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## Case Report

# Combined minimally invasive conjunctival surgery with lens repositioning for traumatic bleb leak with dislocated intraocular lens

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## ABSTRACT

**Purpose:** We report a case of traumatic bleb leak following trabeculectomy and dislocated intraocular lens treated with combined minimally invasive conjunctival surgery (MICS) and lens repositioning.

**Observations:** A 36-year-old woman with a history of phacomorphic glaucoma secondary to microspherophakia and status post trabeculectomy underwent combined MICS and lens repositioning for a late-onset bleb leak and dislocated intraocular lens following minor trauma. The patient's vision rapidly improved postoperatively with prompt resolution of hypotony.

**Conclusion/importance:** MICS is an effective treatment for traumatic bleb leak following trabeculectomy that can be a particularly useful approach for patients undergoing concurrent ophthalmic surgery.

## Introduction

Glaucoma refractory to medical and laser therapy is often treated surgically with trabeculectomy with mitomycin-C, which can be complicated by leakage of the filtering bleb. Traditional conjunctival advancement approaches for bleb revision in the setting of persistent bleb leaks typically involve extensive conjunctival incisions and dissections that often lead to slow visual recovery. Minimally invasive conjunctival surgery (MICS) was recently described as a less invasive alternative for repair of bleb leaks [1]. This underutilized approach may be particularly useful when concurrently performing other ophthalmic procedures requiring extensive manipulation of the eye, which is often needed for management of ocular trauma. We present a case of traumatic bleb leak with dislocated intraocular lens (IOL) treated with combined MICS and lens repositioning, resulting in rapid visual recovery and prompt resolution of hypotony.

## Case report

A 36-year-old woman with a history of phacomorphic glaucoma (secondary to microspherophakia) and trabeculectomy in both eyes presented 11 days following a minor trauma to the right eye, in which her dog had accidentally collided with her. She immediately experienced decreased vision and increased tearing. The trabeculectomy was performed over a decade prior with subsequent recurrent

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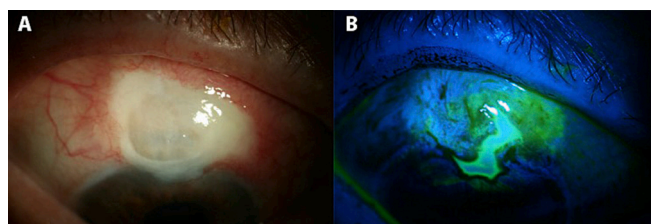
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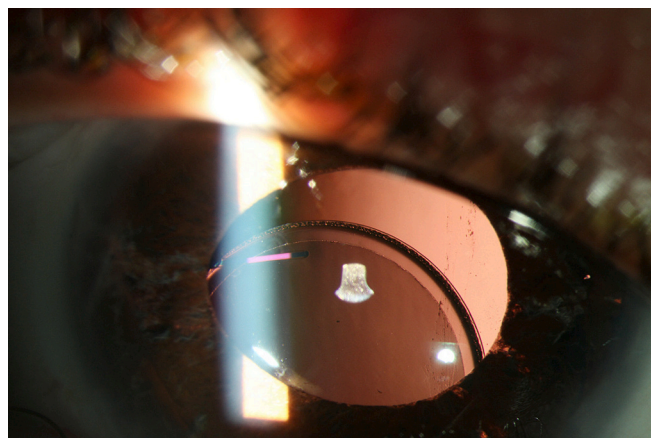
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**Fig. 1.** Pre-operative appearance of the apical bleb leak from a similar patient. (A) Superior thin, avascular bleb and (B) positive Seidel test revealing apical leak.



**Fig. 2.** Slit lamp photo of the dislocated 3-piece posterior chamber intraocular lens.

bleb leaks managed with gentamicin eyedrops. Other past surgical history included recurrent IOL dislocation status post multiple lens repositionings. Best-corrected visual acuity was 20/600 in the right eye. Intraocular pressure (IOP) was 05 mmHg. Slit lamp exam revealed a thin, avascular superior bleb with a small apical leak (Fig. 1). The cornea was notable for striae consistent with hypotony. The anterior chamber was deep and quiet. The 3-piece posterior chamber IOL was dislocated inferiorly (Fig. 2). A dilated fundus exam revealed mild optic nerve edema (from idiopathic intracranial hypertension incidentally diagnosed upon further work-up) and a vertical cup-to-disc ratio of 0.3.

