

# Comparative Evaluation of Efficacy of Topical Ofloxacin and Gentamicin for External Ocular Infections

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## ABSTRACT

**Background:** Although ocular infection may be considered to be a minor infection, it can be "vision-threatening". The present study was conducted to assess efficacy of Topical ofloxacin and gentamicin in the treatment of external ocular infection.

**Materials & Methods:** A total of 140 patients were selected and randomly grouped into two groups, Group 1 and Group 2. Subjects in group 1 were given topical Gentamicin and subjects in group 2 were given topical Ofloxacin for application on the eye with external ocular infection. The clinical symptoms were assessed of each patient. The statistical analysis of the data was done using SPSS version 11.0 for windows. A p-value of 0.05 and lesser was defined to be statistically significant.

**Results:** In the present study, there were total of 70 patients in each group. Number of male patients in group 1 was 68.57% and in group 2 was 72.85%. Number of female patients in group 1 was 31.42% and in group 2 were 27.14%. The mean age of patients in group 1 was 43.55 years and in group 2 was 54.34 years. In group 1, clinical improvement was seen in 87.14% patients and microbiological improvement was noticed in 84.28 patients. In group 2, clinical improvement was seen in

94.28% patients and microbiological improvement was noticed in 91.42% patients. Overall, clinical improvement was more in group 2 (94.42%) than group 1(84.28%).

**Conclusion:** The study concluded that clinical improvement was more in ofloxacin group than Gentamicin group in the treatment of external ocular infection. Therefore, ofloxacin was better than Gentamicin.


**Keywords:** Gentamicin, Ofloxacin, External Ocular Infection.

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## INTRODUCTION

Microorganisms are closely associated with external ocular infection. Particularly, infections caused by bacteria are quite common.<sup>1</sup> The most common external ocular infections include conjunctivitis, blepharitis, dacryocystitis, orbital, and periorbital cellulitis.<sup>2,3</sup> The common bacterial agents responsible for ocular infections include Gram-positive bacteria such as *Staphylococcus aureus*, *Staphylococcus epidermidis* and several *Streptococcus* and *Bacillus* spp. as well as Gram-negative bacteria such as *Pseudomonas aeruginosa*, *Moraxella* spp., and *Haemophilus* spp.<sup>4</sup> These organisms may come from the patient's skin, upper respiratory tract, or caught from another person with an external ocular infection.<sup>5</sup> Even though bacterial infections could also be self-limiting sometimes, topical formulation of antibiotics might be applied as a solution, suspension, or ointment for a week, and quiet often, the clinical course of the bacterial infections is shortened by these topical antibiotics. These antibiotics also control the spread of infection.<sup>6,7</sup> The aminoglycosides gentamicin and tobramycin are well established as first-line therapy for

external ocular infections and possess a broad spectrum of activity against Gram positive and Gram-negative organisms.<sup>8-10</sup> However, resistance to these antibiotics is increasing. For example, resistance to topical aminoglycoside therapy may be encountered in as many as 8% to 10% of ulcerative keratitis cases caused by *Pseudomonas aeruginosa*.<sup>11</sup> Fluoroquinolones, such as ofloxacin, derive their antibacterial activity from their ability to inhibit bacterial DNA gyrase, an enzyme that catalyses the conversion of relaxed covalently closed circular DNA to a supercoiled form.<sup>12,13</sup> Hence, the present study was conducted to compare the efficacy of topical ofloxacin compared with gentamicin in the treatment of external ocular infection

## MATERIALS & METHODS

The present study was conducted in the Department of Ophthalmology, Krishna Mohan Medical College & Hospital, Mathura, Uttar Pradesh (India) to assess efficacy of topical ofloxacin and gentamicin in the treatment of external ocular

infection. For the study, a total of 140 patients with suspected external ocular bacterial infection were selected. A detailed informed consent was obtained from the patients. Patients who were allergic to any of the drug or constituents of the medication were excluded from the study. The patients were randomly grouped into two groups, Group 1 and Group 2. Subjects in group 1 were given topical Gentamicin for application on the eye with external ocular infection. Subjects in group 2 were given topical Ofloxacin for application on the eye with external ocular infection.

