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Analysis of the microbiota in Goldmann applanation tonometers

Análise da microbiota em tonômetros de aplanação de Goldmann

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Abstract

Objective: *Analyze the microbiota prevalence in the Goldmann applanation tonometers in the clinic of the SUS to define the contamination of the tonometers and the efficacy of asepsis of the applanation tonometer cone.* ***Methods:*** *A cross-sectional study was carried out to collect 60 "swabs" divided into the three aplanation tonometers of SUS clinics at two different times. In the first one, the collection will be performed at the beginning of the visits and at the second moment, the collection will be performed at the end of all the visits. All swabs will be harvested in the Stuart medium and culture was carried to sow bacteria.* ***Results:*** *Of the 60 samples, only one showed pathogen growth, Escherichia coli.* ***Conclusion:*** *Regardless of the various ways the ophthalmologist chooses to perform asepsis, it is essential for the maintenance of good patient eye health, thus avoiding the transmission and propagation of pathogens through ophthalmologic examination, and we also conclude that the method used by our patient seems to be effective in this prophylaxis.*

Keywords: *Tonometer; Glaucoma; Microbiota*

Resumo

Objetivos: Analisar a prevalência da microbiota nos tonômetros de aplanação de Goldmann nos consultórios do SUS e definir o grau de contaminação dos tonômetros e a eficácia da assepsia do cone do tonômetro de aplanação. **Métodos:** Estudo transversal em que foi realizado a coleta de 60 "swabs", divididos nos três tonômetros de aplanação dos ambulatórios do SUS em dois momentos distintos. No primeiro realizou-se a coleta no início dos atendimentos e no segundo momento, a coleta foi realizada ao final de todos os atendimentos. Todos "swabs" foram colhidos no meio Stuart e foi realizada a cultura em meio de bactérias. **Resultados:** Das 60 amostras, apenas uma apresentou crescimento de agente patogênico, a Escherichia coli. **Conclusão:** Independente dos vários métodos que o oftalmologista escolher para realizar a assepsia, a mesma é imprescindível para a manutenção de uma boa saúde ocular do paciente, evitando assim a transmissão e propagação de patógenos por meio do exame oftalmológico e concluímos também que o método utilizado pelo nosso serviço parece ser eficaz nesta profilaxia.

Descritores: Tonômetro; Glaucoma; Microbiota

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Introduction

Glaucoma is one of the main causes of irreversible blindness in the world. It is defined by irreversible optic neuropathy in which there is loss of ganglion cells and its main risk factor is increased intraocular pressure (IOP)[1].

An individual's IOP can be determined by means of Goldman's aplanation tonometry, whose original technique was described in 1957 by Goldmann and Schimdt. It is based on the Imbert-Fick principle, in which the applied pressure (P) is equal to the force (F) required to flatten a surface divided by the applanation area (A) (P=F/A).[2] Although there are several new techniques for evaluation, this remains the gold standard technique for IOP measurement.

In this sense, a plastic cone with two prisms is used, and the free end of which lies directly on the patient's cornea, making it possible to measure.[3] The use of fluorescein for this is paramount,[4] but it is not mandatory. Due to direct contact of the plastic cone with the cornea, it becomes potentially contaminated, since the conjunctival sac may contain bacteria and fungi,[5] and fluorescein may be contaminated with Pseudomonas aeroginosa.[6,7]

The objective of the present study was to analyze the prevalence and type of the microbiota in the Goldmann applanation tonometers to determine the degree of contamination of the tonometers, as well as the efficacy of the asepsis of the applanation tonometer cone.

Methods

This is a cross-sectional study, and the collection was performed with swabs on the three aplanation tonometers in SUS ambulatories at two different times. At first, the collection was made at the beginning of the visits, in order to quantify the prevalence and type of the microbiota present in the tonometers. In the second moment, the measurement was made at the end of all the visits, so that the efficacy of the asepsis throughout the day and the change of the microbiota during the day could be analyzed.

