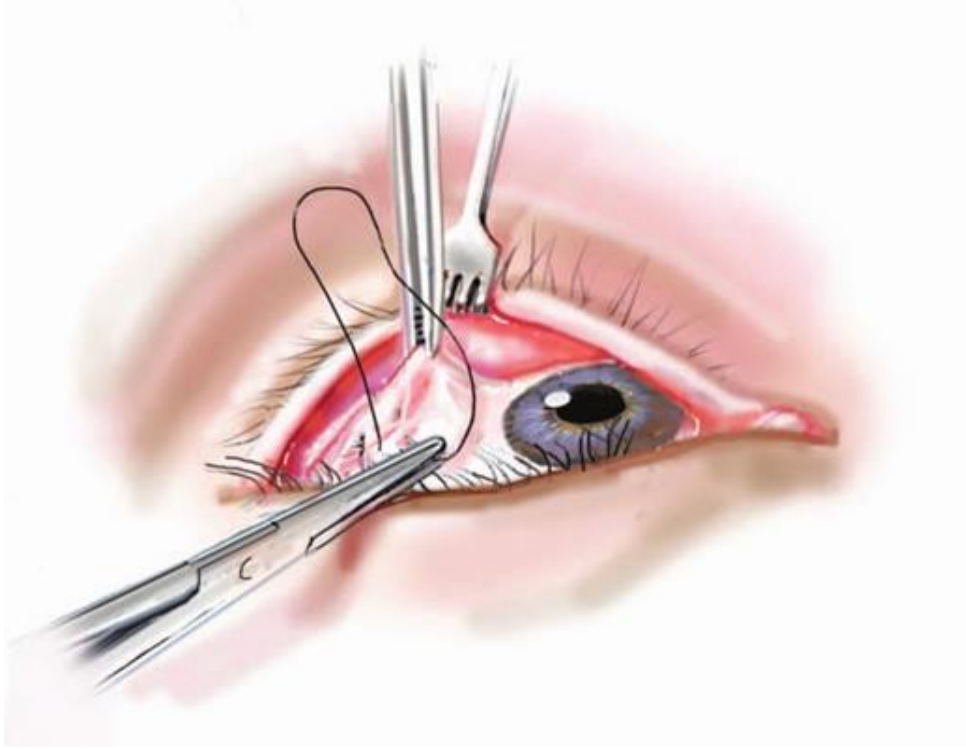
performed with 6-0 plain sutures, placed in the fornix to add tension to the loose conjunctiva ([Figure 8](#)), thereby preventing conjunctival ballooning. A 1-snip procedure can release accumulating fluid in the conjunctival balloon ([Figures 9 and 10](#)). The snip should be made through the bulbar conjunctiva and penetrate the underlying Tenon's capsule (fascia bulbi), which is mildly adherent to the undersurface of the conjunctiva, to allow release of fluid buildup.¹⁷ More extensive opening of the conjunctiva to relieve chemosis has been reported,^{18,19} but in the authors' experience, a 1-snip procedure adequately allows the needed release of fluid. A video of the authors' intraoperative single-snip treatment technique is available at www.aestheticsurgeryjournal.com. You may also use any smartphone to scan the code on the first page of this article to be taken directly to this video on www.YouTube.com.

