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Original research

Conjunctival bacterial flora in fellow eyes of patients with unilateral nasolacrimal duct obstruction and its changes after successful dacryocystorhinostomy surgery

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Abstract

Purpose: To evaluate the results of conjunctival culture in fellow eyes of patients with unilateral nasolacrimal duct obstruction (NLDO) and its changes after successful dacryocystorhinostomy surgery.
Methods: In this prospective study, 71 adult patients with unilateral NLDO and 41 age- and sex-matched controls without NLDO were evaluated. The patients were divided into 2 groups based on clinical examination; group A with purulent regurgitation and group B without purulent regurgitation. Before dacryocystorhinostomy surgery, microbiologic specimens were taken bilaterally from the conjunctiva of both eyes. Postoperative conjunctival sampling was continued weekly until the culture became negative or the colony count reached to the range of the control group.
Results: There were 38 and 33 patients in groups A and B, respectively. Silicone tube was inserted for 17 patients (23.9%). The culture was positive for bacterial growth in 56 fellow eyes (79%). The conjunctival culture in the control group was positive in 17 eyes (41.4%). The mean count of colonies in a sample unit was 624.73 ± 2412.31, 195.75 ± 407.56, and 9.5 ± 1.5 for group A, group B, and controls, respectively. The mean time of normalization of specimens was 1.43 ± 0.69 weeks (range 1−4). Higher colony count at baseline and presence of silicone tube in infected eye were significantly associated with longer normalization time for fellow eye ($P < 0.001$ and $P = 0.003$ respectively).
Conclusions: This study suggests that after successful dacryocystorhinostomy surgery, a waiting period of 4 weeks is needed for conjunctival bacterial cultures to become negative or reach the level of the normal eyes, even for intraocular surgery in fellow eyes.

Keywords: Nasolacrimal duct obstruction; Bacteria; Dacryocystorhinostomy

Introduction

Nasolacrimal duct obstruction (NLDO) is a major clinical problem in ophthalmic practice.[1,2] Apart from disturbing symptoms, NLDO cause a major shift in the composition of the conjunctival residing flora and overgrowth of normal and pathologic bacteria.[3−9] The risk of postoperative endophthalmitis increases in eyes with dacryocystitis, and the intraocular surgery should be postponed until relief of obstruction[10−12.] Previous studies have shown that a waiting period of several weeks is needed before normalization of the conjunctival flora after successful dacryocystorhinostomy surgery (DCR) in eyes with NLDO.[13,14]

The bacteriologic study of the conjunctival samples from both eyes of subjects with normal nasolacrimal drainage systems has shown that the bacteria of a given type were 2−10 times more likely to be cultivated from one eye if they were

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present in the fellow eye.[15] In a comprehensive search in Pubmed database, we could not find any study evaluating the change in the conjunctival bacterial flora in the fellow eyes of patients with unilateral NLDO. The purpose of this study was to evaluate the bacteriologic changes in the conjunctival flora in the fellow eyes of patients with unilateral NLDO and to assess the normalization time after successful DCR.

Methods

In this prospective observational study, a total of 71 adult patients with complaint of unilateral epiphora secondary to NLDO with or without pus reflux, were included. The study protocol was approved by the ethics committee of the Farabi Eye Hospital and informed consents were obtained. Exclusion criteria were acute dacryocystitis and any extraocular disease leading to ocular infection including significant eyelid disorders, history of surgery for nasolacrimal drainage system, use of topical medications, systemic immunosuppression, and active symptomatic infection in other sites of the body. Also patients with history of epiphora in the normal fellow eyes were excluded. A complete ophthalmic examination including evaluation of lacrimal drainage system was performed. Patients were divided in 2 groups based on clinical examination. Group A were the patients with purulent reflux. Group B were the patients with NLDO without pus reflux. All patients had unilateral nasolacrimal system obstructions. A control group of 41 cataract surgery candidates, without any past ocular history and with normal ophthalmic examination except for cataract was prepared.

