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CASE REPORT

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Regenerative Capacity of Anterior Chamber Injection of Eye Platelet-Rich Plasma for Pseudophakic Bullous Keratopathy

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Abstract

Purpose: To present successful management of moderate corneal edema following cataract surgery by using the application of eye platelet-rich plasma (E-PRP) in the anterior chamber in a case of pseudophakic bullous keratopathy.
Methods and Results: A 44-year-old male presented to our clinic with a year of diminution of vision in the right eye, associated with intermittent photophobia and colored halos around lights, primarily upon waking in the morning. The patient had cataract surgery ten years ago. We use AS-OCT, slit lamp, and corneal pachymetry, which reveal multiple small subepithelial micro- and macrobullae involving the entire cornea, diffuse stromal edema, and mild thickening of Descemet's membrane with folds. We administer 0.3 mL of E-PRP into the anterior chamber under sterile conditions.
Various medical treatments involving numerous drops have been unsuccessful. A sterile 0.3 mL of E-PRP was injected into the anterior chamber every 2 weeks for 1 month. Clinical and anatomical improvement began from the first week, and corneal edema resolved at 2 months. Postoperatively, no significant side effect was noted. We followed up with Slit lamp, anterior segment OCT, and corneal pachymetry, which showed improvement in corneal transparency and total disappearance of fluid in the cystic superficial epithelium. The patient is in a follow-up procedure.
Conclusion: This study suggests that the therapeutic response to intracameral injection of E-PRP was satisfactory in moderate pseudophakic bullous keratopathy. In this case, intraocular E-PRP was a promising, safe, and effective treatment option for managing bullous keratopathy, for which conventional approaches had failed.(**International Journal of Biomedicine. 2025;15(4):756-758.**)

Keywords: bullous keratopathy • eye platelet-rich plasma • treatment

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Introduction

Pseudophakic bullous keratopathy (PBK) is a postoperative complication that arises after cataract extraction and intraocular lens implantation, characterized by endothelial cell loss leading to corneal edema, epithelial bullae formation, and, in advanced cases, irreversible vision loss.[1] The most common causes include intraoperative trauma, placement of anterior chamber or iris-supported intraocular lenses, and pre-existing conditions such as Fuchs endothelial dystrophy.[2] Several studies have reported that endothelial cell loss may persist and even progress over time, years after cataract surgery.[4]

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Conventional treatment approaches include topical hypertonic solutions, lubricating ointments, bandage contact lenses, autologous serum, and, in more severe cases, penetrating keratoplasty or endothelial keratoplasty (e.g., Descemet Stripping Endothelial Keratoplasty, DSEK).[4] However, these treatments often provide only temporary relief or require complex surgical procedures. In this context, autologous blood-derived therapies such as platelet-rich plasma (PRP) have gained significant attention due to their regenerative potential and ability to promote wound healing on the ocular surface.[5]

Case Report

A 44-year-old man presented to our clinic complaining of foreign body sensation, pain, redness, photophobia, and decreased vision in his right eye for a year. The patient had

previously been treated with non-preservative artificial tears, antibiotic eye drops, and therapeutic bandage contact lenses to protect the cornea. Treatment in various hospitals was unsuccessful.

Objective examination revealed epithelial and subepithelial bullae that developed and ruptured, resulting in severe pain as underlying nerve endings were exposed and severe corneal thickening (688 μm) measured by anterior segment OCT and pachymetry (Fig. 1). Visual acuity was 20/100 due to corneal edema and irregular astigmatism.

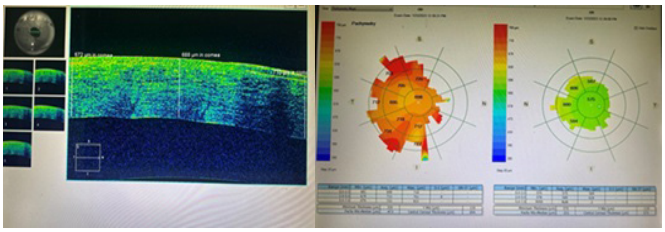

Fig. 1. *Anterior segment OCT and pachymetry.*

With the patient's consent, a novel PRP solution was accepted as treatment. Autologous 0.3 ml of PRP was administered intracameral and subconjunctival to the patient in the operating room in sterile conditions every 2 weeks for one month, along with preservative-free 50% PRP eye drops.(Fig. 2, Fig. 3). After just 30 days, resolution of the corneal lesion was observed, and all topical medications were gradually reduced. The OCT scan and pachymetry demonstrated resolution of the corneal edema, with normalization in corneal morphology, compared to before the injections (Fig. 4). The subjective symptoms, including burning, grittiness, and ocular discomfort, noticeably reduced, and the conjunctival congestion slowly resolved (Fig. 5). Postoperatively, no significant side effect was noted except an early transient moderate (25 mm Hg) intraocular pressure peak. Visual acuity improved from 20/100 to 20/50 on the Snellen chart.

