



# Management of post operative seclusio pupil and corneal decompensation

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## Introduction

PBK may occur in around 1 to 2% of the patients undergoing cataract surgery, which accounts two to four million patients worldwide. It can also occur in patients who undergo trabeculectomy, intraocular lens scleral fixation, anterior chamber lens implants for aphakic correction and high ametropia, after argon laser, radial keratotomy [1].

It is manifested by stromal edema of the cornea with epithelial and sub epithelial bullae due to loss of endothelial cells and decompensation. Progressive stromal edema eventually leads to bullous keratopathy. The main cause of bullous keratopathy is the loss of endothelial cells due to surgical trauma, especially in cataract surgery at sixth decade patients, with or without lens implantation [1,2].

## Abstract

A 71 year old man presented with a history of cataract surgery in both eyes and gradual diminution of vision post surgery in right eye (RE) since 3 years. On examination RE showed corneal decompensation with seclusio pupillae with a small pupil and a posterior chamber intraocular lens (PCIOL). He was diagnosed with pseudophakic bullous keratopathy (PBK). He underwent DSAEK (Descemet's stripping automated endothelial keratoplasty) with synechiolysis and pupilloplasty. Graft lenticule was well attached to the host tissue with a vertically oval pupil and subsequent improvement of vision.

More recently, long-term follow-up has revealed the existence of progressive changes in corneal endothelium following intraocular lens insertion. Though the pathogenesis of this phenomenon is not clear, persistent low grade inflammation and intermittent contact of the IOL with the corneal endothelium are considered to be few contributory mechanisms. Certain IOL designs, especially the iris claw lenses (iris-fixated lenses with the optic anterior to the iris) and anterior chamber lenses, are associated with increased risk of PBK. The introduction of posterior chamber lenses, improved design and quality control of lenses, use of sodium hyaluronate during surgery and better training of surgeons have all contributed to a decline in corneal complications, at least in the first few years after this procedure.

Patients Fuchs' corneal dystrophy where there is underlying



endothelial cell dysfunction are at an increased risk for developing postoperative corneal edema. Other intraop factors include localized increase of temperature due to the phacoemulsification probe causing thermal damage to adjacent corneal tissue, damage to the endothelium due to high irrigation or aspiration rates which can result in turbulent flow with lens particles [3]. Also, the duration of phacoemulsification is very important as the ultrasound energy releases free radicals which are capable of damaging the corneal endothelium by oxidative stress [3].

In order to minimize the occurrence, ophthalmic surgeons are subjecting their patients to preoperative clinical specular microscopy to obtain information concerning the morphologic status of corneal endothelium. Here we report a case of pseudophakic bullous keratopathy with seclusio pupillae who was treated surgically by DSAEK with pupilloplasty.

### Case Report

A 71 year old male presented with gradual decreased vision in Right eye (RE) since 3 years. Patient gives history of cataract surgery in RE 10 years before and that of left eye (LE ) 4 years before. Patient gives a systemic history of hypertension and diabetes mellitus since 11 years and was on treatment for the same. Visual acuity in RE was perception of light with projection of rays being accurate. Best corrected visual acuity in LE was 20/20. Anterior segment examination in RE showed diffuse corneal edema, quite and deep anterior chamber, total posterior synechiae with small pupil and thick fibrous membrane covering the entire pupil (Seclusio pupil) and a very faintly visible underlying IOL (**Figure 1**). The corneal thickness was 850 microns on pachymetry. B scan showed echo free vitreous cavity with normal optic nerve head. LE anterior segment and fundus examination showed no abnormality. Patient was planned for the surgery as all the routine blood investigations were within normal limits.

### Surgical Procedure

Peribulbar anaesthesia was given prior to the surgery. Intraoperatively prior to the routine DSAEK procedure synechiolysis was done using a dialer. Pupilloplasty was done to create and window of opening and increase the size of the pupil, using a vitrector. The pupil was cut 4 mm vertically and 3mm horizontally resulting a vertically oval pupil. A temporal clear corneal incision was made and a descemetorrhexis of 7.5 mm size was made using a reverse sinskey hook. Donor cornea trephined to 8.0 mm size. The trephined lenticule (endothelial graft ) was introduced into the anterior chamber using sheet glide. Air bubble injected into anterior chamber to attach the lenticule to the host stroma. Wounds closed using interrupted 10-0 nylon sutures.

### Results

Post surgery donor lenticule was well adhered to the host stroma. Pupil was noted to be 5 mm and vertically oval. Patient was started on hourly topical steroid and antibiotic medications post operatively. Graft odema subsided within two weeks post surgery (**Figure 2**). Patient had a vision of finger counting at 2metres. Fundus examination showed mild temporal disc pallor with normal macula and tessellated background.

### Discussion

Treatment options for pseudophakic bullous keratopathy includes both medical and surgical management. Medical management includes instillation of topical hypertonic agents such

as sodium chloride (5%), anti-inflammatory drugs, topical and/or systemic antiglaucoma medications, because increased IOP can compromise endothelial cell function, corticosteroids, lubricants and sometimes, due to the pain experienced by the patients, therapeutic contact lenses to improve symptoms [3].

Corneal transplantation is still the gold standard treatment for bullous keratopathy patients, as it helps in providing symptomatic relief and visual rehabilitation [4]. Penetrating keratoplasty is a full-thickness corneal transplant procedure. It was considered as the criterion standard transplant surgery by many surgeons worldwide.

