Antimicrobial efficacy of silver contact lens cases used in conjunction with a multipurpose disinfecting solution containing hyaluronic acid

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Introduction

- Contact lens storage cases are frequently contaminated during use with up to 90% of all contact lens storage cases contaminated.[1,2]
- Contamination of contact lens storage cases can lead to biofilm formation.[3]
- Bacterial biofilms can serve as a source of bacteria contaminating contact lenses during storage[4] that can then transfer to the cornea during wear.[5]
- Adhesion of bacteria to contact lenses is a major risk factor for the development of infectious [6] and inflammatory keratitis.[7]
- Laboratory studies have shown that contact lens cases containing silver can reduce the number of bacteria and biofilm formation.[8,9]
- However, very few clinical studies have examined the efficacy of contact lens cases containing silver in reducing bacterial contamination during normal use of lens cases by contact lens wearers.[10]

Purpose

The purpose of this study was to compare the microbial contamination between silver-impregnated contact lens cases and non-silver contact lens storage cases.

Methods

- A prospective, single-center, randomised, single masked clinical trial was conducted.
- The study received ethics approval (HREC#190910) from the UNSW Human Research Ethics Committee and the trial was registered with the Australia and New Zealand Clinical Trial Registry (ACTRN12619001520123).
- 2 types of contact lens storage cases were used
  - ✓Silver impregnated lens cases
  - ✓Standard (non-silver) contact lens cases
- Single contact lens multipurpose disinfecting solution (MPS) containing polyhexamethylene biguanide and hyaluronic acid (Hy-Care*, CooperVision, Inc., Pleasanton, USA) was used.
- Habitual contact lens wearers using two weekly or monthly replacement contact lenses were included in the study.
- Participants were randomised to either use the silver impregnated or standard lens case for 3 months and crossed over to use the other lens case type for next 3 months.
- At the follow up visit (1-month, 3-month, 4-month and 6-month), used lens storage cases were collected and cultured to recover bacteria and fungi.
- Chi-squared test was used to compare the microbial contamination between silver-impregnated contact lens cases and standard contact lens storage cases.

Results

- Twelve participants with a mean age of 32 ± 10 years were recruited, 67% of them were female.
- Ten participants completed the study.
- One participant had to be discontinued from the study due to non availability for the follow up visits.

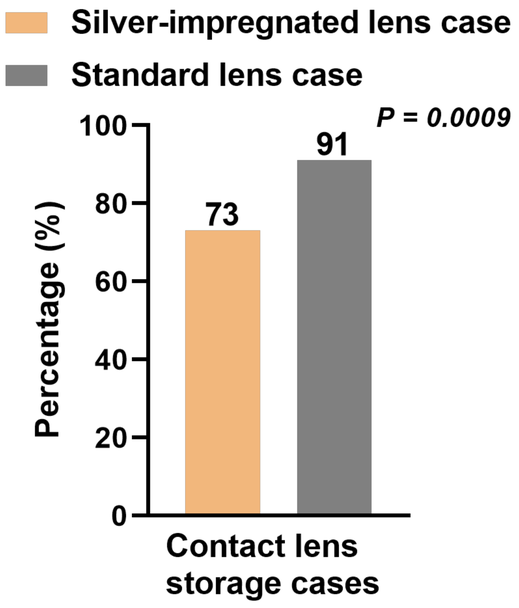

Figure 1: Contamination of silver-impregnated and standard lens case

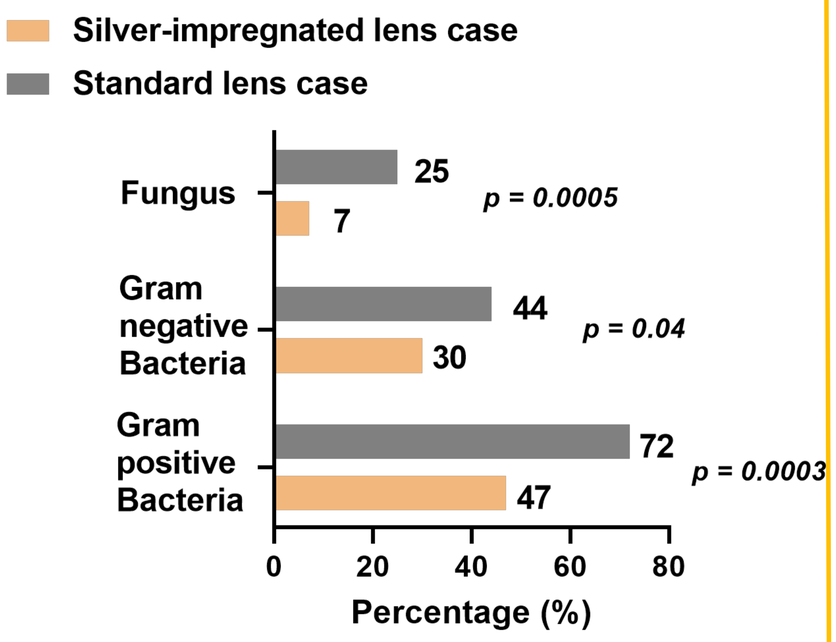

Figure 2: Frequency of lens case contamination by types of microbes

Table 1: Number of microbes in silver-impregnated and standard lens case (colony forming units/case)

Type of Microbes	Silver lens case (Mean ± SD)	Standard lens case (Mean ± SD)
Gram positive bacteria	1 ± 2 x10^3	14 ± 72 x10^3
Gram negative bacteria	30 ± 72 x10^3	3018 ± 4857 x10^3
Fungus	1 ± 3	5 ± 10

Conclusion

Silver-impregnated contact lens storage cases used in conjunction with a MPS containing hyaluronic acid showed reduction in microbial contamination of the lens cases compared to standard contact lens storage cases.

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- *, not currently available in the USA

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