Figure 7



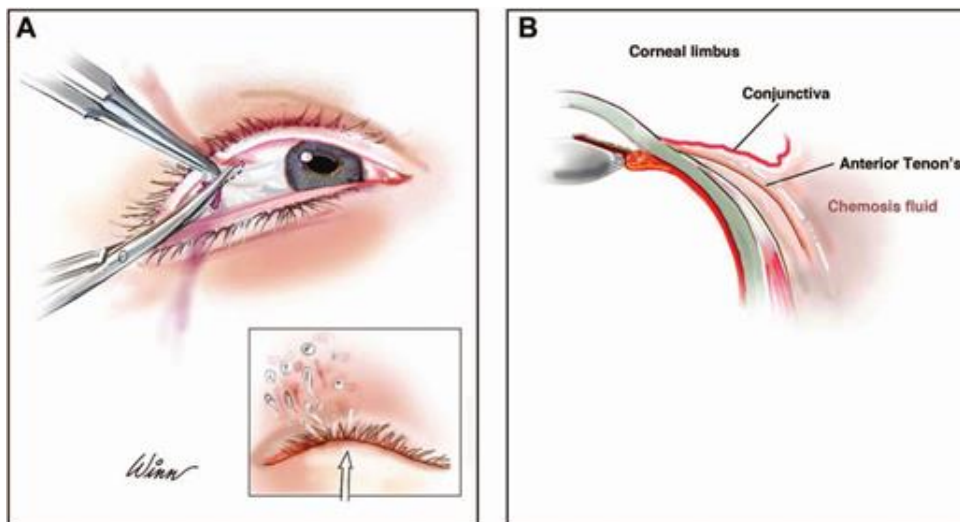
Intraoperative intermarginal suture placement or tarsorrhaphy prevents postoperative chemosis. This maneuver is usually performed with 6-0 nylon. Sutures enter and exit the eyelids at mid-thickness and are placed to avoid potential contact with the ocular surface.

Figure 8



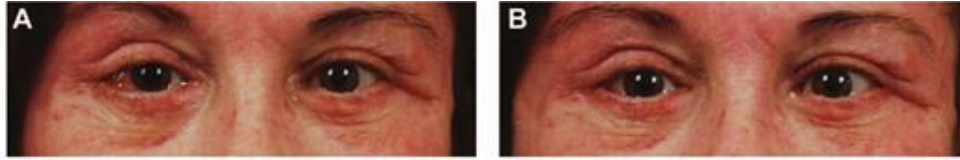
Intraoperative plication of bulbar conjunctiva near the lower fornix prevents postoperative chemosis. A fast-absorbing suture is used and is placed away from the cornea.

Figure 9



One-snip conjunctivotomy to release chemotic fluid. (A) The underlying Tenon's capsule is spread with scissors to allow fluid egress. (B) The relationship between conjunctiva, Tenon's capsule, and chemotic fluid is shown. Penetration through Tenon's capsule is needed for maximum fluid release.

Figure 10



(A) This 63-year-old woman presented with chemosis 10 days after a lower lid blepharoplasty. (B) Same patient immediately after 1-snip conjunctivotomy, performed in the office, with almost complete resolution of the bulging conjunctiva.

Instillation of anti-inflammatory and vasoconstrictive eye drops, phenylephrine 2.5%, and topical cortisone drops (1% Pred Forte; Allergan, Irvine, California) is also beneficial in reducing inflammatory response in the conjunctiva ([Figure 11](#)). Treatment with these can be combined with the other intraoperative maneuvers described in this section.

Figure 11



Ophthalmic preparations of 2.5% phenylephrine and 1% dexamethasone.

Postoperative

Early Chemosis (First Week)

Mild chemosis

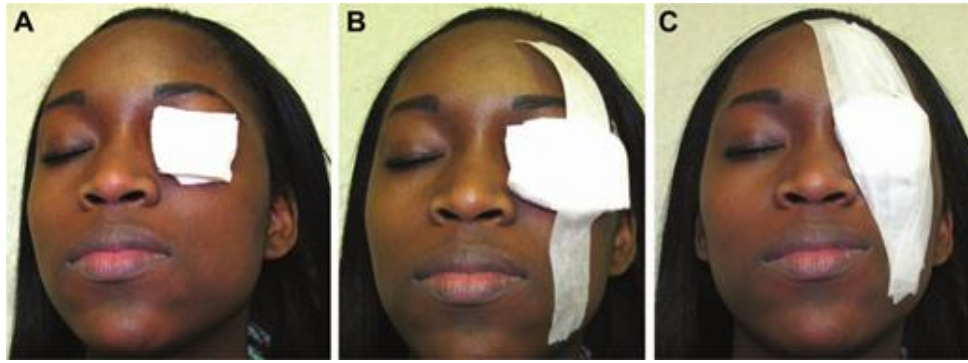
Mild chemosis, which is seen in the early postoperative period, may be treated successfully with 2 drops of 2.5% ophthalmic phenylephrine and dexamethasone eye drops and

