

# Corneal Melting and Perforation Following Uneventful Small Incision Cataract Surgery in a Well-Controlled Diabetic

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**Abstract** This is a concise report of a rare case of post-operative sectoral keratolysis following an otherwise normal cataract surgery. Risk factors and predisposing co-morbidities are largely unknown. In this index case, a postoperative corneal perforation spanned the original location of corneal part (about 1.0mm into clear cornea) of Manual Small Incision Cataract Surgery (MSICS) sclero-corneal tunnel. Conjunctival hyperemia was mild at areas adjacent to melted cornea. The immediate surroundings of the melted cornea were edematous but not friable. The sclera was otherwise healthy except a dehiscence of the scleral part of the sclero-corneal tunnel on one side while the second side was firmly anchored giving a trap-door pattern.

**Keywords** Corneal melting, Cataract surgery, Diabetes

## 1. Introduction

Corneal melting following use of Non-steroidal anti-inflammatory Drug (NSAID) after uncomplicated cataract surgery has been reported in medical literature. [1, 2] However, cases of post-operative keratolysis following Manual Small Incision Cataract Surgery (MSICS) in the absence of NSAID use are sparse. The process of melting may be initiated by a variety of factors including local, immune mediated vasculitis, and ocular surface disease, especially keratoconjunctivitis sicca and corneal infection. [3, 4] These have been reported following LASIK (Laser In-Situ Keratomileusis). In a review of 12 cases in 11 patients with corneal melting following LASIK surgery, Li et al., [5] reported the time lapse of two to five weeks between laser surgery and the appearance of the melting. As corneal melting is often the final response to a series of insults to the tissue following surgery, the time of presentation may vary. Perez-Sontanja et al., [6] reported the appearance of cases at six months following surgery in a study of hyperopic LASIK patients, while Kymionis et al., [7] reported a case referred due to severe post-LASIK epithelial ingrowth, eventually leading to corneal melting two years after the initial surgery. More aggressive cases of corneal melting have also been reported. Feiz et al., [8] reported a

case of a patient who developed stromal melting in both eyes at four days after photorefractive keratectomy (PRK). This was believed to be associated with frequent post-operative dosing of nepafenac, an NSAID.

Till date, to the best of our knowledge despite extensive search of major scholarly data bases, no case of postoperative keratolysis has been reported in Nigeria. As MSICS continues to gain popularity in Nigeria and other parts of Africa, it is considered expedient to make known this rare surgical complication which occurs in spite of uneventful surgical procedure with a view to making prompt diagnosis and intervention.

## 2. Case History

A 75 year old Nigerian man with bilateral visually significant cataract was scheduled for Left Manual Small Incision Cataract and Posterior Chamber Intraocular Lens Implantation (LSICS-PCIOL). He is a known diabetic of 2 years duration on insulin. Fasting Blood Sugar (FBS) was initially 6.5mmol/l which the internist normalized to 3.7mmol/l preoperatively. There were no musculoskeletal, gastrointestinal or urinogenital symptoms. Other systemic reviews were normal. Ancillary investigations carried out including glycosylated haemoglobin were essentially normal. On examination, visual acuity was 6/60 (OD) and 3/60 (OS). Pupils reacted briskly to light and slitlamp examination showed cortical spokes and posterior subcapsular opacities. The discs and retina were healthy bilaterally on dilated 78D funduscopy.

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Published online at <http://journal.sapub.org/surgery>

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### 3. First Surgical Procedure: Cataract Extraction

After peribulbar anaesthesia and Van Lint facial nerve block with 23G hypothermic needle, eye lids and periocular skin were cleaned with Chlorhexidine and 10% Povidone Iodine. Ocular surface was cleaned with 5% Povidone Iodine and same irrigated. Conjunctival peritomy was done superiorly and haemostasis secured with light cauterization. With blade fragment, a scleral nick was made away from intended scleral incision. The nick served as a point to hold to stabilize the globe during subsequent surgical manipulations as bridle suture is not routinely applied by the surgeon (MEO). About 6.5mm scleral incision was made 1.5mm away from the limbus with blade fragment. With crescent knife, sclero-corneal tunnel together with lateral pockets was created 1.0mm into clear cornea. A temporal side port was done followed by intracameral air and trypan blue. A dispersive viscoelastic agent was used to reform and maintain the anterior chamber for effective continuous curvilinear capsulorhexis (CCC). Anterior chamber was entered with 1.5mm keratome at the anterior-most part of the clear cornea incision and same extended to the left and right until enough space was created for the anticipated nucleus. Hydrodissection ensured easy nucleus prolapse into the anterior chamber. Prolapsed nucleus was sandwiched between vectis and dialer and delivered. Soft lens matter was irrigated with one-way Simcoe. A 22.0 dioptre IOL was inserted and dialed into the capsular bag. Viscoelastic material was irrigated out and stromal hydration at the side port confirmed competent sclera-corneal tunnel.

### 4. First Post-Operative Day

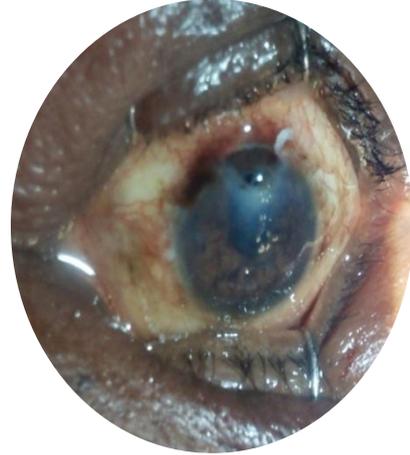
The visual acuity was Hand Movement. There was minimal lid edema, conjunctival hyperemia and plus two corneal striae. Anterior chamber was well formed and clear. The PCICOL was in-situ.

