

Unilateral Decompensated Cornea Secondary to Corneal Laceration: Assessment and Optometric Management

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Abstract - The inner layer of the cornea is composed of endothelial cells that make the cornea clear [2]. Corneal trauma may result to significant ocular discomfort, visual difficulty, or even blindness. Corneal decompensation which is manifested by corneal opacity is a result of several factors like deep penetration of foreign bodies to the cornea, residues from surgical instruments, surgical trauma, or improper use of intraocular drugs [10]. This case report reviews the management options for patients with decompensated cornea, discussing clinical findings and treatment options as they relate to the case presented.

Keywords: blepharitis, corneal edema, corneal laceration, decompensated cornea, enucleation

I. INTRODUCTION

About 3% of hospital emergency visits are due to eye trauma, involving 80% of corneal injuries. Partial or complete thickness of corneal injury caused by direct or indirect eye trauma can lead to corneal laceration which is a very serious eye injury typically involves activities that cause high-speed projectiles such as a sharp object flying into the eye, causing a deeper cut than an abrasion, requiring an immediate medical attention to prevent vision loss [5] [6] [8].

The corneal epithelium quickly regenerates and richly innervated; therefore, it is very painful when an injury occurs. After an inciting event, corneal pain may be delayed for several hours. Extreme eye pain, blurring of vision and foreign body sensation with clinical indications such as excessive tearing, blepharospasm, and conjunctival erythema can be observed when examined. Delay in managing traumatic ocular occurrence further leads to severe complications and may not be prevented from having its normal structure and function.

II. MATERIAL AND METHOD

A. Procedure

January 31, 2019 - A 54-year old male patient visited the Centro Escolar University (CEU) Vision and Eye Care Center

(VECC) for comprehensive eye examination. He inquired if could be fitted with prosthetic contact lenses in order to hide his right cornea's opacity. He complained of constant blurring of vision at distance without old prescription and left unilateral headache which lasts for at least 30 minutes every time his eyes get tired. Resting his eyes alleviate the pain. The patient is a spectacle wearer since 2009 and already had 3 pairs since then.

In 2009, his right eye was hit by shattered pieces of broken glasses that made his cornea lacerated. He underwent eye surgery but still resulted to complete loss of vision. No other surgeries were done. He did not suffer from any serious illnesses. He takes multivitamin as his daily supplement.

Uncorrected visual acuity in OS was 20/400 at distance and J3 at near while his right eye has no light perception. Pinhole acuity in OS is 20/30. The patient's current single vision prescription given last 2018 is -2.50 Dsph = -1.50 Dcyl x 10 VA 20/25 J8. His dominant eye is OS while his dominant hand is right. Corneal reflex is centric. Diplopia, NPC, and vergence tests were not performed because they require both eyes.

External examination showed significant observations. The patient's lids and lashes are flaky; has grade 2 conjunctival injections on both eyes and has brown spots on his right; grade 2 tarsal redness on his palpebral conjunctiva; clear left cornea while the right has white opacity; VH 2-3 anterior chamber, brown iris, clear lens on the left while unable to observe the right due to corneal opacity. Internal examination on his left eye was unremarkable. Keratometry finding on the left eye is 42.50 @ 90 42.75 @ 180 and -0.25 Dcyl x 90 corneal astigmatism. Mires on his right cornea were distorted.

Objective Examination in OS revealed the following: Static retinoscopy is -3.00 Dsph = -0.25 Dcyl x 90, Automated refraction is -2.25 Dsph = -1.50 Dcyl x 104, Subjective refraction is -2.50 Dsph = -1.50 Dcyl x 90 Add +2.00 D BCVA 20/25 and J2. Phorometric tests were not performed. AOA on his left eye is 2.50 D. Visual field of OS is within normal limits.

B. Data Analysis

Consult 1

February 8, 2019 - The patient was referred to an ophthalmologist for ocular examination and the possibility of wearing prosthetic contact lens for cosmetic purposes. The patient was asked by the specialist about his ocular history to further assess him. He was observed with a slit lamp with fluorescein dye put on his eyes.

The diagnosis was decompensated cornea secondary to corneal laceration 5/p repair and bilateral blepharitis. The patient was given permission by ophthalmologist to wear prosthetic contact lens until the blepharitis is resolved. The management was to start Tobramycin eye ointment, 1 strip to each eye before bedtime, eyelid scrub 2x a day, and for removal of suture first. The ophthalmologist's remark is the patient may do prosthetic contact lens fitting after a week of antibiotic and removal of suture.

Consult 2

March 5, 2019, the patient was referred to a hospital for suture removal and was attended by another ophthalmologist. His ocular history was again investigated especially the trauma suffered by the right eye. He mentioned that the first ophthalmologist allowed him to wear prosthetic contact lens, but the suture must be removed first. However, as a second opinion, the latter did not permit him to wear one because the condition might worsen if cornea will be deprived of oxygen; noted that he already has edematous cornea.

III. RESULTS

Based on the ocular history and results gathered, the case was diagnosed with Unilateral Decompensated Cornea Secondary to Corneal Laceration and Bilateral Blepharitis with associated age-related eye condition - Presbyopia. Since the patient's cornea has white opacity and eager to have his eyes look natural again, the ophthalmologist recommended to enucleate the affected eye and wear ocular prostheses to prevent further damage to the affected eye.

