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Acinetobacter Corneal Ulcer, An Ocular Involvement by An Uncommon Organism; A Case Report

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Case Report

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Abbreviation: ICU: Intensive Care Unit; UCVA: Uncorrected Visual Acuity, LP: light perception; mm: millimeters, PKP: Penetrating Keratoplasty; IOL: Intraocular Lens, POD: Postoperative Day

ABSTRACT

Acinetobacter is a gram-negative bacteria genus that belongs to the Gamma proteobacteria class. Under magnification, *Acinetobacter* species are oxidase-negative, have twitching motility, and occur in pairs. They are significant soil organisms that aid in the mineralization of aromatic compounds, for example. *Acinetobacter* species, particularly *Acinetobacter baumannii*, are a major source of infection in hospitalised debilitated patients. Corneal ulcers are inflammatory or infective conditions of the cornea that involve rupture of the epithelial layer and involvement of the corneal stroma. It is a frequent ailment among humans, especially in tropical and rural countries. Children with Vitamin A deficiency in underdeveloped nations are at a higher risk of developing corneal ulcers and becoming blind in both eyes, which can last a lifetime.

INTRODUCTION

Acinetobacter is an Opportunistic invader which comprises physiological flora in human. The main pathogenic species is *Acinetobacter baumanni*. It mostly exists in the hospital environment and plays a significant role in the colonization and infection of hospitalized patients, especially in patients admitted in the Intensive Care Unit (ICU) setting. It is recognized as a rare cause of ocular infections with various manifestations including endophthalmitis, corneal ulcer, keratoconjunctivitis, and preseptal cellulitis [1-4]. Here, we reported the patient with traumatic sclera laceration who experience corneal ulcer caused by *Acinetobacter*.

CASE PRESENTATION

A 79-year-old obese male was admitted to the Intensive Care Unit (ICU) due to falling down because of syncope and diminished vision of his right eye. He had a previous history of the large abdominal aortic aneurysm which was known recently, without any specific management. Additionally, he had a suspect history of sleep apnea. There was nothing remarkable in his past ocular history. Regarding his condition, we conducted the bedside examination with penlight and indirect ophthalmoscopy. On examination, the Un-corrected Visual Acuity (UCVA) of right and left eyes were Light Perception (LP) and 20/40 respectively (using near chart). On anterior segment examination of his right eye, there was periorbital edema, mild bloody chemosis mostly at the temporal side, and clear intact cornea. Additionally, we found a large full-thickness scleral laceration about 12 millimeters diameter with irregular edges at the supra temporal side near the limbus. Examination of anterior and posterior segments of the left eye was within normal limits except for mild meibomian gland dysfunction and cataract. Due to low oxygen saturation and hemodynamic instability of our patient, the physician of ICU did not let us repair the scleral laceration, hence; an eye shield was placed on his eye, and a systemic antibiotic was initiated (Ceftazidim, Vancomycin and Clindamycin). We visited the patient on daily basis (Figures 1 and 2).

Figure 1. Severe bloody chemosis and corneal epithelial defect with infiltration.

