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Case Report

Case Report: Recurrent Hypopyon after Penetrating Corneal Wound Complicated by a Staphylococcus Capitis Infection

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Abstract

Purpose: Description of the management of recurrent inflammation with hypopyon in an ocular penetrating trauma complicated by a rare Staphylococcus Capitis infection.

Observations: We report the clinical case of a 40-year-old forest ranger who sustained a penetrating corneal wound with anterior lens impact caused by a plant. This patient subsequently developed recurrent inflammation with hypopyon, occurring remotely from the initial trauma as soon as local antibiotics were tapered. It was difficult to identify the cause (the first cultures being negative) and to control the inflammation despite re-introduction of antibiotic treatment. A sine lente phacoemulsification procedure finally allowed control of the infection, most likely by removal of the infectious lens focus. At the same time, new cultures came back positive for Staphylococcus Capitis. After secondary implantation of an intraocular lens, the patient regained full visual acuity.

Conclusions and Importance: To the best of our knowledge, this is the first report of Staphylococcus Capitis intraocular infection following a trauma in an adult. The right balance between medically and surgically treating a recurrent inflammation caused by a rare multi-susceptible Staphylococcus Capitis infection in a penetrating corneal wound associated with a traumatic cataract remains challenging. Doctors should closely monitor and be prepared to adapt their management to the clinical evolution. In traumas, prevention stays paramount.

Keywords: Recurrent Hypopyon; Recurrent Inflammation; Penetrating corneal wound; Infectious traumatic cataract; Vegetal trauma; Staphylococcus Capitis

Introduction

Corneal wounds are common and all too often preventable injuries with potentially significant visual sequelae. The management and visual prognosis depend on the type of injury. A systematic approach is therefore needed to identify the cause and adapt the treatment, especially when the trauma is complicated by infection or inflammation, the origin of which is often difficult to determine. Proper management requires prompt diagnosis, microbiological sampling to identify possible germs as soon as possible, and medical or surgical treatment depending on the size and nature of the wound. We present the case of a penetrating corneal wound by a hawthorn branch in a 40-year-old forest ranger with effraction of the anterior surface of the lens, which evolved into recurrent inflammation, the origin of which was difficult to diagnose and treat.

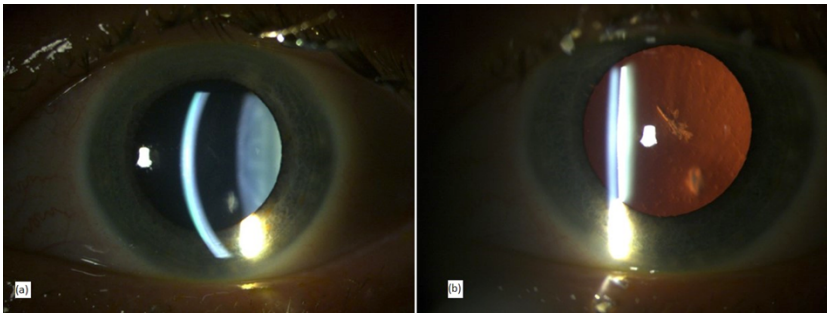

Figure 1: Left eye of our patient at presentation. Description: 1A Penetrating corneal wound in a paracentral-inferior location and 1B central impact in the anterior lens capsule highlighted by retroillumination.

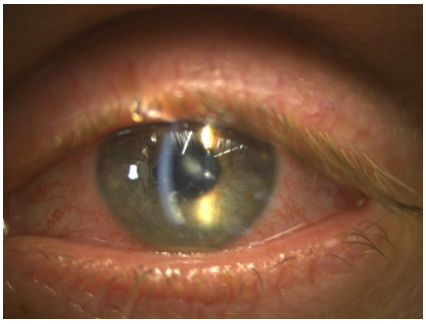

Figure 2: Left eye of our patient, 3 weeks post initial trauma. Description : Presence of intraocular inflammation in the left eye with diffuse hyperaemia, a fluoropositive inferocentral corneal wound, a 1mm hypopyon, a 2-cell Tyndall in the anterior chamber and whitish deposits on the anterior lens capsule.