### 5. Seventh Post-Operative Day

Patient complained of pain which was said to be severe and the vision failed to improve post-operatively. There were no eye discharges nor tearing and photophobia. On examination, visual acuity was Light Perception. There was mild lid edema, No proptosis or restricted ocular motility. The conjunctiva was mildly injected. No chemosis. The corneal part of the sclero-corneal tunnel had melted exposing the iris which was not prolapsed. The cornea was edematous especially in areas adjacent to the melted cornea. The sclera was essentially normal except a dehiscence of the scleral part of the sclero-corneal tunnel on one side. The second side was still firmly anchored giving a trap-door pattern.

Anterior chamber was flat but otherwise clear, no hypopyon or vitreous. The intraocular lens was in-situ and not displaced. Further details were precluded by hazy edematous cornea. Patient was placed on topical and

systemic steroids (Maxitrol and prednisolone 10mg), topical and systemic ciprofloxacin and hypertonic saline. Patient was schedule for surgery on the next operation day which was 2 days later. By this time the cornea was clear enough to appreciate a good fundal reflex.



**Figure 1.** Findings 7<sup>th</sup> post-operative day (shows corneal perforation, a whitish tag of sclera and flat anterior chamber)

### 6. Second Surgical Procedure: Corneal Repair and Gunderson Flap

Following routine peribulbar anaesthesia, cleaning and draping, the wound was meticulously debrided such that only necrotic sloughs were removed. A firmly anchoring dehiscence and necrotic scleral part of the sclero-corneal tunnel was also abscised. Bandage contact lens was not available so that a continuous 10/0 nylon was used to make a purse-ring to approximate the perforated cornea. This ensured that the perforation reduced in size significantly. Initial conjunctival peritomy was freed and further dissected until it was sufficient to cover residual corneal perforation. Same Conjunctival hood was anchored on opposite virgin conjunctiva and adjacent cornea by partial thickness bites. The anterior chamber was reformed and maintained by intracameral air through a side port created infero-temporally. This was followed by routine subconjunctival gentamicin / prednisolone and topical ciprofloxacin and maxitrol.



**Figure 2.** Second surgical procedure: corneal repair and Gunderson flap (on the surgical table)

## 7. First Post-Operative Day of Second Surgical Procedure

Visual acuity was Light Perception, the conjunctival hood was in-situ and anterior chamber was formed with the presence of air bubble. Patient was discharged on preoperative medications with cartella shield in place to protect the eye.



**Figure 3.** First day post-operative view of the left eye (note the intra-cameral air for anterior chamber maintenance)

## 8. Second Post-Operative Week of Second Surgical Procedure

Visual acuity was 6/36 with markedly reduced inflammation of ocular surface. Anterior chamber was deep being maintained by the conjunctival flap which had slightly retracted. Red reflex was visible only through clear cornea. See figure 4. Patient was scheduled for a monthly visit but lost to follow-up.



**Figure 4.** Two weeks post-operative view of the left eye

## 9. Discussion

The relative incidence of corneal melt across the wider ophthalmic community following refractive or cataract surgery is difficult, if not impossible, to quantify accurately. Reports in the published literature are often small series or

case reports outlining a single incidence.

Corneal ulceration with rapidly progressive stromal thinning or melting occurs most commonly in association with a systemic vasculitis. [1,2] Following cataract extraction, Mamalis et al., [9] reported that Rheumatoid arthritis was a universal finding among four patients who developed scleral melting. Diabetes is associated with poor wound healing. But in our case, it was well controlled and unlikely to have impeded corneal healing. Suffice to mention, however that diabetes can be immune-mediated same as many collagen vascular diseases which are associated with ocular inflammation and melting of ocular tissue. A possibility exists that in spite of adequate glycemic control, ocular tissues may already have been rendered susceptible to degradation and melting which could be triggered by surgical incisions.

In this index case co-morbidity with vasculitis could not be established. Anterior segment angiography is not a routine pre-operative procedure for cataract surgery in our center and neither were there local or systemic indications for work-up for vasculitis or other predisposing corneal melting conditions.

That only the corneal flap was largely affected in our index case appears instructive. It is thought that splitting cornea into two in the course of creating a sclerocorneal tunnel may have further compromised an unhealthy cornea. Thus, predisposing it to post-operative keratolysis. Cornea is avascular with tendency to melt in the face of microangiopathic condition like diabetes mellitus. There is the plausibility of diabetic neurotrophic corneal melting exaggerated by surgically-induced corneal denervations. Toxic epitheliopathy related to post-operative medication have also been suggested as contributing to the post-operative keratolysis. [10] But in this index case post-operative medications were the regular regimen routinely given to all patients after MSICS.

## 10. Conclusions

The causes of diabetic post-operative keratolysis appear multifactorial, ocular and systemic inflammatory conditions playing significant roles. Poor wound healing and surgical trauma-induced apoptosis may be contributory. As a common pathway, relentless inflammatory cascade leads to leucocytic enzyme release and collagenolysis. There remains little doubt that further investigation on impact of diabetes on postoperative sclera-corneal wound is warranted.

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