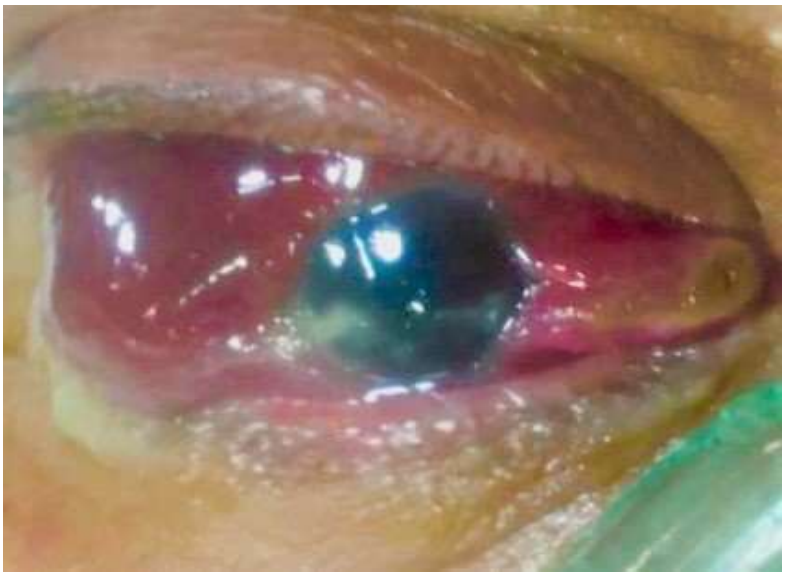

Figure 2. A fluorescein stain image showed no improvement in corneal ulcer, one day after starting topical Colistin drop.

After five days, we noticed the exacerbation of the bloody chemosis that push the lids outward that create exposure keratitis which resulted in corneal ulcer at the lower third part of the cornea with a large corneal epithelial defect about 6*3 mm diameter with infiltration (two sites of infiltration about 1*1 mm) but far from the site of scleral laceration. The corneal ulcer was scraped for microbiologic examination and culture and a large lateral tarsorrhaphy was done. We started the empiric broad-spectrum antibiotics (fortified eye drops of Vancomycin 5% and Ceftazidim 5%). Until the preparation of the antibiogram result, the ulcer progressed in the size of defect and infiltration. The culture of the sample revealed *Acinetobacter baumanni*, while the culture of blood specimens gave negative results. The antibiogram showed resistance of the organism to all antibiotics but Colistin. So, regarding consultation with an infectious disease specialist, aggressive treatment was administered: 3 million units of Colistin intravenously twice daily and Topical Colistin drop (0.19%) every 3 hours. Unfortunately, the patient passed away 2 days later due to low blood pressure and cardiac arrest, however; we found no changes in the corneal situation before his death.

RESULTS AND DISCUSSION

Among the large family of bacteria, the *Acinetobacter* group has been known as gram-negative, non-fermentative, aerobic *coccobacillus which widely exists* on skin, mucus membranes, and in the urinary tract with relatively low virulence. However, its virulence would aggravate in patients with impaired hosts' defenses or using broad-spectrum antibiotics in hospitals. In contrast to patients who are admitted to the ICU, the rate of community-acquired form of *Acinetobacter* infection is very low [5].

The ocular infections caused by *Acinetobacter* species are very rare. Patients with exposure of cornea, history of contact lens usage, history of Penetrating Kerato Plasty (PKP), and immunosuppression are vulnerable to *Acinetobacter keratitis* and ocular infection [2]. To the best of our knowledge, our study is the first one that reported corneal ulcer by *Acinetobacter* following not repaired scleral laceration in a patient without mechanical ventilation and any pieces of evidence of systemic infection. However, our patient was in a compromised condition and had been admitted to the ICU.

There are very few studies that reported the ocular involvement provoked by *Acinetobacter*. It could demonstrate various ocular features. On the other hand, it feasibly could be co-infected with fungi and the other bacteria [2-7].

R. Roy described the 4 cases of endophthalmitis caused by *Acinetobacter baumanni* of endophthalmitis were post-cataract surgeries and the last one occurred in a patient with previous corneal repair due to trauma. All these patients underwent intravitreal antibiotic (Ciprofloxacin) and vitreoretinal surgical intervention. Finally, the ocular condition of 3 of them deteriorated (one resulted in evisceration, one in the phthisic eye and the other one developed retinal detachment, post vitrectomy) and only 1 patient reached the visual acuity of 20/200 [8]. Recently a case of *Acinetobacter baumanni* endophthalmitis has been reported, which resulted from intravitreal Ranibizumab injection [9]. Several studies revealed the trauma-induced endophthalmitis with *Acinetobacter*, due to corneoscleral lacerations [10,11]. Additionally, Crawford, et al. reported the recurrent endophthalmitis caused by multiple organisms including *Acinetobacter iwoffi.* The patient underwent several intravitreal injections and pars plana vitrectomy. The contamination source is presumed to be self-contamination as a result of utilizing non-sterile antibiotic drops. This point emphasizes that even healthy young patient with history of trauma but no immunosuppressive setting could be vulnerable to ocular involvement by unusual catastrophic organisms including *Acinetobacter* species.