All collections were carried out between November 13, 2017 and November 20, 2017, totaling 20 collection periods and 60 samples. The samples were separated into three groups, Offices I, II and III, which are divided according to the room where the tonometer is located.

All samples were collected by means of sterile swabs wrapped in Stuart's medium, which conserve pathogenic microorganisms such as: Haemophilus spp., Pneumococcus, Salmonella spp., Shigella spp., among others.[8] After 24 hours of collection the material was sent to the accredited laboratory to be seeded in a culture medium for bacteria, which occurred within 48 hours after collection. Before each collection, the apparatus was cleaned using paper tissues soaked in alcohol 70%, followed by friction at the patient's contact location, from the head holder in the slit lamp to the Goldmann tonometer cone.

Results

All the swabs of Office I and Office II did not show growth of bacteria. In Office III, Escherichia coli was only present in one sample resistant to ciprofloxacin and trimethoprim + sulfadiazine and sensitive to the other classes of antimicrobial agents. Such sample was obtained at the first moment, before the beginning of the consultations in the office (Table 1).

Table 1
Results of the cultures

	Office I		Office II		Office III	
	1st mom.	2nd mom.	1st mom.	2nd mom.	1st mom.	2nd mom.
1	NG	NG	NG	NG	NG	NG
2	NG	NG	NG	NG	NG	NG
3	NG	NG	NG	NG	NG	NG
4	NG	NG	NG	NG	NG	NG
5	NG	NG	NG	NG	NG	NG
6	NG	NG	NG	NG	NG	NG
7	NG	NG	NG	NG	NG	NG
8	NG	NG	NG	NG	NG	NG
9	NG	NG	NG	NG	ENGhericia Coli	NG
10	NG	NG	NG	NG	NG	NG

NG = no growt

Discussion

There are several products for the asepsis of the Goldmann tonometer, which consist of water and soap, dry cotton, cotton with alcohol and serum, running water, cotton with antibiotic eyedrops, Soapex®, ultraviolet radiation, alcohol plus ether, germikil, shampoos, saline solution, Methiolate®, sodium hypochlorite 1%, hydrogen peroxide 3%, and contact lens products and ether.[9,10] There are also several hygiene modes, ranging from cone friction with cotton or wipe, to the immersion of the tonometer cone in aseptic solution.[3]

For optimal asepsis, the American Academy of Ophthalmology recommends the immersion of the cone for 5 to 10 minutes in a solution of hydrogen peroxide 3% or sodium hypochlorite 0.5% preceded by rinsing and drying.[11]

Our study showed that only one sample had bacterial culture, and this result is in accordance with the study of Netto et al.,[11] which also showed that most tonometers did not show growth of any pathogen.

However, our study differs from the others in relation to the pathogenic agent in the sample. In the studies of Netto et al.[11] and Norn et al.,[12] Staphylococcus sp coagulase negative was the most prevalent microorganism, whereas in our study we only obtained the growth of Escherichia coli and only in one isolated sample.

In our study, we used Stuart's culture medium, which is considered the ideal for collection of material that took time to be sown[8,13] and discarded any change due to poor use of the culture medium. It is known that for the viability of microorganism in the Stuart medium, it can wait until 72h for sowing,[13] and in our study sowing was made 48h after the material was collected.

As the swab presenting growth was the one from the first moment of collection, we believe that this result can demonstrate contamination of the sample, since this is not the normal conjunctival microbiota. The finding may also suggest that this bacterium was present in the conjunctival sac of the last patient attended the day prior to collection, showing a potential contamination if the correct asepsis of the tonometer is not performed.

Conclusion

Regardless of the various methods that the ophthalmologist has to perform asepsis, it is essential for the maintenance of good eye health of the patient, thus avoiding the transmission and propagation of pathogens through ophthalmologic examination. Finally, we conclude that the method used by our service seems to be effective in this prophylaxis

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