DOI 10.5935/0034-7280.20190011

Contact lenses causing conjunctivity by *Ralstonia pichettii*

Lentes de contato provocando conjuntivite por Ralstonia pichettii

Cristiane Coimbra de Paula[1,2] https://orcid.org/0000-0001-7334-9412
Walkiria Shimoya Bittencourt[3,4] https://orcid.org/0000-0003-2350-8897
Diniz Pereira Leite Junior[5,6,7] https://orcid.org/0000-0002-5934-8613

Abstract

The present report reports a case of conjunctivitis caused by Ralstonia pichettii in an immunocompetent patient wearing a contact lens. The bacterium isolated from the solution used to disinfect R. pichettii does not belong to the human microbiota but infects immunodepressed patients and is present in aqueous solutions. There is no standardization of sensitivity for this bacterium and few antibiotics have been tested for non-fermenting glucose bacteria. Due to the reduced antimicrobial sensitivity profile demonstrated by R. pichettii, it is important to correctly identify this etiologic agent in conjunctivitis and keratitis. This case report illustrates that R. Pickettii is a more important pathogen than previously thought.

Keywords: *Eye infections; Bacteria; Conjunctiva; Ralstonia pichetti; Contact lenses; Case reports*

Resumo

O presente relato apresenta o caso de conjuntivite causada por *Ralstonia pichettii* em paciente imunocompetente usuária de lente de contato. A bactéria isolada da solução utilizada para desinfecção das lentes *R. pichettii* não pertente a microbiota humana mas infecta pacientes imunodeprimidos e está presente em soluções aquosas. Não há padronização de sensibilidade para esta bactéria e poucos antibióticos foram testados para bactérias não fermentadoras da glicose. Devido ao reduzido perfil de sensibilidade aos antimicrobianos demonstrado pela *R. pichettii*, torna-se importante a identificação correta deste agente etiológico em quadros de conjuntivite e ceratites. Este relato de caso ilustra que *R. Pichettii* é um patógeno mais importante do que se pensava anteriormente.

Descritores: Infecções oculares; Bactérias; Conjuntiva; *Ralstonia pichettii*; Lentes de contato; Relato de casos

[1]Laboratório Carlos Chagas, Cuiabá, MT, Brazil;
[2]Centro Universitário de Várzea Grande, Várzea Grande, MT, Brazil;
[3]Master's Program in Environment and Health, Universidade de Cuiabá Cuiabá, MT, Brazil;
[4]Medicine School, Centro Universitário de Várzea Grande, Várzea Grande, MT, Brazil;
[5]Medicine School, Universidade Federal de Mato Grosso, Cuiabá, MT, Brazil;
[6]Laboratory of Pathogenic Yeasts, Universidade de São Paulo, São Paulo, SP, Brazil;
[7]Centro Universitário de Várzea Grande, Várzea Grande, MT, Brazil.

Institution where the study was carried out: Laboratório Carlos Chagas, Cuiabá-MT, Brasil.

The authors declare no conflicts of interests.

Received for publication 17/01/2018 - Accepted for publication 22/02/2018.

Introduction

Etiological agent

The bacterium *Ralstonia pichettii* (current nomenclature), also known as *Burkholderia picketti* (previous nomenclature), is a gram negative non-fermentative glucose bacillus which is not part of the normal human microbiota, therefore affecting immunosuppressed patients and having the environment as their habitat. Although its transmission is unknown, it is likely that in a hospital environment it is transmitted by human contact with contaminated medical equipment causing infection[1,2] These infections may include bacteremia and/or septicemia caused by contaminated solutions such as distilled water, water for injection and aqueous solutions of chlorhexidine, and may be isolated in the blood, urine or sputum. Rare cases of unusual infections such as meningitis, septic arthritis and osteoheitis may also occur associated to the presence of another known bacterium, Pseudomonas.[3,4]