In 2004, one study showed that one asymptomatic infectious cornea donor could result in post-PKP corneal ulcer in one cornea recipient and post PKP endophthalmitis in the other one [12]. Additionally, it indicates the fact that we might consider this problem in utilizing the corneal graft of patients who were admitted in ICU even without any apparent corneal infiltration.

In consensus with our finding, one study showed that exposure keratitis in patients with systemic diseases and admission in ICU would lead to *Acinetobacter* corneal ulcer which could be treated by antibiotic and tarsorrhaphy. In contrast to ours, the isolated *Acinetobacter* from urine might be a sign of generalized infection with this organism with secondary corneal involvement.

Association of *Acinetobacter* species with soft contact lens–induced infiltration has been proved previously [13, 14]. *Acinetobacter* species were isolated from 16 (13%) of 126 patient corneal infiltration samples. this study demonstrated that patient's hand microbiota could be recognized as a possible source of *Acinetobacter* species which be transferred to the ocular surface via contact lens.

Acinetobacter species have been associated with keratitis and corneal ulcers caused in different settings have been reported [3,15-17]. A report from Korea showed that in contrast to most bacterial keratitis, corneal ulcers induced by *Acinetobacter* usually were placed at the peripheral site of the cornea. However, in our patient, the ulcer located at the lower third of the cornea may be explained by exposure keratitis in this special case.

de Oliveira Ribeiro reported a history of a 70-year-old patient who underwent phacoemulsification and Intra Ocular Lens (IOL) implantation. On Postoperative Day (POD) 9, he was referred with severe eye pain and redness. B-mode ultrasound scanning showed the vitreous condensation, in favor of endophthalmitis. The posterior vitrectomy and sampling vitreous humor for culture and antibiogram were performed. The antibiogram showed multi drug-resistant *Acinetobacter* baumanni. Hence, due to devastating pain and no response to antibiotic therapy, ocular evisceration was performed for the patient.

Furthermore, there are several reports in favor of preseptal cellulitis caused by *Acinetobacter* species [4,18]. In these two patients, none of them had the history of admission in the hospital and ocular surgeries or interventions. Regarding patients' occupation, it assumed that one possible source of inoculation is the vegetative matter.

In conclusion, we should be mindful to consider *Acinetobacter* as a probable pathogen even in healthy patients but especially in patients stayed in the ICU, even while may not show any evidence of *Acinetobacter* bacteremia

simultaneously. It may not respond to empiric treatment and progress to a devastating condition. Additionally, hand hygiene among ICU staff would obviate many ocular infections including *Acinetobacter* keratitis and corneal ulcer.

CONCLUSION

In conclusion, we should be mindful to consider *Acinetobacter* as a probable pathogen even in healthy patients but especially in patients stayed in the ICU, even while may not show any evidence of *Acinetobacter* bacteremia simultaneously. It may not respond to empiric treatment and progress to a devastating condition. Additionally, hand hygiene among ICU staff would obviate many ocular infections including *Acinetobacter keratitis* and corneal ulcer.

DECLARATIONS

Competing interests:

The authors declare that they have no competing interests.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The Institutional Review Board of Iran University of Medical Sciences in Tehran, Iran approved the study protocol. This study adhered to the tenets of the Declaration of Helsinki. This report does not contain any personal identifying information of the patient.

CONSENT FOR PUBLICATION

Not applicable

AVAILABILITY OF DATA AND MATERIALS:

Not applicable.

AUTHORS' CONTRIBUTION:

Mahsa Sardarinia: Concept, Design, Data Collection and/or Processing, Literature Search, Roles/Writing – original draft,

Gholamhoseyn Aghai: Investigation,Methodology,

Leila Ghiasian: Project administration, Supervision, Validation, Visualization

Alireza Mohseniansisakht: Investigation,Methodology, Roles/Writing – original draft

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