The patient underwent MICS combined with lens repositioning using trans-scleral fixation of the superior haptic. After instilling Healon into the anterior chamber through a paracentesis incision, the eye was rotated downwards using a traction suture and sub-conjunctival injection of 1 % lidocaine with epinephrine was placed posterior to the avascular bleb. The ballooned conjunctiva was stretched over the bleb towards the limbus. As a modification of the previously-described procedure [1], a conjunctival relaxing incision was placed deep in the superior fornix to achieve adequate tissue laxity. Five interrupted 10–0 nylon sutures were used to anchor the leading folded edge of conjunctiva to the limbus and cover the existing bleb. The conjunctival closure was watertight after Healon was evacuated from the anterior chamber using balanced salt solution. The anterior chamber was deeply-formed with a satisfactory filtration bleb over the superior limbus and there was notable resolution of hypotony intraoperatively. IOL repositioning was then performed as follows: a conjunctival peritomy was made at the one o'clock position 1 mm posterior to the limbus, where a single 10–0 prolene suture was passed through the sclera, lassoing the superior haptic of the IOL to pull the lens into position. The peritomy was closed with a single interrupted 8–0 vicryl suture.

On postoperative day 1, pinhole-corrected visual acuity was 20/150 and IOP was 11 mmHg. Seidel testing showed no leak. The IOL was well-centered. The patient was treated with topical polymyxin B-trimethoprim 10,000 unit/mL-1 % and prednisolone acetate 1 % four times daily for one week. Prednisolone was tapered by one drop each week and then discontinued. One week later, pinhole-corrected visual acuity was 20/70 and IOP was 11 mmHg. Seidel testing showed a brisk leak at the limbus near the central nylon suture (Fig. 3). The patient started gentamicin sulfate 0.3 % drops four times daily, gentamicin sulfate 0.3 % ointment three times daily, and timolol maleate 0.5 % drops twice daily for aqueous suppression. By postoperative week 3, the leak had resolved, visual acuity returned to the patient's baseline of 20/50, and IOP was 12 mmHg. Gentamicin drops and ointment were discontinued, and timolol was switched to dorzolamide HCl 2 % twice daily due to irritation and tearing.

At postoperative month 5, recurrent IOL subluxation inferiorly and posteriorly prompted a pars plana vitrectomy and replacement of the posterior chamber IOL with an anterior chamber intraocular lens (ACIOL) through a temporal clear corneal incision to avoid the site of prior MICS. At the most recent follow-up visit at postoperative month 13, visual acuity was 20/50 and IOP was 10 mmHg. The bleb was Seidel negative and the ACIOL was well-positioned (Fig. 4). The patient continued to use dorzolamide HCl-timolol maleate