For the treatment of bilateral blepharitis, he was prescribed with Tobramycin ointment, 1 strip to each eye before bedtime. Hot compress, lid massage and scrub, twice a day was required for eyelid hygiene. While the patient is still undecided to proceed to the enucleation, he was provided a flat top prescription glasses OU -2.50Dsph = -1.50Dcyl x 90 Add +2.00D; 2 tone gray tint for cosmetic purposes. Patient was also informed about his condition, prognosis, and other treatment options.

IV. DISCUSSION

In 2009, the patient's right eye was hit by shattered pieces of broken glass. After the incident, excessive tearing developed, associated with severe pain over the right eye. However, there were no photophobia, floaters, flashes of light, or curtain field defects. After a few hours, he noticed

progressive blurring of vision in OD. He consulted an ophthalmologist who performed an immediate surgery to remove the glass debris to avoid severe eye damage. Unfortunately, their region had a very strong typhoon that time so the electricity was down. The patient insisted to go on with the operation even without sufficient facilities, considering that the ophthalmologist explained the risks in doing so. The patient's comfort and visual performance went back to normal but only for a short period of time. After a few days, the cornea slowly became white and started to have fluid inside. Visual acuity is only light perception until the year 2011, when vision was completely lost.

The cornea consists of tissue layers that contribute in having a clear image projected to the retina. Endothelium is the innermost layer that has barrier and pumps out any fluid that enters the eye to maintain corneal clarity^[2]. Unlike the epithelium, it does not regenerate so they are gone for good if they are harmed. The cornea will swell when damaged and the fluids build up, leading to cloudy vision^[1]. Corneal decompensation leads to overhydration of the cornea, also known as the corneal edema. If it progresses, blurred vision and glare are manifested caused by several folds in the Descemet's membrane and increased stromal thickness. Long-standing corneal edema leads to corneal neovascularization and scarring. Corneal neovascularization which arises from the limbus, conjunctiva, and iris is triggered by corneal exposure to trauma and certainly not harmful. But in some circumstances, it can exceed to the limit and invades the cornea, blocks the visual field, and reduces visual acuity^[1].

Corneal decompensation which is manifested by corneal opacity is a result of several factors like deep penetration of foreign bodies to the cornea, residues from surgical instruments, accident contact of instruments during surgery, or improper use of intraocular drugs.

Complete ocular and medical history, accurate clinical findings and assessment of the ophthalmologist are necessary for a sound diagnosis and effective management plan for the patient. With the condition of the patient, he was accidentally hit by a sharp foreign object directly to his cornea which caused a deep cut onto it. Failure to consult immediately made the situation worse. Unsuccessful surgery of the corneal laceration brought several complications such as corneal edema, neovascularization, and lead to corneal decompensation.

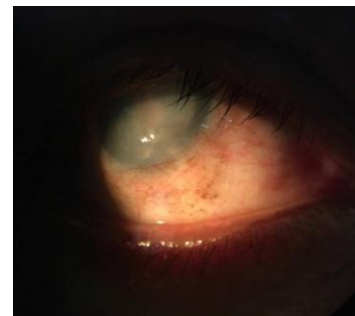


Fig. 1. Grade 2 - conjunctival injections on OD with neovascularization on the decompensated cornea. Brown pigments are also present on the bulbar conjunctiva.



Fig. 2. Neovascularization is present on the decompensated cornea. Stitches can also be seen on it.

Since corneal transplant is very expensive, two ophthalmologists suggested two different plans – prosthetic contact lenses or ocular prostheses. The first ophthalmologist gave the patient permission to wear prosthetic contact lens but upon seeking second opinion, another ophthalmologist recommended enucleation – the final step in the treatment of severe ocular trauma. After the patient is healed from the surgery, they will be replaced with artificial eye. Enucleation is a traumatic event which will affect the patient psychologically and physically.

Another condition seen in the patient is blepharitis. It is an eyelid infection that makes the eyelids red, flaky, and itchy because of the obstructed Meibomian gland. People with blepharitis often experience burning sensation in their eyes, excessive tearing, swollen eyelids and dry eye, but it's not contagious and do not cause permanent damage to eyesight. Warm compress to eyelids helps unblock its gland and loosen the eyelid crusts to make removal easier. If eyelid hygiene didn't work, ophthalmic antibiotic ointment can be used to treat blepharitis that works by stopping the growth of bacteria, specifically eye infections^[7].

V. CONCLUSION

This case demonstrates the role of patient history, clinical observation, and ophthalmology referrals in the diagnosis and management of decompensated cornea secondary to ocular trauma. It is important for clinicians under the supervision of clinic instructors to appreciate their role as front liners in eye and vision care thus avoiding potential complications which

could lead to blindness. Although the prognosis for patients with corneal decompensation is very poor, patients must be advised to see their ophthalmologists more often. Optometrists must come in for the optometric management like prescribing prosthetic contact lenses, tinted glasses and ocular prostheses.

Ocular emergencies like the one experienced by the patient must be taken seriously because majority of which need prompt medical attention. Early action is necessary to prevent severe or permanent damage to the eye.

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