

Bacterial Keratitis: Risk Factors and Causative Agents. Hussein Bataineh**, Qasem Hammory*, Ahmed Khatatba*.

Abstract

Objectives: to describe the clinical, microbiological characteristics and risk factors of Bacterial Keratitis at Prince Zeid and Rashed Military Hospitals.

Methods: A retrospective study of the hospital records of 35 patients who were diagnosed as Bacterial Keratitis and treated at the Ophthalmology in-patient department of Prince Zeid and Rashed Military Hospitals. Patients with no corneal scraping, or culture and sensitivity findings, were excluded. Risk factors, clinical and microbiological data were reviewed.

Results: In the period from January 2003 to October 2005 35 patients with bacterial Keratitis were identified, 21(60%) were males; 20(57.1%) had right eye involvement, 15(42.9%) had left eye involvement. The common predisposing factors were ocular trauma in 16(45.7%), contact lens in 11(31.4%), ocular surface diseases in five(14.2%) patients and one(2.8%) patient for each of lagophthalmos, steroid eye drops and infected corneal suture. Offending organisms were isolated in 17(50%) cases only. Pseudomonas in 10(58.8%) cases, Staphylococcus aureus and Bacillus spp. each in 2 (11.8%). Empirical topical antibiotic treatment was unchanged in 28(80%) patients. Topical steroid was employed in 2(5.7%) cases. 13(37.1%) patients were treated with systemic antibiotics.

Conclusion: Bacterial keratitis often occurs following ocular trauma and in contact lenses wearers. Pseudomonas was the major causative organism. Proper sampling and microbiological workups are recommended to minimize the negative bacterial isolates.

Key words: ophthalmology, staphylococcus aureus, corneal scraping



Infective keratitis is a significant cause of blindness and preventable ocular morbidity worldwide. There are many published series of infective keratitis from both temperate and tropical parts of the world, and management strategies are well established¹. However, infective keratitis continues to be an important cause of hospital admission, particularly among vulnerable patient groups such as the elderly. The demands of this group on healthcare systems worldwide will continue to rise¹.

Because of its high incidence and potential complications, bacterial keratitis, is one of the most visually threatening ocular infectious pathologies. The avascular corneal stroma is particularly susceptible to bacterial infection, and many patients have a poor clinical outcome if aggressive and appropriate therapy is not promptly initiated².

Primary treatment for suspected microbial keratitis is generally successful. Although risks such as contact lens use are well recognized as causative factors for microbial

keratitis, little is known about the risk factors that influence treatment outcome³.

Microbial keratitis in pediatric patients is more likely to be of bacterial etiology, and ulcers in this age group have a better chance for resolution with medical therapy alone when compared with that in the adult population. Conversely, elderly patients with microbial keratitis tend to present with severe, central ulcers with a significant risk of having a poor visual outcome⁴.

Microbial keratitis remains clinically challenging and although the outcome is favorable with appropriate management, there is potential for significant and permanent visual impairment, particularly in severe cases. Regarding management, it is imperative to know the "local" etiology of keratitis in a particular region⁵.

The aim of this study was to identify predisposing factors, and to define clinical and microbiological characteristics of bacterial Keratitis in our current practice in Tafila and Irbid, Jordan.

Patients and Methods

Retrospective analyzed the records of 35 inpatients of all ages with bacterial keratitis who were treated in the inpatient departments of Prince Zeid and Rashed Hospitals in the

*Department of Ophthalmology**Department of pediatrics. Correspondance to: DR Hussein Azzam Bataineh. Email: Bataineh_hussein@yahoo.com Phone: 00962777243881

period January 2003 to October 2005 was done.

We excluded patients with non-bacterial causes of Keratitis, and those with no corneal scraping findings.

In the charts history and examination were focused on the following risk factors: corneal trauma, contact lens wear, ocular surface diseases, Lagophthalmos, steroid eye drops and corneal foreign bodies or sutures as well as history of systemic diseases particularly diabetes mellitus. Antibiotic treatment, culture and sensitivity results, steroid drop therapy, and surgical interventions.

