

A Case of *Serratia marcescens* Conjunctivitis in a Young Male after Exposure to Contaminated Shampoo in a Fitness Club

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Abstract

The contamination of shampoo with bacteria is not very common but can happen and can be a potential cause of conjunctivitis. This case report describes a 24-year-old male who developed conjunctivitis after using a *Serratia marcescens* contaminated shampoo in a fitness club. The patient had redness, swelling, and discharge in both eyes. Cultures of the shampoo and eye swabs were positive for *S. marcescens* with indistinguishable DNA fingerprints. The patient was treated with an eye drop antibiotic and his symptoms resolved within a week. This case highlights the possibility of exposure in places where shampoos containers are refilled or shared. The avoidance of refilling them and using replaceable cartridges, single-sealed refill bags, or bringing personal shampoo is highly recommended to prevent such incidents.

Keywords

Serratia marcescens, Conjunctivitis, Contaminated Shampoo, Eye Swabs

1. Background

Serratia marcescens is a Gram-negative, rod-shaped bacterium normally found in dry and moist environments. It is an opportunistic pathogen that can cause a wide range of human infections, including urinary tract infections, wound infections, bacteremia, and conjunctivitis [1] [2]. In the literature, *S. marcescens* has been associated with different eye infections, some of which are serious such as corneal ulcers [3], crystalline keratopathy [4] and other complications that could lead to complete visual loss [5]. Recently, it has become more resistant to many antibiotics, making it a major concern in hospitals [6]. Outside medical institutions on the other hand, *S. marcescens* is also involved in different infections as

it is isolated from different places in the community [7]. The objective of this paper is to highlight the serious clinical involvement of *S. marcescens*, in the community, when it reaches the eyes through uncommon sources such as shampoo.

2. Case Presentation

A 24-year-old male athlete wakes up the following day after a shower in the club he regularly visits with sticky eyelashes, redness in his eyes, itching, and grainy sensation, especially in the right eye (Figure 1). He was immediately seen by an eye specialist. On examination, the patient complained of bilateral red eyes, tearing, blurry vision, thick mucopurulent discharge, and irritation. The eye examination clearly showed hyperemia and swollen conjunctiva due to the inflammation. During history taking, the patient confirmed that his eyes were exposed to the shampoo available in the fitness club shower, which he described as a small, diluted amount at the bottom of the container. The patient had no serious diseases or previous ocular history, as he is young, healthy, fit and not on any medication. Conjunctivitis was confirmed clinically as the diagnosis, and eye swabs were taken and sent to the microbiology lab for culture and sensitivity. Gentamicin eye drops of 0.3% every 6 hours for five days were prescribed.

In the lab, the eye swabs were cultured on Blood agar, Chocolate agar and MacConkey agar and then incubated aerobically at 37°C for 24 h. On the second day, pure growth was shown on all plates. Creamy-white to grayish-light colored colonies were clearly grown on MacConkey agar which indicated the growth of Gram-negative bacteria (Figure 2). A full identification with a sensitivity report was done using the VITEK 2 machine (bioMérieux, Inc., Durham, N.C.).

Serratia marcescens was identified by the machine, and the sensitivity report



Figure 1. The infected right eye of the patient showing redness and discharge.

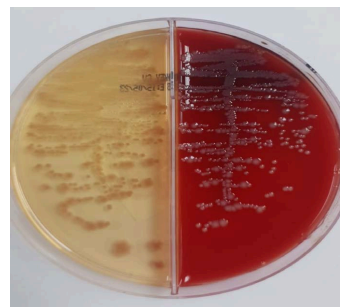


Figure 2. *Serratia marcescens* on MacConkey agar and Blood agar.

indicated that the organism was sensitive to gentamicin, ciprofloxacin, polymyxin B/trimethoprim, and resistance to aztreonam and ceftriaxone. The patient progressed well after starting the eye drops, and five days later, he fully recovered. Further investigation of the incident required taking a few drops of the shampoo to the same lab for culture and sensitivity. The culture of the shampoo came positive with the same organism and the same sensitivity. Both isolates, the one isolated from the patient's eye and the one isolated from the shampoo, were then sent to a reference molecular lab for DNA fingerprinting and analysis using Pulsed Field Gel Electrophoresis (PFGE). The lab report confirmed the genetic relatedness between the two isolates as indistinguishable.

3. Discussion

Serratia marcescens is a common cause of hospital infections worldwide, especially in intensive care units and in low immunity patients. Moreover, it can be a multidrug resistant organism that is hard to treat and responsible for different outbreaks [8] [9]. In this study, the link between the clinical infection of the eye and the shampoo was confirmed by PCR testing, and this raises the question of how such a bacteria reached the shampoo container. It must be stated, however, that the detection of *S. marcescens* in shampoos was confirmed for a long time in different studies. This is because it can tolerate low concentrations of different detergents, which are the main components of shampoo [10]. Furthermore, another study confirmed that *S. marcescens* was isolated from 43% of the 39 shampoo samples tested [11]. This indicates that it can be found in multiple bottles simultaneously. The authors suggested that contamination of the shampoo containers may occur during improper handling, which might be the cause of the incident. *S. marcescens* was also isolated from 3/11 (27%) newborns who suffered from *S. marcescens* infection in nursery intensive care unit. All three cases had conjunctivitis. Moreover, all eleven reported cases occurred after exposure to contaminated shampoo in the unit with the same bacteria, which indicates how frequently *S. marcescens* can contaminate them [12]. Fitness clubs usually have wall-mounted shampoo containers in the shower area. Cleaners who work in these clubs are responsible for replacing or refilling them. They usually refill to top up the amount of shampoo without cleaning the containers. Since the shampoo container is inside the shower area, diluting the remaining amount with water is highly possible during shower use, especially if the fitted dispenser is loose or broken. Ray *et al.* [13] argue that this may give a chance for this bacteria to stay and form a biofilm inside the bottom of the container and resist dying. This can happen if the container was not replaced/changed or washed before refilling as a multiple-use container [14]. Another possible explanation is that the main gallon that the cleaners used to fill the shampoo containers is itself contaminated [15]. Unfortunately, it was not possible in this study to trace this. Therefore, based on what was presented, refilling should be stopped to prevent such incidents from happening. Using other methods such as replacea-

ble ready cartridges, single sealed refills bags, or shampoo dispensers with single-use pumps already installed in the cartridge is recommended [16] [17] [18] Finally, bringing one's own personal shampoo may be the best option for fitness club visitors to avoid such incidents.

4. Conclusion

This case study highlights the potential risk of shampoo bottles in fitness clubs. *Serratia marcescens* can contaminate containers because of poor hygiene during refilling, improper handling, or storage. Its presence in a shampoo container can lead to the development of conjunctivitis. This case highlights the possibility of contamination of such products and the associated consequences. It may raise the concern of not using these public shampoos in fitness clubs and using personal ones instead.

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I would like to thank the patient for allowing me to show the picture of his right infected eye.

Informed Consent

Written informed consent has been obtained from the patient for showing the picture of his infected eye.

Conflicts of Interest

The author declares no conflicts of interest.

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