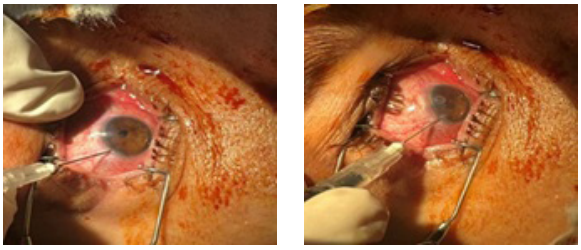

Fig. 2. *Injection of PRP into the anterior chamber.*

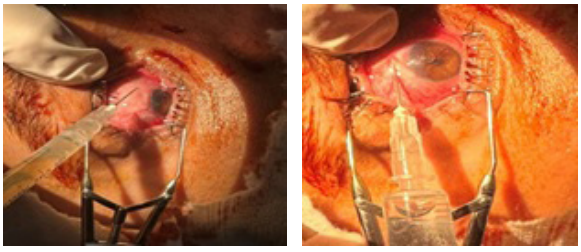

Fig. 3. *Subconjunctival injection of PRP.*

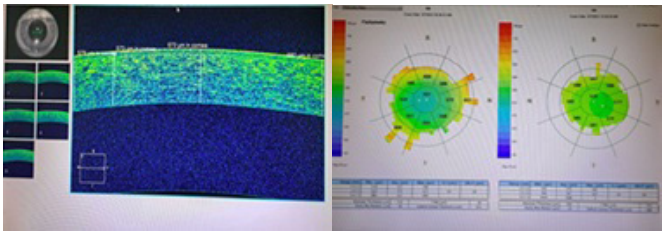

Fig. 4. *AS-OCT and pachymetry - 1 month after surgery.*

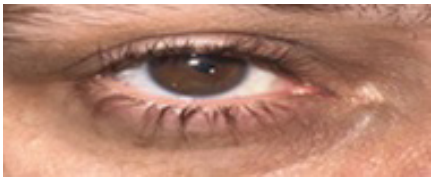

Fig. 5. *Slit lamp biomicroscopy.*

Discussion

Platelet-rich plasma is an autologous, preservative-free preparation that contains a high concentration of platelets and numerous growth factors essential for tissue regeneration and wound repair.[5,6] Compared to autologous serum (AS), PRP has a higher concentration of biologically active components, including platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF-β1 and β2), insulin-like growth factor (IGF-1), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), and fibroblast growth factor-2 (FGF-2).[7] These molecules play critical roles in promoting epithelial cell proliferation, collagen synthesis, angiogenesis, and tissue remodeling.

Additionally, PRP contains cytokines such as PF4 and CD40L that contribute to immune modulation and cellular adhesion.[8] This composition supports a favorable environment for epithelial regeneration and corneal surface stability, especially in conditions characterized by chronic or recurrent epithelial defects.

Kheirkhah et al.[9] compared the clinical effects of PRP and AS in treating ocular surface diseases. They reported superior outcomes with PRP in terms of epithelial healing and symptom relief, particularly in cases of dry eye disease and neurotrophic keratopathy. Similarly, Alio et al.[10] demonstrated that PRP eye drops improved healing in patients with persistent epithelial defects and ocular surface disorders, suggesting its potential as a safe and effective therapy. In the context of PBK, where chronic corneal edema and epithelial instability are common, PRP may offer significant advantages by providing essential growth signals that support re-epithelialization and tissue repair. Although the application of PRP specifically for PBK remains underexplored, the evidence from related ocular surface conditions strongly supports its potential efficacy. Further randomized controlled trials are warranted to establish standardized treatment protocols and assess the long-term safety and effectiveness of PRP in PBK management.

Conclusion

Pseudophakic bullous keratopathy remains a challenging postoperative complication with limited long-term therapeutic options. While conventional treatments provide symptomatic relief, they often fail to promote lasting regeneration of the corneal endothelium. Autologous PRP, due to its high concentration of growth factors and bioactive molecules, offers a promising adjunct or alternative therapy. Evidence from similar ocular surface diseases supports its regenerative potential, particularly in promoting epithelial healing and reducing inflammation. Although further clinical trials are necessary to validate its efficacy and safety in PBK specifically, early findings suggest that injection in the anterior chamber or topical PRP could become an innovative and biologically sound strategy in the management of corneal decompensation following cataract surgery. Its autologous origin, low risk of immune reaction, and ease of preparation make it a valuable option for personalized, regenerative ocular care.

Patient Consent

The patient has provided written informed consent. This report does not contain any personal information that could be used to identify the patient.

Conflicts of Interest

The author declares no competing interests.

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