Standard external DCR was performed for all patients by a single surgeon (BE). Silicone intubation was performed in patients with upper lacrimal drainage system stenosis and when the lacrimal sac or nasal mucosal flap was inadequate for successful anastomosis. Postoperative systemic antibiotic (cephalexin 500 mg every 6 h for 5 days) and topical antibiotic (chloramphenicol 0.5% every 6 h for 10 days) were prescribed. Conjunctival specimens were obtained bilaterally from the eyes of all patients preoperatively and from 1 side of the control group. The culture procedure was according to the previously described method.[13] Briefly, samples were obtained by rolling a dry sterile swab against the lower conjunctival sac with great care to avoid the contact with eyelid margin and eyelashes. Each swab was immediately placed in a tube containing 1 ml thioglycollate medium. After 3 h of incubation, the blood agar, chocolate agar, and eosin methylene blue agar plate were inoculated with 0.1 ml incubated medium for aerobic and anaerobic cultures. After the incubation period of 48 h, colonies were differentiated and enumerated by standard bacteriologic laboratory techniques. Postoperative conjunctival specimens were obtained weekly until the result of the culture became negative or reached to the range of control group. The maximum colony count in the control group was 60 colonies of *Staphylococcus epidermidis* or *Staphylococcus saprophyticus* specimen in a sample unit which was considered as normal colonizing populations of flora. The surgery was considered successful when the regurgitation was absent and the patency of lacrimal drainage system was confirmed by free fluid passage to the nasal cavity. Patients with surgical failure were excluded. In patients in whom the cultured organisms were similar to the control group (*S. epidermidis* or *S. saprophyticus*), the normalization time was considered as the interval between DCR surgery and the time that the culture results were below the range of control group (60 colonies in a sample unit). In others, the bacterial normalization time was defined as the interval between DCR surgery and the time that the culture results were negative. Data analyzed using a SPSS software (version 16, SPSS Inc., Chicago, IL, U.S.A.). Student t-test, Mann–Whitney test and chi-square test were used for analysis. $P < 0.05$ was considered significant.

Results

Forty-seven women and 24 men with a mean age of 51.41 ± 15.56 years underwent DCR surgery. Purulent regurgitation was found in 38 eyes (53.5%). Silicone tube was inserted for 17 patients (23.9%). The culture was positive for bacterial growth in the fellow eyes in 56 patients (79%) and 46 patients (65%) have abnormal bacterial growth in the fellow eyes. Table 1 summarizes the results of the cultures obtained from the conjunctival sac of fellow eyes.

Table 1
Isolated organisms and the colony count in fellow eyes of patients with unilateral nasolacrimal duct obstruction at baseline and the normalization time after dacryocystorhinostomy surgery.

	No. patients	No. and type of isolated organisms in fellow eye (%)	Mean ± SD of colony count in a sample unit	Normalization time (wk)
Cases with purulent regurgitation (group A)	38 (53.5%)	*Staphylococcus epidermidis* 16 (42.1%) *Streptococcus viridans* 3 (7.9%) Further As *Staphylococcus aureus* 2 (5.3%) *Klebsiella* 1 (2.6%) *Diphtheroids* 3 (7.9%) *Staphylococcus saprophyticus* 3 (7.9%) *Bacillus c*ereus 1 (2.6%) Haemophilus 1 (2.6%) No growth 8 (21.1%)	624.73 ± 2412.31	1.54 ± 0.81
Cases without purulent regurgitation (group B)	33 (46.5%)	*S. epidermidis* 13 (39.4%) *S. viridans* 5 (15.2%) *S. aureus* 3 (9.1%) *Diphtheroids* 1 (3%) *S. saprophiticus* 3 (9.1%) *S. pneumoniae* 1 (3%) No growth 8 (21.2%)	195.75 ± 407.56	1.30 ± 0.47
P			0.101	0.35

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