Alteration of Bacterial Population upon Endoscopic Nasolacrimal Duct Intubation in Japanese Patients

Masahide Kokado*, Yuku Hayashi and Shizuya Saika

Department of Ophthalmology, Wakayama Medical University, 811-1 Kimiidera, Wakayama, 641-0012, Japan

*Corresponding author: Masahide Kokado, Department of Ophthalmology, Wakayama Medical University, 811-1 Kimiidera, Wakayama, 641-0012, Japan; Tel: 81-73-441-0649; E-mail: kokado@wakayama-med.ac.jp

Received date: July 23, 2018; Accepted date: July 30, 2018; Published date: August 07, 2018


Copyright: © 2018 Kokado M, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Background: We retrospectively observed the results of bacteriological culture of the conjunctival swab samples before and after endoscopic nasolacrimal duct intubation to know the effect of nasolacrimal drainage recovery on conjunctival contamination.

Methods and Findings: 33 sides in 27 patients were included in the study. They were followed for three or more months after successful endoscopic nasolacrimal duct intubation in Department of Ophthalmology, Wakayama Medical University Hospital, Wakayama, Japan from July, 2015 to June, 2016. Bacteriological culture of the conjunctival swab samples were performed before operation and 3 months after removal of the tube of successful intubation.

Conclusions: Bacteriological culture turned to negative in 5 of 9 sides (55.6%) at 3 months after removal of the tube post-successful intubation of nasolacrimal duct obstruction or stenosis. Population of Staphylococci and Candida was eliminated in conjunctiva after the successful treatment, while Corynebacterium and Streptococci were survived. Recovery of nasolacrimal drainage system was effective in diminishing bacterial growth in conjunctiva, although the effectiveness was limited.

Keywords: Nasolacrimal intubation; Bacterial contamination; Conjunctiva; Endophthalmitis

Abbreviations

MSSA: Methicillin-Susceptible Staphylococci aureus

Methods

This retrospective study was approved by Institutional Review Board of Wakayama Medical University, Wakayama, Japan. The study included the patients who had been followed for three or more months after successful endoscopic nasolacrimal duct intubation in Department of Ophthalmology, Wakayama Medical University Hospital, Wakayama, Japan from July, 2015, to June,
2016. Surgery was performed in each patient by one well-trained surgeon (MK). The subjects were 33 sides in 27 patients. The mean age of patients was 69.2-year-old (range 15 to 84-year-old). The types of the patient condition were obstruction or stenosis (narrowing) of nasolacrimal duct (16 or 7 sides, respectively), obstruction of common canaliculus (5 sides), obstruction of a canaliculus of either upper or lower eyelid (3 sides) and punctal closure of both upper and lower eyelids. After bacterial examination in the conjunctival swab sample the patient with nasolacrimal duct obstruction received topical 1.5% ofloxacin and 0.5% topical cefmenoxime hydrochloride for 3 days just prior to the duct intubation. The operation was performed under local anesthesia. Obstruction or stenosis of the tear drainage system was opened and an 18-gauge sheath (Safuro needle of 64 mm in length) was introduced under the assistance of nasolacrymal endoscopy and nasal endoscope. Then a PF catheter® was placed with the technique of Sheath-guided-intubation (SGI). After the surgery the patients received topical 1.5% ofloxacin and 0.1% fluorometholone for one month. Nasolacrimal syringing with normal saline was performed every two or three weeks until removal of the tube.

The tube was removed three or two months in patients with abnormal ductal system or lacrimal canaliculus, respectively. And after removing the tube, nasolacrimal syringing with normal saline was performed every month for 3 months. Bacteriological culture of the conjunctival swab samples was performed at three months after removing the tube.

Results

Bacteria culture was detected in 9 of 33 sides with nasolacrimal duct obstruction or stenosis (2 of 16 sides with nasolacrimal duct obstruction, 1 of 7 sides with nasolacrimal duct stenosis, 3 of 5 sides with common canaliculus obstruction, 1 of 3 sides with canaliculus obstruction and 2 of 2 sides with punctal closure of both upper or lower eyelids). Bacteriological culture turned to negative in 5 of 9 sides (55.6%) at 3 months after removal of the tube post-successful intubation of nasolacrimal duct obstruction or stenosis. The microorganism detected pre- and post-intervention for nasolacrimal apparatus abnormalities are shown in the Table 1.

Table 1: The microorganism detected pre- and post-intervention for nasolacrimal apparatus abnormalities.

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Before incubation</th>
<th>After incubation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram-positive cocci</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coagulase-negative Staphylococci</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(levofloxacin-resistant)</td>
<td>(levofloxacin-resistant)</td>
<td></td>
</tr>
<tr>
<td>Methicillin-susceptible Staphylococci aureus (MSSA)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Streptococci species</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Gram-positive bacilli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corynebacterium species</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Fungus</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

Microorganism detected decreased from 14 strains to 5 strains (64.3%) at 3 months after removal of the tube post-successful intubation of nasolacrimal duct obstruction or stenosis.

Although nasolacrimal intubation is effective in eliminating bacteria from conjunctiva, it is to be noticed that commensal bacteria or others could survive after the treatment prior to following cataract surgery.

Discussion

We showed herein that bacteriological culture turned to negative in 5 of 9 sides (55.6%) at 3 months after removal of the tube post-successful intubation of nasolacrimal duct obstruction or stenosis. In the current cases Staphylococci species (levofloxacin-resistant coagulase-negative Staphylococci and methicillin-susceptible Staphylococci aureus) and Candida, critical microorganisms as pathogens of acute post-operative endophthalmitis, were eliminated following the intubation. It was reported that nasolacrimal duct obstruction promotes growth of Gram-negative bacteria in conjunctiva [9,10]. It is to be noted that levofloxacin-resistant microorganism was well treated by nasolacrimal intubation, clearing indicating that post-operative one-month application of topical 1.5% levofloxacin.

On the other hand, Streptococci species bacteria survived after the treatment in two of four cases, although the surgical intervention to the impaired nasolacrimal drainage system was recognized as effective to reduce the bacterial colonization in the conjunctival sac/tear fluid.

After two month-antibiotic-free duration post-tube removal commensal bacteria of Corynebacterium was still detected in 3 of 5 eyes with positive culture before the intubation. We previously reported that 94.4% of cases of nasolacrimal duct obstruction with positive culture for bacteria in conjunctival swab samples turned to negative for conjunctival bacteria with topical antibiotics without surgical intervention [11].

Funding

This study was supported by the Department of Ophthalmology, Wakayama Medical University.
References