The data were analyzed with SPSS version 9.

Results:

Patients were classified according to

Table 1: Risk factors and bacterial culture results.

Bacteria/risk	Contact lens	Trauma	Surface disease	Lagophthalmus	Steroid drops	Infected suture	No.
Pseudomonas	3	5	1	0	1	0	10
Staph. epidermidis	1	0	0	0	0	0	1
Staph. Aureus	0	1	1	0	0	0	2
Strep. Pneumonia	0	0	0	1	0	0	1
Moraxella	0	1	0	0	0	0	1
Bacillus spp.	0	1	0	0	0	1	2
No growth	7	8	3	0	0	0	18
Total	11	16	5	1	1	1	35

Systemic risk factors were diabetes mellitus in seven (20%), immune-suppression in one (2.8%) case. Keratitis involved the right eye in 19(57.1%) and the left eye in 16(42.9%) patients. The location of the infiltrates was central in 21(60%) cases. Hypopyon was present in seven (20%) cases. Yield of culture was in around 50% and the main causative organism was pseudomonas in 10 patients. All 35 patients in this study were initially managed empirically with first line broad-spectrum antimicrobial treatment such as ceftazidime + gentamicin 23(65.7%) or cefalexin + gentamicin 12(34.3%); it was modified in seven (20%) cases depending on the results of culture and sensitivity tests and it was continued unchanged on the initial treatment in 28(80%) patients, two patients received topical steroid during the course of their treatment. 13(37.1%) patients received systemic antibiotic treatment (oral

their age into three groups: children (< 10 years) 7.1%, adolescents (10-20 years) 10% and adults (> 20 years) 82.9%. Out of the 35 patients, 21 (60%) were males with male: female ratio 1.5:1. Predisposing factors along with the causative organisms were summarized in **Table 1**: in which trauma was the most common risk factor and this was encountered in 16(45.7%) patients, five (14.3%) of them were caused by pseudomonas. Contact lenses were the second most common cause seen in 11(31.5%) patients, 3(8.5%) of them were also due to pseudomonas. Ocular surface diseases were present in five (14.3%) patients and one (2.8%) patient for each of lagophthalmos, steroid eye drops, and infected corneal suture.

ciprofloxacin).

Two (5.7%) patients had penetrating keraoplasty for visually disabling residual corneal opacification; one case (2.8%) ended with evisceration because of progression of the infection into unresolving endophthalmitis, one case needed conjunctival flap to overcome the imminent perforating ulcer while two cases required removal of corneal suture. Pseudomonas is the commonest offending organism that caused Keratitis requiring surgical intervention.

Discussion:

Bacterial keratitis is an ophthalmic emergency that needs immediate institution of treatment. In the absence of laboratory diagnosis the initial therapy is usually broad spectrum intensive treatment. Specific therapy should be based on laboratory data which identify the causative agents and provide

antibacterial susceptibility results⁶.

We found that trauma is the commonest predisposing factor in our patients, similar to that reported in Iran by Yazd⁷. Wearing contact lenses is a major risk factor for bacterial keratitis in our series which is similar to reports from Saudi Arabia and France^{8,9}.

The microbiological profile of bacterial keratitis in this series showed that *Pseudomonas* Spp. were the commonest pathogens. This goes with the findings in South India¹⁰, Malaysia¹¹ and Beijing in China¹².

The yield of culture from eye scrapings to assess the aetiological diagnosis of bacterial keratitis in our study was around 50%. This is less than reports from New Zealand¹³. Gentamicin was used in every combination as supported by the evidence from Tamil Nadu, India⁶.

Conclusion:

Pseudomonas and, to a lesser extent, *Staphylococci* and *Streptococcus pneumoniae* were the mostly encountered causative organisms in our study. Adequate ocular prevention, knowledge of the microbial pattern in given clinical practice, and prompt choice of appropriate antibiotics constitute the management of bacterial keratitis that is caused by ocular trauma or contact lens wear.

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