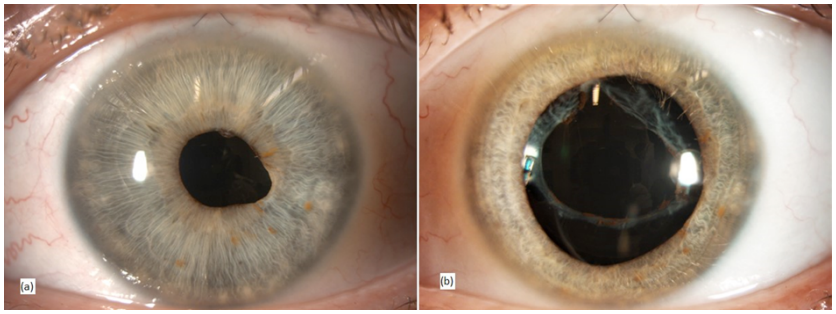

Figure 3: Post operatives pictures of the left eye. Description : 3A Post-phaco resection image and secondary implantation in the sulcus, undilated iris socket. Scleral suture at 12 o'clock, iris corectopy. 3B : Picture taken with dilated iris. Superior scleral suture, intraocular implant in the sulcus, Residual synechiae's are visible along the capsulorhexis performed in difficult situation.

Case Presentation

The patient, who had no previous medical history nor medication, came urgently to a private ophthalmology practice after sustaining a penetrating hawthorn thorn injury to his left eye at work. Clinical examination concluded to a self-sealing penetrating corneal wound located in the paracentral-inferior cornea of the left eye, associated with a central anterior lens impact. The anterior chamber was quiet and well formed. A three-week follow-up showed spontaneous closure of the corneal wound and central anterior lens opacification, with no evidence of ocular inflammation (Figure 1) and visual acuity (VA) surprisingly remained at 20/16 and intraocular pressure (IOP) stayed normal (13mmHg). As the patient complained of ocular discomfort, treatment with a topical antibiotic (TA) and corticosteroids was initiated (De Icol®). Three weeks later, the patient had a decreased VA of 20/25, probably due to discontinuation of the TA treatment

5 days earlier. Despite an intensive 5-day course of De Icol® 5x/d and cycloplegia for pain relief, the VA plateaued at 20/40 with the appearance of a 1mm high hypopyon without associated hypertonia (Figure 2). The patient was then referred to Erasme University Hospital (Université Libre de Bruxelles) for suspected endophthalmitis. The dilated fundus and the ocular computed tomography (OCT) showed no posterior segment involvement. After a first anterior chamber puncture (ACP), treatment with broader spectrum topical (Ciloxan® hourly during the day and Trafloxal® ointment in the evening) and systemic (Avelox® po) antibiotics as well as topical (Natamycin 6x/d) and systemic (Fluconazole po) antifungal agents were initiated. Cycloplegia was continued to avoid irido-crystalline synechiae and reduce the patient's pain. Given the good evolution with disappearance of the hypopyon, a topical corticosteroid was added to the treatment the next day (Pred Forte® 3x/d). Intraocular inflammation was quickly controlled. The clinical remission of the inflammation was maintained when the systemic antifungal and antibiotic treatments were stopped on day 10. However, each time the TA treatment was reduced, recurrence of anterior segment inflammation occurred (three recurrences in total in 11 weeks, counting from initial trauma). These recurrences responded each time to antibiotic treatment alone, without reintroduction of the antifungal agent. The first two ACPs did not reveal any germ. There was progressive increase of the post-traumatic anterior cortical cataract in line with the effraction of the anterior lens capsule. However, the third recurrence did not reply as well to TA treatment. A therapeutic window initially planned to last 48 hours, to allow microbiological sampling in the best conditions, had to be shortened after 24 hours following quick clinical deterioration with intense ocular pain and AV limited to less than 20/400. A sine lente phacoemulsification was promptly performed to control the infection by removal of the suspected infectious focus in the lens. An intra-cameral injection of Vancomycin and Ceftazidime was administered at the end of the procedure. Concurrently, the culture of aqueous humor from an intraoperative PCA and the phacoemulsification cassette revealed the presence of Staphylococcus Capitis.

Results

After the surgery, the patient rapidly improved, with resolution of pain and complete disappearance of intraocular inflammation. Six months after the first surgery, an intraocular lens was implanted in the sulcus, which allowed the patient to recover a far uncorrected 20/16 monocular VA and a far uncorrected 20/12.5 binocular VA (Figure 3). This penetrating corneal wound caused by a vegetal was complicated by a multi-sensitive Staphylococcus Capitis infection, which recurred at the slightest discontinuation of the TA, probably due to an infectious focus located in the lens. A year later, as expected but not wanted, patient experienced a plant trauma in the fellow eye but luckily, not penetrating this time.