Case Report

A 54-year-old female patient, E.M.T.A.L., immunocompetent, wearing contact lens for fifteen years. After medical prescription, she switched her contact lens to a brand offering 6 pairs of extended wear and disposable lenses to wear in a year. In 2017, while wearing the last pair of contact lenses, she arrived home and delayed the removal of the contact lenses to sleep because her hands were dirty. Later on, driven by personal problems she cried a lot and ended up sleeping with the lenses. When she woke up, she noticed an initial swelling, but she did not matter because she thought it was due to crying the night before. However, she started losing visual acuity in both eyes the same day, with increased swelling, ciliary injection and burning.

By staying with the contact lens the eye was hurt and began to tear, which made it difficult to feel the contact lens, which the patient stated she had removed. Five days after the onset of symptoms, another ophthalmologist found that the patient still remained with the contact lenses, removing the lenses and placing them in a cleaning vial. The vial with the lens wash was sent for microbiological analysis. The liquid containing the lens was seeded on blood agar, chocolate agar and MacConkey agar, and incubated at 35°C for 24 h.

At the ophthalmologic examination, the patient presented visual acuity with blurred vision in the right eye, and corneal infiltrate, conjunctival hyperemia, preserved iris and free tarsus in the left one. The diagnostic hypothesis raised was hypoxia with infectious infiltrate in both eyes.

Sample growth was abundant in all seed media (Figures 1 and 2). Conventional standard tests were used for its identification, such as gram staining (gram negative bacillus), oxidase test (negative), and identification of the bacteria in the non-fermenting glucose kit. The initial results for identification were inconclusive, then the isolate was sent for identification in the support laboratory (São Paulo) using the Mald Tof identification device. The result indicated the presence of *Burkholderia pichettii* (cepacia complex). Although there was no standardization of antimicrobial susceptibility test for this bacterium(5), an antibiogram was performed using some discs tested in non-fermenting microorganisms. In this case, the bacterium was sensitive only to sulfamethoxazole/trimethoprim and levofloxacin, and resistant to ceftazidime.

After removal of the patient's lenses, the physician immediately prescribed Zymar XD 5 mL (Gatifloxacin 0.5%) to be taken during the first few days every 15 minutes for 1 hour, following drug administration every 1 hour and after that every 3 hours. The ophthalmologist kept the medication after the antibiogram results. The patient's eyes evolved in the next follow-ups with less dense perilesional infiltrate, absence of hypopyon, and improvement in visual acuity. After confirmation of the improvement of ocular acuity and decrease of the infiltrate during the appointment, the use of the medication prescribed (antibiotic eye drops) was interrupted, and the use of glasses was suggested.

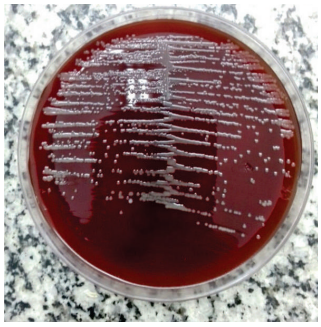

Figure 1: Growth in sheep's blood agar 5%

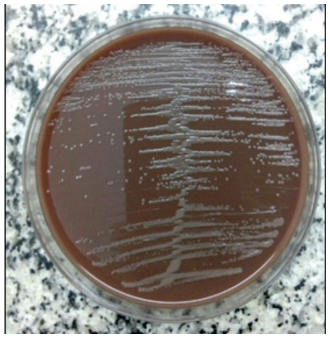

Figure 2: Growth in chocolate agar

Discussion

The incidence of bacterial keratoconjunctivitis occurs in 3.5 per 10,000 daily users of lenses, and in 20 per 10,000 users of lenses for a prolonged period, therefore being significant among users of contact lenses.[6]

Microbial keratitis represents an important cause of morbidity worldwide, especially when late diagnosed. Its severity varies according to the virulence of the agent involved and the clinical conditions of the patient.[7]

