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Streptococcus Pneumoniae Keratitis After Penetrating Keratoplasty

Taha AYYILDIZ[1], Ümit ÇALLI[2]

[1] Department of Ophthalmology, Oltu Public Hospital, Erzurum, Turkey.
[2] Department of Ophthalmology, Umraniye Training and Research Hospital, İstanbul, Turkey

ABSTRACT

This study aimed to determine the clinical course of Streptococcus pneomoniae keratitis following penetrating keratoplasty.

A retrospective analysis was performed of hospital records of all patients who presented with culture-proven S. pneomoniae keratitis in the corneal graft between January 2011 and January 2016.

This study included 8 eyes of 8 patients. Five patients were male, and three were female. The mean age of the patients was 61 ± 9 years (range: 52–77 years). The median time interval between surgery and infection was 11 months (range: 3–25 months). Five eyes (62.5%) had graft failure after 6 weeks of treatment, and three eyes had complete remission with a mild corneal scarring. Re-penetrating keratoplasty was performed in two eyes with emergency tectonic penetrating keratoplasty and disease relapse in the graft.

S. pneumoniae keratitis after penetrating keratoplasty is an extremely damaging disease. The clinical and microbiological diagnosis of the disease should be performed urgently, and appropriate treatment should be initiated without delay.

Key words: Streptococcus pneumoniae, Keratitis, Penetrating keratoplasty

INTRODUCTION

The development of microbial keratitis after penetrating keratoplasty is a concern in terms of graft survival (1-4). Also, microbial keratitis after surgery can develop at any time; it often occurs within first 1 year. Early postoperative infection sources include host infection recurrence, intraoperative contamination, and infected donor corneas; late postoperative infection sources include environmental factors.

Factors that facilitate the development of microbial keratitis in the graft are persistent epithelial defects, ocular surface disorders including dry eye, graft failure, use of soft contact lenses, graft hypoaesthesia, lid abnormalities, and recurrence of herpes simplex keratitis (5-7). These eyes have unhealthy and loose epithelium, which suffers from frequent breakdown, consequently predisposing the eyes to infection.

This study aimed to explore the effects of Streptococcus pneomoniae keratitis on graft survival, necessity of surgery, and surgery timing.

MATERIALS AND METHODS

This study was a retrospective analysis. Eight eyes of eight patients, who developed culture-proven *S. pneumoniae* keratitis after a successful optical penetrating keratoplasty performed during the study period from January 2007 to January 2013, were enrolled as cases in the present study. Patients included in this study were admitted to the clinic for microbial keratitis

Correspondence:
Taha AYYILDIZ
Oltu Devlet Hastanesi, Oftalmoloji Bölümü, Erzurum, Türkiye.
e-mail: obirtahadir@hotmail.com

and diagnosed with *S. pneumoniae* keratitis in the microbiology laboratory with the help of corneal scrapings and smears. For the purpose of the study, graft infection was defined as an epithelial defect overlying an area of stromal infiltration and associated anterior chamber reaction on slit lamp biomicroscopic examination.

After patients were admitted to the hospital, their medication was stopped within 24 h. Corneal scrapings were obtained under a surgical microscope and 0.5% topical oxybuprocaine (proparacaine) anesthesia. Routine Gram staining and potassium hydroxide wet mount were performed to examine the smears. The specimens obtained were inoculated onto blood agar plates, chocolate agar plates, and Sabouraud agar tubes for culturing bacteria and fungi. In vitro disk diffusion tests were performed on culture-positive cases to determine the antibiotic sensitivity profile. A positive culture was defined as the growth of more than one colony of an organism in the inoculating streak of any culture medium.

After 1 h, loading-dose treatment was initiated with a combination of fortified antibiotic drops comprising cephazolin sodium (5%) and gentamycin (1.4%) at hourly intervals in all cases of graft infection. After detection of S. pneumoniae keratitis, treatment was changed to hourly vancomycin (5%) and gentamycin (1.4%). As supportive care, topical cycloplegic and preservative-free artificial tears were given to the patients. Data reviewed included patient's age, sex, predisposing factors for infection, clinical presentation, microbiological treatment, and outcomes.

RESULTS

Eight eyes of eight patients were analyzed. Five patients were male, and three were female. The mean age of the patients was 61 ± 9 years (range: 52–77 years). The median time interval between the graft and infection was 11 months (range: 3–25 months). When patients were admitted to the hospital, four had loose sutures, one had exposing sutures, and six still had topical corticosteroid treatment.

Five eyes (% 62.5) had graft failure after average 6 weeks (4–8 weeks) of treatment, and three eyes had complete remission with a mild corneal scarring. Remaining two of five patients planned tectonic keratoplasty due to the impending corneal perforation. The disease recurred in two grafts in a week. Fortified vancomycin (5%) and gentamycin (1.4%) treatment was gradually reduced and finally terminated. Despite treatment, the two patients had graft failure. Optical penetrating keratoplasty was planned for these patients with graft failure, waiting for at least 3 months for the remission of inflammation. The disease did not occur in five patients during 12-month observation. Surgery was not considered for the other three patients because the mild corneal scar did not have much impact on vision.

DISCUSSION

S. pneumoniae keratitis after penetrating keratoplasty is a disease with highly destructive consequences. Graft decompensation and failure may result in the loss of normal epithelial barrier against infection. The clinical and microbiological profiles of cases with *S. pneumoniae* keratitis after penetrating keratoplasty were analyzed in the present study.

Microbial keratitis in a graft can occur any time after keratoplasty. It was reported that many graft infections frequently occurred within 12 months of corneal transplantation [8,9]. The time interval between graft failure and graft infection was short (6.13 ± 1.7 weeks).

Long-term use of topical corticosteroids was found to be the most significant ocular risk factor in the present study, with a high overall prevalence (75%). A previous study suggested the role of prolonged topical corticosteroid therapy in corneal graft infection [8]. Prolonged use of corticosteroids decreased the efficacy of the local immune response, increasing a patient's susceptibility to microbial keratitis. The suture-related problems were high in the present study (62.5%). The association of broken or loose sutures with microbial keratitis in corneal grafts suggested the need for immediate removal to prevent epithelial erosion and risk of infection [6,7].

Visual prognosis remains poor in eyes with graft infection even after optimal therapy, with a high rate of graft decompensation [10,11]. Bates et al found that only 23% of cases retained a clear graft after infection and 53% of the eyes required a regraft [10]. Harris et al showed that only 40% of the previously clear grafts

retained clarity and 11% eyes lost light perception [11]. In the present case series, only 37.5% of the patients retained clear grafts.

The clinical and microbiological diagnoses of the disease must be performed urgently, and appropriate treatment should be initiated without delay because of highly damaging *S. pneumoniae* keratitis. Optic penetrating keratoplasty should not be planned without sufficient suppression of inflammation.

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