standard ocular lubricants. These are only to be administered in the physician's office. They have a very beneficial effect on chemosis, purportedly because they restabilize the conjunctival vasculature and reduce inflammation (e-mail communication with Dr. Zane Pollard, pediatric ophthalmologist). In some mild cases, chemosis can resolve by the next office visit. Patients are also instructed to use lubricants at home. In addition, initiating a temporary low-carbohydrate diet that restricts carbohydrates to less than 20% of caloric intake can often facilitate reduction of swelling.

Moderate chemosis

When chemosis is more severe, occlusion of the eyelids with firm patching for 24 hours should supplement the office administration of phenylephrine and dexamethasone drops and use of lubricants, ointment, and eye drops in mild cases. Depending on the severity of chemosis, the patch can be left in place for 1 to 2 days, at which time the eye can be rechecked. It is imperative that eye patching be performed properly ([Figure 12](#)) so that it accomplishes complete closure of the eyelids with corneal coverage and creates firm pressure on the eye, both of which will reduce the chemosis. If they experience severe pain, patients are instructed to remove the patch early and begin topical antibiotic drops for treatment of presumptive corneal abrasion due to incomplete closure under the patch. Additional systemic anti-inflammatories (Medrol dose pack; Pfizer) may be combined with pressure eye patching.

Figure 12



The authors' method of performing eye patching for chemosis is demonstrated on this 28-year-old woman. Three oval eyepads and multiple strips of 1-inch paper tape are used. (A) The first eyepad is folded, moistened with saline, and placed over closed eyelids. (B) The second 2 eyepads are placed on top of the first one and anchored with strips of paper tape. (C) Multiple strips of tape anchored on the forehead and cheek are used to further compress the eyepad.

Severe chemosis

In cases of impaired eyelid closure or failure of eye pressure patching, conjunctivotomy with release of fluid should be administered. This can be performed easily with only topical anesthetic (tetracaine) and 2.5% phenylephrine for vasoconstriction. Afterward, pressure patching of the affected eye should be applied for at least 2 days and systemic anti-inflammatories should be used. Following this regimen, additional treatment can be employed depending on how well the patient responds.

Later Chemosis (2–3 Weeks)

On occasion, despite the use of steroid drops and lubricants, recurring chemosis may persist. If chemosis is allowed to become more chronic and inflammation has subsided, additional changes in the cornea may prolong the condition. As described above, the cornea may become dehydrated adjacent to the chemotic conjunctiva. Loss of corneal epithelial integrity causes further irritation and inflammation in the conjunctiva, thereby perpetuating chemosis. This “feedback” cycle must be broken with firm