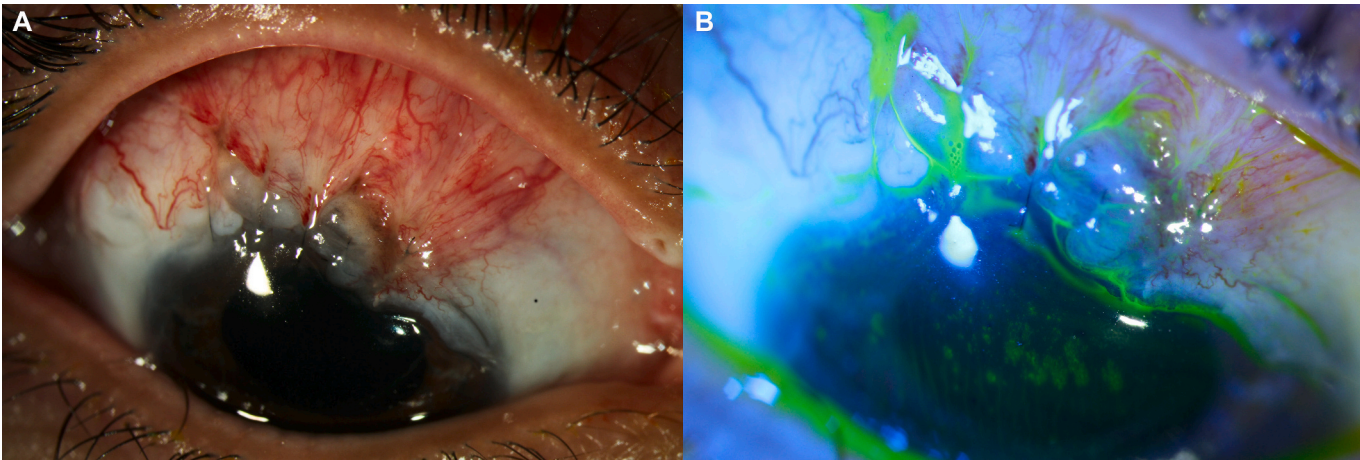
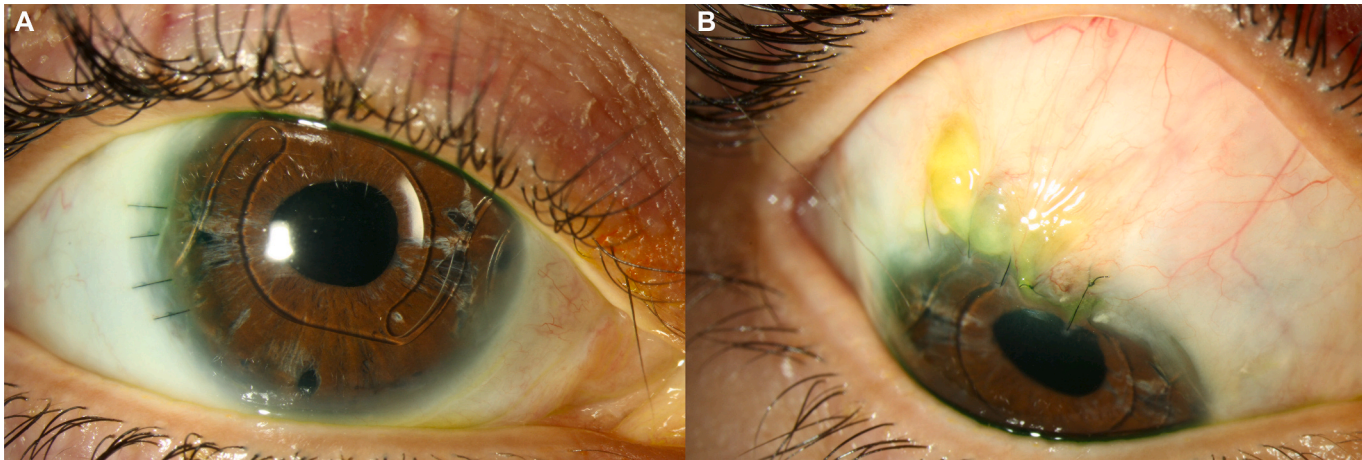


Fig. 3. Postoperative week 1 following minimally invasive conjunctival surgery (MICS) and lens repositioning. (A) Superior bleb with limbal nylon sutures and (B) positive Seidel test revealing moderate leak at limbus adjacent to central nylon suture that subsequently resolved at postoperative week 3.



**Fig. 4.** Postoperative week 2 following lens replacement with anterior chamber intraocular lens (performed 5 months after combined MICS and lens repositioning surgery). (A) Anterior chamber intraocular lens in good position with (B) Seidel negative, low-lying diffuse bleb.

22.3–6.8 mg/mL twice daily for long-term aqueous suppression to prevent future bleb leaks.

## Discussion

Trabeculectomy with mitomycin-C effectively lowers IOP by draining aqueous fluid from the anterior chamber and creating a filtering bleb [2]. However, late-onset bleb leaks (occurring at least 3 months postoperatively) occur in 5.9–8 % of trabeculectomies with mitomycin-C [3,4]. Greenfield and Parrish (1996) reported a case of a ruptured bleb due to minor trauma involving eye rubbing, highlighting their susceptibility to minor trauma [5]. Bleb leaks can result in substantial vision loss from hypotony, cataract, corneal decompensation, choroidal effusion, suprachoroidal hemorrhage, and endophthalmitis [3]. However, despite the availability of multiple surgical approaches, no single method has been shown to be most effective for bleb leak repair [6]. Conjunctival advancement is a commonly-used surgical approach that has been successful for resolving bleb leaks while preserving bleb function [7]. However, due to the large conjunctival incision and dissection it often requires, there can often be a prolonged recovery period before patients return to their baseline visual acuity, and complications such as ptosis and hypertropia may result from shortening of the superior conjunctiva and traction on the conjunctival attachments of the superior rectus muscle.