Being an infectious inflammatory process of the cornea which can be caused by bacteria, fungi, viruses and protozoa, it is considered an ophthalmological urgency because its clinical development is very fast and with a potential risk of decreased vision and blindness.[8]

According to Cury[9], patients with keratitis present greater severity in clinical development than patients with ocular conditions other than keratitis, and it is essential to identify the etiologic agent in order to subsidize the choice of therapy. In the present study, after identification of the etiological agent, it was possible to associate factors of infection occurrence, clinical development and adequate treatment. This is in agreement with the reports by Cury[9], indicating a greater severity in the clinical

development of patients with ocular affections, being essential the rapid identification of the etiologic agent.

The contact lenses were considered in this study a preponderant factor for the onset of inflammation and installation of the bacterial agent in the cornea. This initial report shows the infection caused by *R. pichettii,* where the most commonly reported agents are the gram-negative bacterium Pseudomonas aeruginosa[10] and fungi of the genus Fusarium, being Fusarium solani the main causative agent of fungal keratitis in warm climate regions. [11,12] However, it is important to emphasize that antimicrobial therapy should always be directed by the antibiogram result, in order to guarantee eradication of the bacterium, or antifungigram in the case of fungi.

There is consensus and divergence among several authors[13-15] regarding both rigid and gelatinous lenses made from materials with high oxygen permeability, negatively influencing the proliferation rates of the central corneal epithelium, which indicates that the mechanical presence of the lens may alter epithelial homeostasis compared to non-lens users. Robertson et al.[15] address this situation in their casuistry, alerting the indiscriminate use of contact lenses.

The study of Shin et al.[14] emphasizes that the ocular microbiome of the research participants wearing lenses had higher concentrations of Pseudomonas, Acinetobacter, Methylobacterium and lactobacilli, and to a lesser extent the agents of the genera Haemophilus, Streptococcus, Staphylococcus, and Corynebacterium, indicating that contact lenses alter the residual bacteria of the eyes and modify the ocular biome, making it more similar to that of the skin.

More recently, Zhang et al.[13], in a survey carried out to compare the microbial communities of users and non-users of contact lenses, found no differences in diversity, only a slight variability of microorganisms evident in the two groups studied.

The use of contaminated contact lenses and cleaning solutions has been considered to be associated to the development of keratitis.[16] Some microorganisms may adhere to the surface of contact lenses, colonize the cornea during use, and survive in the lens case, especially when handled improperly. Users of contact lenses with infectious keratitis often report prolonged hours of use, maintenance of contact lenses in saline solution, and handling them with dirty hands.[17]

As in other body sites, such as the intestine, skin, and mouth, which have residual microbiota, the human eye also has a regular community of bacteria that is expected to confer resistance and protection to the ocular microbiota from invading agents. However, the ophthalmic microbiota requires a greater understanding of ocular diseases and the discovery of their specific functions. This manuscript emphasizes the inadequate use of lenses and the damage caused by persistent contact with users who do not wear lenses, warning of the possible role of the ocular microbiome in increasing the risk of eye infections in contact lens users.

We can conclude that colonization in ophthalmic environments presents the proliferation of microorganisms associated to patients who fall asleep and forget to remove their contact lenses, lack of hygiene of the cleaning product and even the hands when handling the lenses, which can cause infection. This unfavorable outcome may culminate in an invasive procedure, such as surgical intervention, or cause permanent damage and even lead to blindness.

Acknowledgements

We thank the laboratory Carlos Chagas immensely for making the data available for this work, and Dr. Murilo de Campos Borges for the exceptional consultative support.

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Corresponding author:
Cristiane Coimbra de Paula
Centro Universitário de Várzea Grande – UNIVAG, Medicine School, Nº 2.655, Várzea Grande – MT, Brazil.
ZIP Code:78.118-900.
E-mail: cristianepaula4@gmail.com