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Prolonged chemosis can be frustrating particularly following combined upper and lower eyelid blepharoplasty surgery or following very large eyelid reconstruction cases. Many known risk factors for prolonged chemosis include previous periocular surgery, ocular allergy, thyroid orbitopathy, lagophthalmos, preoperative conjunctivochalasis, and prior head and neck radiation. Intraoperative factors are excessive surgical manipulation, cauterization, and swelling. For procedures involving conjunctival incisions, placement of phenylephrine drops 10–20 min prior can reduce bleeding and hemorrhage risk. Intraoperatively, it is best to avoid whenever possible severing both the medial and lateral canthi of the same eyelid, placing upper and lower blepharoplasty incisions within 5 mm of each other, and making vertical incisions at the lateral canthal angle, which can sever the lateral lymphatic drainage predisposing to prolonged swelling and chemosis. Typically chemosis will spontaneously resolve, if identifiable, underlying issues are addressed. But if the chemosis is severe, it can prolapse over the lower eyelid and cause dellen formation and ongoing discomfort. If there is preoperative conjunctivochalasis, then warn the patient they are at higher risk and

consider treating with perioperative ophthalmic steroids and frequent lubricating drops/ointment.

Intraoperatively, if significant chemosis develops, at the end of the surgery I will do a small snip conjunctivotomy at its peak height, and if appropriate do a pressure patch for 24 h postoperatively. I always instruct patients to remove their dressing if pressure-type pain develops, check their vision to detect for an orbital hemorrhage, and call.

Once postoperative chemosis develops, it should ideally be addressed within a few weeks to help avoid a more prolonged course. Besides ocular lubricants, I will start with ophthalmic steroid and decongestant drops, and if no contraindications oral prednisone (40 mg po q day for 5 days). If there is unilateral asymmetry, I will often place a pressure patch after placing ocular lubricant for 24 h. Patients should also be instructed to massage the areas of chemosis by gently pushing their eyelids over the chemosis.

If this proves unhelpful for severe chemosis within a few weeks of surgery, it is best to consider surgical treatment modalities. Others have described suture placement through the chemosis down to the lower fornix, lymphatic drainage, limbal peritomy conjunctivoplasty, drainage conjunctivotomy, and perilimbal needle manipulation. I generally have found that snip conjunctivoplasty as similarly described by Jones et al. to be very helpful and a well tolerated in-office procedure (Jones et al. 2010). Topical proparacaine, phenylephrine drops to vasoconstrict the vessels, and

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povidone-iodine solution for antisepsis are placed. A small elliptical strip of conjunctiva and the Tenon's capsule at the inferior aspect of the chemotic conjunctiva is removed with Westcott scissors. Next massage is performed through the closed eyelids, which will usually cause sufficient fluid to egress. If fluid persists, then undermining of the Tenon may foster scar formation and reduce the potential space for fluid to accumulate. A drop of phenylephrine, 2.5–10 %, is instilled again at the end of the procedure to induce vasoconstriction and to reduce ocular congestion. Lastly, ocular steroid-containing ointment and a firm patch are then placed for 24 h. This has proven very successful and only rarely needs repeating particularly if topical and/or 4–5 days of systemic steroids are also prescribed.

Another modality that has been reported for refractory chemosis following combined upper and lower eyelid blepharoplasty is subconjunctival tetracycline 2 % injection (Moesen and Mombaerts 2008). Utilizing this as a peribulbar sclerosing agent is an off-label use and I have not had to utilize it following eyelid surgery but have used it on an unoperated patient that had idiopathic unilateral chemosis, which had been

refractory to topical ocular steroids, subconjunctival triamcinolone injections, and snip conjunctivoplasty with pressure patching. This patient required two injections of the 2 % tetracycline spaced a month apart but has now had resolution of the chemosis over 18 months out. These patients should be warned that the treated area could feel uncomfortable for 24–48 h.

In summary, if identified and managed early, postoperative chemosis can be minimized before the cycle of events lead to a more chronic and difficult to treat course. Patients at risk should be warned that this may occur and all patients should be instructed to notify their surgeon if they see chemosis developing to minimize its impact on their surgical healing and satisfaction.

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## References

- Jones YJ, Georgescu D, McCann JD, Anderson RL. Snip conjunctivoplasty for postoperative conjunctival chemosis. *Arch Facial Plast Surg*. 2010;12(2):103–5.
- Moesen I, Mombaerts I. Subconjunctival injection of tetracycline 2% for chronic bulbar chemosis after transcutaneous four-eyelid blepharoplasty. *Ophthal Plast Reconstr Surg*. 2008;24(3):219–20.