Discussion

Several studies show the importance of assessing the initial VA after an ocular trauma as it is the best prognostic factor to predict final vision [1]. The Ocular Trauma Score (OTS) is essential to guide treatment and estimate the potential for visual recovery of an eye after ocular trauma. Our patient had a good chance of recovering his vision since he had an initial VA of 20/16 and an OTS score of 4 (corresponding to a corneal wound with no aggravating factor in the OTS score). The intraocular inflammation of our patient was controlled, but tapering local treatment would loud to inflammatory relapses including a hypopyon. The first two aqueous humor cultures were negative, raising questions about the diagnosis. Was it a post-traumatic intraocular inflammation of phaco-antigenic origin, of infectious origin or of mixed origin? In favor of the phaco-antigenic component, which refers to an immune response to antigens normally sequestered within the lens but released into the anterior chamber following breakage of the lens capsule [2], the clinical symptoms and the time interval between the trauma and the intraocular inflammation were definitely compatible with the diagnosis (between 2 days and 59 days post-trauma) [3]. Phacolytic uveitis may or may not be complicated by a hypopyon [3]. In favor of an infectious component, the intraocular inflammation, which initially lasted for more than a month, recurred only when the TA was discontinued. After two failed aqueous humor cultures, the therapeutic window was of paramount importance in making the diagnosis of Staphylococcus Capitis infection, which is very rarely identified in post-traumatic ocular infections. Hence, the two positive culture samples (one from the phaco-emulsification cassette and one from the 3rd ACP) confirmed the infectious origin. To our knowledge, only one case of post-traumatic Staphylococcus Capitis infection has been reported in the literature, which was in a pediatric patient [4]. Staphylococcus Capitis is a commensal bacterium of the flora of the adnexal tissues of the human head [5], capable of generating biofilms to evade the immune system [6]. Although a case of inflammation caused by a wood splinter resulting in a perforating wound with lens abscess has been reported in the literature and labelled as chronic endophthalmitis, no germ was found despite combined surgical management using a posterior approach and phacoemulsification [7]. Post-phacoemulsification endophthalmitis caused by Cutibacterium Acnes (formerly known as Propionibacterium Acnes) also tends to recur because of its resistance to standard antibiotic treatments, but in a more torpid and persistent manner, usually developing over more than 6 weeks after phacoemulsification surgery, sometimes even after months of delay. These endophthalmitis present with a similar clinical picture of uveitis with hypopyon. The best therapeutic approach is mechanical, by removing the previously inserted intraocular implant, as in our patient for whom removal of the lens definitively resolved the infectious problem [8]. Any penetrating

ocular wound is at risk of ocular infection, but some risk factors increase the likelihood of infectious complications. Risk factors should therefore be relied upon to guide sampling and possibly initiate antibiotic therapy [9]. Among those, contact with plants or a rural setting increase the risk of fungal infection and make it imperative to start antifungal treatment alongside with antibiotics. It should also be noted that a tetanus booster should not be neglected in cases of possible risk. At first, our patient did not have endophthalmitis but had an effraction of the lens, an important risk factor for infection [10]. The question arises as to whether earlier and more intensive antibiotic therapy could have eradicated the infectious focus in the lens without need for surgery.

Conclusion

We have identified and eradicated a rare Staphylococcus Capitis infection complicating a penetrating corneal wound with effraction of the anterior lens capsule and causing recurrent inflammation of the anterior segment of the eye. It remains difficult in a traumatic context to identify the respective roles of the inflammatory and infectious components. From the onset, a methodical approach is required: to define the type of injury, its OTS and to identify possible germs early on. ACP samples should be taken, and empirical antibiotic therapy initiated. Close monitoring of the patient will allow rapid reaction and adaptation of treatment. In the event of a pejorative evolution despite antibiotic therapy, a therapeutic window should be considered, especially if the germ could not be identified at the outset. The occurrence of a trauma to the adelphic eye of this patient one year later underlines the importance of preventing ocular trauma in at-risk populations of manual workers who tend not to protect themselves sufficiently in the workplace.

Informed consent/ Patient consent: Written informed consent has been obtained from the patient to publish this paper and those pictures. The article was written according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Hôpital Erasme of Université Libre de Bruxelles.

Ethical Statement: The patient gave his informed consent to write an article on his case. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Hôpital Erasme of Université Libre de Bruxelles.

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Declaration of Conflicting Interests: The Authors declare that they have no conflict of interest.

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