

Case Report

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# A Case of Dellen Formation following 27-Gauge Vitrectomy with Rapid Improvement by Scleral and Conjunctival Sutures

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## Keywords

Vitrectomy · Dellen · Bleb

## Abstract

**Introduction:** Dellen is a corneal disease characterized by shallow, saucer-like excavations at the corneal margin. Herein, we presented a case of dellen formation that developed following a 27-gauge pars plana vitrectomy (PPV) and was rapidly resolved using scleral and conjunctival sutures. **Case Presentation:** A 73-year-old woman underwent a 27-gauge PPV for the epiretinal membrane of the right eye. Intraoperatively, owing to coexisting diabetic retinopathy, the peripheral vitreous was shaved, and retinal photocoagulation was performed on the peripheral retina. The intraocular pressure (IOP) was 15 mm Hg on 1 day after the PPV and on postoperative day 4; however, on day 14, the IOP decreased to 10 mm Hg, and conjunctival bleb formation was observed. By day 18, the bleb height remained unchanged, and dellen formation was noted at the corneal periphery. Because of marked corneal thinning, conjunctival and scleral sutures were placed 20 days following the PPV. Intraoperative findings revealed leakage from the scleral wound at the trocar puncture site. The IOP increased to 20 mm Hg at 19 h following the suture, resulting in the disappearance of the bleb and dellen. Since then, the bleb or dellen did not recur. **Conclusion:** We encountered a case of late-onset scleral wound cleavage 2 weeks following microincision vitreous surgery, resulting in bleb and dellen formation, which was immediately managed by the scleral and conjunctiva suturing.

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## Introduction

Corneal dellen are shallow, saucer-like excavations at the corneal margins, as described by Fuchs [1] in 1929. They occur idiopathically, secondary to paralimbal elevation, paralytic lagophthalmos, prolonged contact lens wear, and postsurgical procedures (cataract/rectus muscle surgery/trabeculectomy) [2–4].

Herein, we reported a first case of delayed development of a conjunctival filtration bleb and corneal dellen following minimally invasive vitreous surgery (MIVS), which resolved rapidly with scleral and conjunctival suturing. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see <https://doi.org/10.1159/000534501>).

## Case Presentation

A 73-year-old woman had undergone a 27-gauge pars plana vitrectomy (PPV) for the epiretinal membrane in her right eye (Fig. 1). The trocar was inserted into the vitreous cavity at a 30° angle to the scleral surface, positioned 3.5 mm posterior to the corneal limbus. The patient had diabetes mellitus, and preoperative optical coherence tomography angiography revealed a nonperfusion area, so the peripheral vitreous was shaved and retinal photocoagulation was performed on the peripheral retina. There were no scleral abnormalities such as thinning observed before or during the surgery. The surgical procedure lasted approximately 1 h. There were no complications, including unusual procedures or problems with the trocar site. The patient maintained a stable intraocular pressure (IOP) of 15 mm Hg 1 day after surgery and on postoperative day 4, and no abnormality was observed in either the conjunctiva or cornea. However, on day 14, the IOP decreased to 10 mm Hg, and bleb formation was observed in the conjunctiva. Fluorescein staining revealed no leakage from the conjunctival wound at the trocar puncture site (Fig. 2).

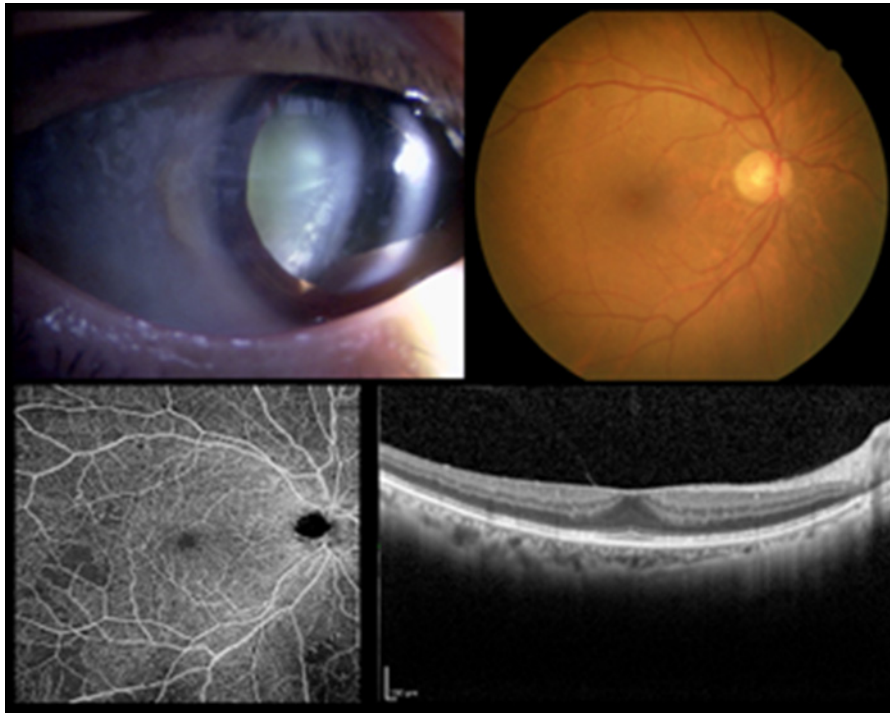
On the 18th day following the PPV, the height of the bleb remained unchanged, but the corneal limbus in contact with the bleb appeared depressed, resembling saucer-like excavations. Fluorescein staining revealed no epithelial defects or fluorescein pooling, leading to a diagnosis of dellen (Fig. 2). Owing to marked corneal thinning, conjunctival and scleral suturing was performed 20 days following the PPV. Intraoperative findings revealed a leakage from the scleral wound at the trocar puncture site when the conjunctival bleb was incised; therefore, scleral suturing was performed. In addition, an 8-0 vicryl compression suture was placed on the conjunctiva in the fornix to prevent bleb recurrence (Fig. 3).