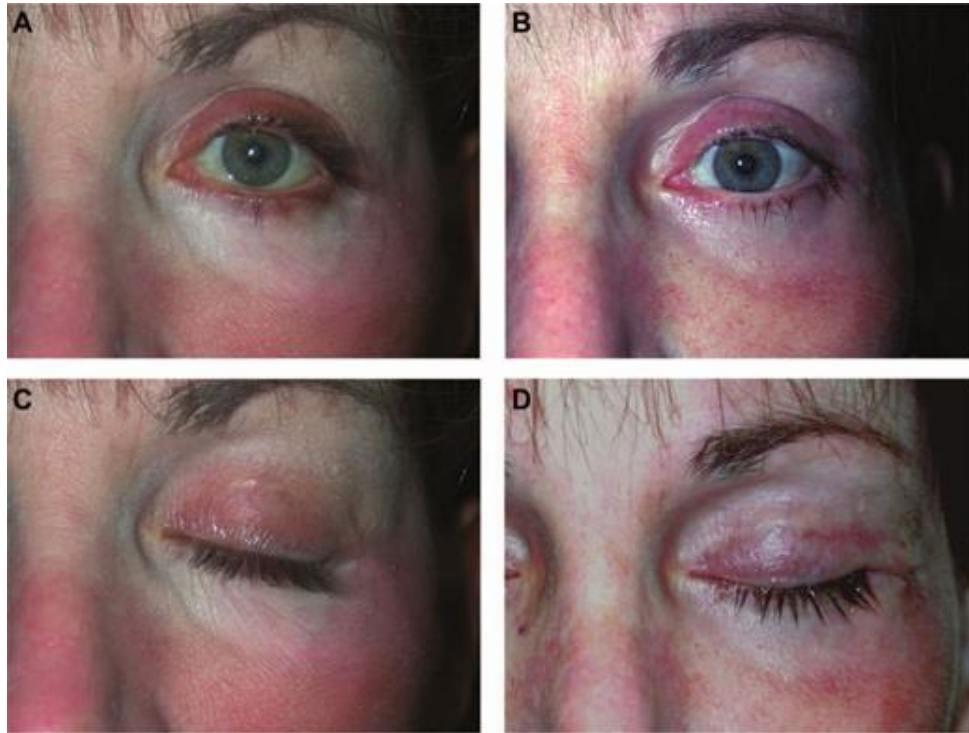
patching of the affected eye.

At this point, the conjunctiva may appear to have little inflammation, appear more white in color, and take the appearance of a noninflamed blister. Anti-inflammatory will no longer be effective at this stage. The most efficient course of resolution is to release fluid within the chemotic blister with a 1-snip conjunctival opening, as described above. It is advisable to apply a mild-pressure eyelid bandage afterward to compress the conjunctiva.

Prolonged Chemosis (1 or More Months)

Uncommonly, chemosis persists even after all of the above measures have been taken. One author (C.D.M.) has consulted on cases of chemosis that have persisted for several months to a year despite all conventional efforts at resolution. In these cases, it is common to see dysfunction in eyelid closure mechanics as the underlying etiology. In some cases, there may be no lower lid malposition or stiffness in the upper lid, but only a “fish-mouthing” type of poor lid closure due to canthal laxity. A video demonstrating this phenomenon is available at www.aestheticsurgeryjournal.com. You may also use any smartphone to scan the code on the first page of this article to be taken directly to this video on www.YouTube.com. With these prolonged cases, it is important to diagnose and correct any lagophthalmos, closure problems, or lower lid laxity that may exist. In every case seen by the authors thus far, correction of dysfunctional eyelid problems has allowed remission of longstanding chemosis ([Figure 13](#)).

Figure 13



(A, C) This 43-year-old woman presented with chronic chemosis that had lasted a year following blepharoplasty. The patient exhibits poor eyelid closure with “fish-mouthing” movement at the lateral canthus. A different patient seen by an author (C.D.M.) with this condition is demonstrated in a video available at www.aestheticsurgeryjournal.com. You may also use any smartphone to scan the code on the first page of this article to be taken directly to the video on www.YouTube.com. (B, D) The patient is shown 4 weeks after drillhole canthal anchoring with repositioning of the eyelids. Chemosis was resolved and normal eyelid closure mechanics were restored.

Conclusions

Postblepharoplasty chemosis can generally be considered a postoperative (or intraoperative) inflammatory response in the conjunctiva that may or may not persist regardless of our proposed algorithm for management. Intraoperative detection and utilization of intermarginal sutures or forniceal 1-snip procedures can help prevent severe postoperative chemosis. Initial postoperative management is aimed at controlling the inflammatory component of the pathophysiology. However, as the chemosis becomes more chronic, it is important to diagnose and treat any associated

mechanical problems, including conjunctivochalasis, fixed and noninflamed blistering, and eyelid mechanical abnormalities.

Disclosures

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