MICS has been recently described as a novel, incision-less method for treating bleb leaks [1]. Gupta et al. (2019) first reported 14 eyes treated with MICS for late-onset bleb leaks. There was complete resolution of the bleb leak following surgery in all cases with maintenance of bleb function. Patients did not require additional medications or surgical interventions over a mean follow-up of 10 months, except for one patient who had a recurrent bleb leak 2 years postoperatively. The authors postulated that the double conjunctival layer “biological patch” in this approach may be more secure than traditional single-layer approaches for reinforcing the leaking bleb. Another study by Sugimoto et al. (2020) reported a similar technique, called bleb plication, in which they performed bleb needling followed by suturing adjacent conjunctival tissue over the thin, avascular tissue of a leaking bleb [8]. All bleb leaks resolved without complications or recurrences in 11 eyes with at least 6 months of postoperative follow-up.

Our case report is notable because prior studies have not described the use of MICS in combination with other ophthalmic surgeries, nor have there been any previously-reported cases of traditional conjunctival advancement bleb revision performed concurrently with dislocated IOL repositioning, likely due to the challenges of performing the latter procedure in a hypotonous eye. As a relatively new technique, few eye surgeons are aware of MICS and its substantial advantages in the setting of trauma in which multiple eye surgeries may be required. Thus, our case demonstrates how MICS allows for rapid visual recovery following traumatic bleb leak repair with concurrent IOL repositioning.

## Conclusion

MICS is an effective treatment for traumatic bleb leak following trabeculectomy that can be a particularly useful approach for patients undergoing concurrent ophthalmic surgery.

## Patient consent

Informed consent was obtained verbally from the patient for publication of this case report and accompanying images.

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## Authorship

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

## Declaration of competing interest

None of the authors of this paper has a financial or personal relationship with other people or organizations that could inappropriately influence or bias the content of the paper.

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## References

- [1] N. Gupta, Incision-free minimally invasive conjunctival surgery (MICS) for late-onset bleb leaks after trabeculectomy (an American ophthalmological society thesis), *Am. J. Ophthalmol.* 207 (2019) 333–342, <https://doi.org/10.1016/j.ajo.2019.04.031>.



- [2] K. Jinza, S. Saika, K. Kin, Y. Ohnishi, Relationship between formation of a filtering bleb and an intrascleral aqueous drainage route after trabeculectomy: evaluation using ultrasound biomicroscopy, *Ophthalmic Res.* 32 (5) (2000) 240–243, <https://doi.org/10.1159/000055620>.
- [3] D.S. Greenfield, J.M. Liebmann, J. Jee, R. Ritch, Late-onset bleb leaks after glaucoma filtering surgery, *Arch. Ophthalmol.* 116 (4) (1998) 443–447, <https://doi.org/10.1001/archophth.116.4.443>.
- [4] P.W. DeBry, T.W. Perkins, G. Heatley, P. Kaufman, L.C. Brumback, Incidence of late-onset bleb-related complications following trabeculectomy with mitomycin, *Arch. Ophthalmol.* 120 (3) (2002) 297–300.
- [5] D.S. Greenfield, R.K. Parrish, Bleb rupture following filtering surgery with mitomycin-C: Clinicopathologic correlations, *Ophthalmic Surg. Lasers* 27 (10) (1996) 876–877.
- [6] F. Bochmann, A. Azuara-Blanco, Interventions for late trabeculectomy bleb leak, *Cochrane Database Syst. Rev.* 9 (2012), <https://doi.org/10.1002/14651858.CD006769.pub2>.
- [7] Y. Catoira, D. WuDunn, L.B. Cantor, Revision of dysfunctional filtering blebs by conjunctival advancement with bleb preservation, *Am. J. Ophthalmol.* 130 (5) (2000) 574–579, [https://doi.org/10.1016/S0002-9394\(00\)00653-X](https://doi.org/10.1016/S0002-9394(00)00653-X).
- [8] K. Sugimoto, H. Murata, T. Yamashita, R. Asaoka, Bleb plication: a minimally invasive repair method for a leaking ischemic bleb after trabeculectomy, *Sci. Rep.* 10 (1) (2020) 14978, <https://doi.org/10.1038/s41598-020-72056-w>.