Nineteen hours after the conjunctival-scleral suturing, the scleral wound was closed, and fluorescein staining revealed no leakage (Fig. 3). The IOP increased to 20 mm Hg, and the bleb and dellen disappeared (Fig. 3). Since then, no recurrence of blebs or dellen was observed.

## Discussion

The current report presents a case of late-onset bleb and dellen formation following a MIVS, which was promptly managed using scleral and conjunctival sutures. In recent years, vitrectomy has become less invasive with smaller incisions, and sutureless surgery is now possible [5]. However, postoperative hypotony has been reported as a potential complication [6].

In this case, no leakage was observed from the conjunctival wound by the 4th postoperative day, and the IOP remained within the normal range. However, 2 weeks after



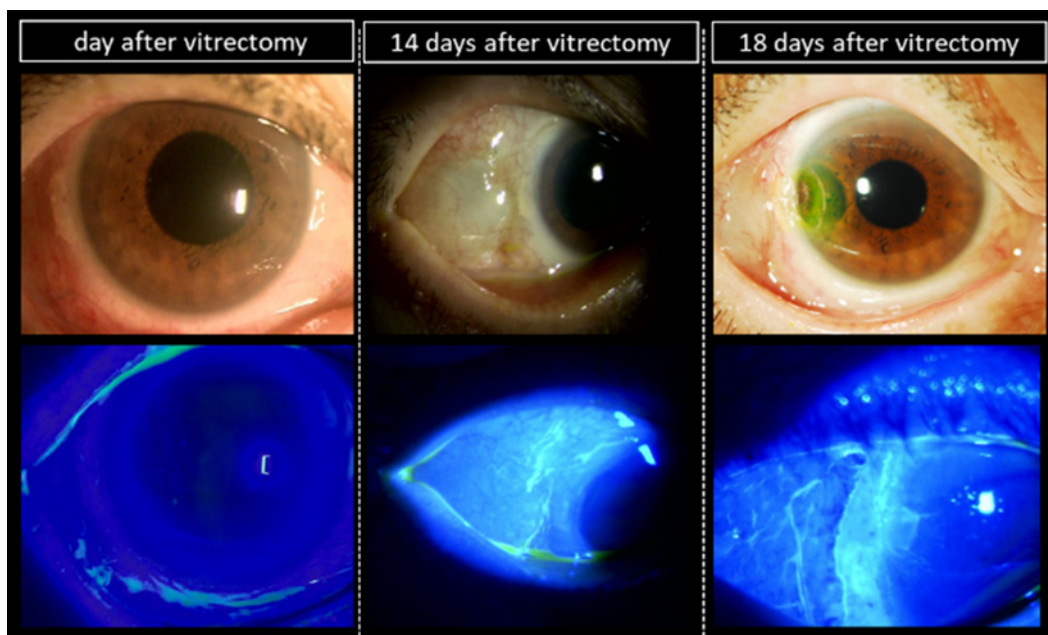
**Fig. 1.** Pre-vitrectomy imaging data showing the cornea and conjunctiva with no abnormal findings. Fundus examination reveals the presence of an epiretinal membrane, and optical coherence tomography angiography examination shows a nonperfusion area related to diabetes mellitus.

PPV, the IOP decreased and bleb formation was observed. The presence of leakage from the scleral wound when the bleb was surgically incised suggested that the decreased IOP and bleb formation were caused by the cleavage of the scleral wound. Transconjunctival sutureless 23-G vitrectomy is often associated with early postoperative hypotony, which may be related to the gap between sclerotomy wound margins observed in the early postoperative period [7]. However, mostly, hypotony resolves spontaneously, and postoperative suturing to prevent wound leakage is usually not required [7–9]. In 25-gauge MIVS, the incidence of conjunctival bleb at 3 h postoperatively was significantly higher in eyes with open sclerotomy than without open sclerotomy. However, conjunctival bleb gradually decreased on the first postoperative day [10]. Therefore, delayed leakage from a scleral wound is considered uncommon. However, Yamane et al. [10] reported the delayed development of ciliochoroidal detachment and suggested the possibility that sclerotomies were opened by the pressure applied to the globe by the squeezing of the lids or blinking. This case also implied that postoperative eyelid opening stimulation or movement load caused scleral wound cleavage may have contributed to the late-onset leakage and bleb formation.

