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Commentary

Characteristics of *Elizabethkingia meningoseptica* Ophthalmic Infections

Ye Xiao*

Department of Ophthalmology, Hang Seng University of Hong Kong, Hang Shin Link, Siu Lek Yuen, Hong Kong, China

ABOUT THE STUDY

Elizabethkingia is a Gram-negative, obligate aerobic, oxidase positive, non-glucose fermenting bacillus that is widely available in nature and is increasingly being identified to survive on hospital surfaces and medical equipment. *Elizabethkingia* is known to cause a variety of nosocomial human infections and has emerged as a clinically important pathogen because of its resistance to multiple anti-microbial agents. Ophthalmological *Elizabethkingia* infections are becoming more common, with contact lens use, trauma, ocular surgery, and ocular surface disorders all being linked. Due to the scarcity of cases, standardised management, antimicrobial treatment selection, and prognosis of *Elizabethkingia* ocular infections are lacking. We present the first case series of *Elizabethkingia* induced ophthalmic infections, with specific emphasis on its clinical spectrum, risk factors, treatment and outcome.

Microbiological specimens growing *Elizabethkingia* were reviewed retrospectively in a regional tertiary hospital from 2005-2019. Positive *Elizabethkingia* isolates from eye swabs, corneal scrapping and bacterial culture for contact lens in respective cases were retrieved from the hospital microbiological database. All clinical specimens were collected and handled according to standard protocols. *Elizabethkingia* was first identified by conventional phenotypic method. Gram-negative bacilli were initially recovered from the specimens.

Elizabethkingia is an important saprophyte that has grown much attention in recent years due to its ability to cause clinically significant infections and resistance to multiple anti-microbial agents. Contact lens use, trauma, previous ocular surgery, and ocular surface disorders all appeared to be important risk factors for ocular *Elizabethkingia* infections. We present the most extensive series of *Elizabethkingia* infection in eyes. The spectrum of *Elizabethkingia* ocular infections is wide and mostly confined to the ocular surface. The clinical characteristics of *Elizabethkingia* echoed with previous reports and are found confined to the ocular surface. Previously reported *Elizabethkingia* induced endophthalmitis was not found in our series and no intraocular infections were identified.

The association of *Elizabethkingia* induced keratitis and contact lens is demonstrated in our study. Contact lens predisposes the cornea to microtrauma and hypoxia which disrupted the corneal epithelium and barrier to bacterial binding. In addition, biofilm formation and pathogen colonization on contact lens also potentiated the infection. The ability of *Elizabethkingia* to attach on contact lens, cases and water supplies is an important factor for development of ocular infections. Mechanisms including substandard contact lens hygiene, extended wear and trauma may also play a role in the potentiating the infection.

The use of topical steroids in the post-operative cataract period may also be linked to *E. meningoseptica* blepharitis. Prolonged topical steroid was prescribed in our case due to anterior chamber inflammation. We suspect that the treatment aggravated the development of *Elizabethkingia* blepharitis, as topical steroid has been shown to delay epithelial healing and inhibit neutrophil activation, which subsequently weakened the ocular surface protective barrier. The multiple anti-microbial resistance in *Elizabethkingia* is conferred in β-lactams as a result of possession of Ambler class A serine Extended-Spectrum β-Lactamase (ESBL) gene blaCME and Ambler class B Metallo-β-Lactamase (MBL) genes blaBlaB and blaGOB. Resistance is also seen in quinolones secondary to genetic mutations in DNA gyrase and topoisomerase IV.

Correspondence to: Ye Xiao, Department of Ophthalmology, Hang Seng University of Hong Kong, Hang Shin Link, Siu Lek Yuen, Hong Kong, China, E-mail: xiaoye@hsu.edu.hk

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