Partial thickness corneal surgery has evolved rapidly in the past two decades, replacing penetrating keratoplasty. Other partial thickness procedures for treating PBK include posterior lamellar keratoplasties like deep lamellar endothelial keratoplasty (DLEK), Descemet membrane endothelial keratoplasty (DMEK), Descemet membrane automated endothelial keratoplasty, Descemet stripping endothelial keratoplasty (DSEK), Descemet stripping automated endothelial keratoplasty(DSAEK). Other low cost treatment options include anterior stromal puncture (ASP), Phototherapeutic keratectomy (PTK) and amniotic membrane transplant.

DSAEK is a modified technique of Descemet stripping endothelial keratoplasty, where a microkeratome is used for the donor dissection [5]. In the procedure, Descemet membrane and the endothelium are stripped off from the host cornea and replaced with a donor button consisting of posterior stroma, Descemet membrane, and endothelium. DMEK is a technique where only Descemet membrane and endothelium are used to replace host tissue of Descemet membrane and endothelium without posterior stroma. Among all partial thickness procedures, DSAEK is the most common type of endothelial keratoplasty performed worldwide [5]. Posterior corneal pathologies where DSAEK are indicated include Fuchs endothelial dystrophy, pseudophakic and aphakic corneal edema, endothelial decompensation, failed grafts, iridocorneal endothelial syndrome, and posterior polymorphous corneal dystrophy.

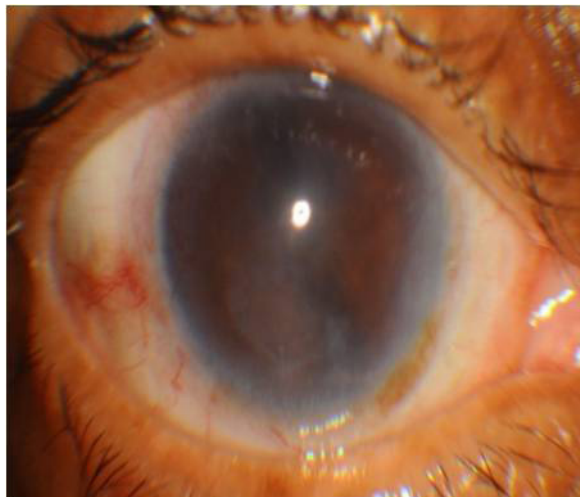
Advantages of DSAEK include that it allows vision improvement to 6/9 to 6/12, has a lower rejection rate than penetrating keratoplasty, results in faster visual rehabilitation, uses a small incision and astigmatic neutral surgery, and maintains globe integrity and less wound dehiscence [6]. However, DSAEK may still limit the best-corrected vision due to the donor lamellar interface.

Pupilloplasty procedures can be used to close a large symptomatic peripheral iridectomy close an iris defect, make a fixed and dilated pupil smaller, centering the pupil on a diffractive multifocal IOL, to close a congenital iris coloboma, or round up an irregular pupil. In DSAEK they help to configure the structure of the anterior chamber (AC) that facilitates the endothelial keratoplasty (EK) procedure by providing anatomical and functional support by maintaining the AC depth for graft unrolling and adherence. Where as in our case the indication of pupilloplasty was to increase the size of the pupil post synechiolysis which aided in a better view of the position of the PCIOL ( which was noted to be in the sulcus) and the evaluation of the posterior segment which would help in deciding the visual prognosis of the patient and more importantly improve the vision by allowing more light to enter into the eye.

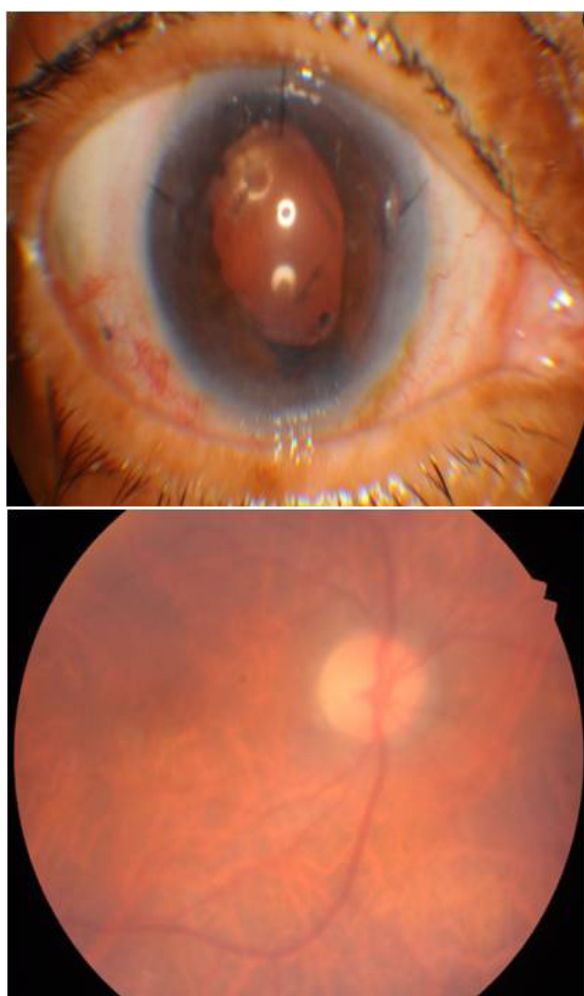
## Conclusion

Patients presenting with PBK along with posterior synechiae and small/irregular pupils which give a poor view of the posterior segment can be managed with combined procedure of DSAEK with synechiolysis and pupilloplasty. This also helps in rounding up the pupil which would minimize the glare problems experienced by patients due to irregular pupils.

## Figures



**Figure 1** : Seclusio pupil with corneal edema



**Figure 2** : Vertically oval pupil with clear cornea and central endothelial graft .Optic disc showing mild temporal pallor.

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