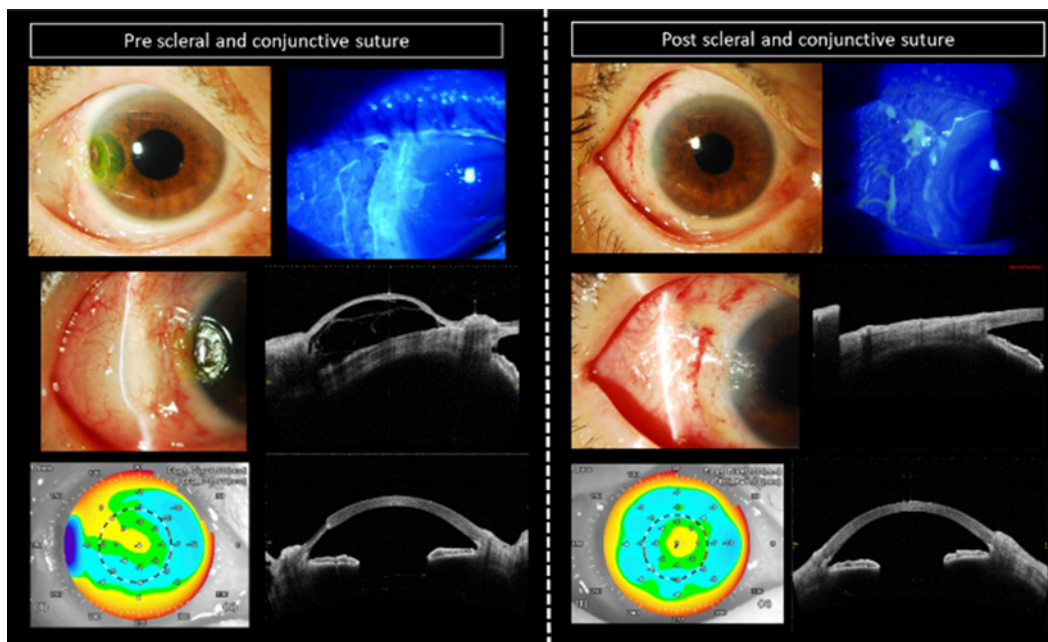
Dellen formation has been reported to occur in eyes with filtration blebs following glaucoma surgery [3]. Paralimbal elevation causes a localized disruption in the precorneal oily tear film, resulting in a focal absence of the mucin layer [11].

The absence of mucin leads to water repulsion and localized dehydration, resulting in corneal dry spots and a dry epithelial surface [12]. In the present case, the dellen formation could be attributed to a similar mechanism observed after glaucoma surgery.

In this case, the dellen disappeared in just 19 h after bleb removal using scleral and conjunctival sutures. Typically, corneal turnover takes approximately 7 days for a corneal



**Fig. 2.** Post-vitrectomy imaging data showing the cornea and conjunctiva with no abnormal findings. On the 14th day post-vitrectomy, bleb formation is observed in the conjunctiva. Subsequently, on the 18th day post-vitrectomy, dellen is observed at the limbus of the cornea, in addition to the bleb formation.



**Fig. 3.** Imaging data demonstrating the disappearance of the bleb and dellen, immediately following scleral and conjunctival suturing.

defect to heal [13]; therefore, such rapid improvement, as observed in this case, is unexpected. Since dellen is considered to be caused by a localized corneal stromal dehydration due to a deficiency in the tear mucin layer, the normalization of the tear film through the elimination of the bleb by conjunctival and scleral suture corrected the corneal stromal dehydration, resulting in rapid improvement in the corneal thickness.

In conclusion, we encountered a case of late-onset scleral wound cleavage, occurring 2 weeks following the MIVS, which resulted in bleb and dellen formation. The dellen resolved rapidly with normalization of the tear film achieved through scleral and conjunctival suturing.

### Acknowledgments

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### Statement of Ethics

This study was approved by the Ethics Committee of Saitama Medical University (July 4, 2021). At our facility, we implement a comprehensive opt-out consent process for case reports without requiring written informed consent. The protocol for patient opt-out consent for the publication of their medical case details and any accompanying images was approved by the Ethics Committee of the Institutional Review Board of Saitama Medical University. This report does not contain any personally identifiable information.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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### Author Contributions

Y.Y. cared for the patient, performed the workups, and carried out the treatment. S.Y., M.C., and Y.Y. prepared the figures, collected data, and analyzed the ophthalmological findings. S.K. provided critical suggestions. Y.Y. and S.Y. prepared the manuscript. All authors agree to be accountable for all aspects of work. Patient anonymity is preserved. All authors attest that they meet the current ICMJE criteria for authorship.

### Data Availability Statement

The data supporting the conclusions of the article are included within the article. Further inquiries can be directed to the corresponding author.



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