One drop of the medication was applied to the affected eye(s) six times daily (every 2 to 4 hours) for 2 days (day 1 and day 2) and then four times daily for the next 8 days (day 3 to day 10). The first dose was administered by the investigator, and all subsequent doses were self-administered by the patient. The patients were recalled after 10 days. The clinical symptoms were assessed of each patient. The statistical analysis of the data was done using SPSS version 11.0 for windows. A p-value of 0.05 and lesser was defined to be statistically significant.

**Table 1: Demographic data**

Variables	Group 1	Group 2
No. of patients	70	70
Gender		
Male n(%)	48(68.57%)	51(72.85%)
Female n(%)	22(31.42%)	19(27.14%)
Mean age (years)	43.55	54.34

**Table 2: Improvement noticed in patients**

	Number of patients with improvement		
	Clinical improvement	Microbiological improvement	Overall
Group 1	61/70 (87.14%)	59/70 (84.28%)	59/70 (84.28%)
Group 2	66/70 (94.28%)	64/70 (91.42%)	64/70 (94.42%)

## RESULTS

In the present study, there were total of 70 patients in each group. Number of male patients in group 1 was 68.57% and in group 2 was 72.85%. Number of female patients in group 1 was 31.42% and in group 2 were 27.14%. The mean age of patients in group 1 was 43.55 years and in group 2 was 54.34 years.

In group 1, clinical improvement was seen in 87.14% patients and microbiological improvement was noticed in 84.28 patients. In group 2, clinical improvement was seen in 94.28% patients and microbiological improvement was noticed in 91.42% patients. Overall, clinical improvement was more in group 2 (94.42%) than group 1(84.28%).

## DISCUSSION

Globally, damage of the eye due to ocular infections is responsible for increased incidence of morbidity. Infection and inflammation of the ocular regions may also lead to blindness if prompt and appropriate therapy is not administered.<sup>14</sup>

In the present study, there were total of 70 patients in each group. Number of male patients in group 1 was 68.57% and in group 2 was 72.85%. Number of female patients in group 1 was 31.42% and in group 2 were 27.14%. The mean age of patients in group 1 was 43.55 years and in group 2 was 54.34 years. In group 1, clinical improvement was seen in 87.14% patients and microbiological improvement was noticed in 84.28 patients. In group 2, clinical improvement was seen in 94.28% patients and microbiological improvement was noticed in 91.42% patients. Overall, clinical improvement was more in group 2 (94.42%) than group 1(84.28%).

Gwon A et al, did a double-masked, randomised, controlled study to assess the effectiveness and safety of 0.3% ofloxacin solution were compared with those of 0.3% gentamicin ophthalmic solution

in treating external bacterial ocular infections. The clinical improvement rate for patients treated with ofloxacin was 98% (51/52) and 92% (48/52) for those treated with gentamicin. Microbiological improvement was achieved in 78% (40/51) of the ofloxacin patients, compared with 67% (35/52) of the gentamicin group. Ofloxacin treatment eradicated or controlled 85% (86/101) of the Gram positive and 89% (17/19) of the Gram-negative organisms cultured, compared with 83% (103/124) and 78% (29/37), respectively, after gentamicin treatment. None of these differences were statistically significant. The incidence of adverse effects attributable to ofloxacin treatment (3-2%) was less than that reported for gentamicin (7.1%). Ofloxacin proved to be an effective, safe, and comfortable therapy for external bacterial ocular infection.<sup>15</sup>

Miller IM et al 9 performed a study in which they randomly assigned 488 patients with clinical signs of acute bacterial conjunctivitis or blepharitis, or both, to treatment with either norfloxacin ophthalmic solution 0.3% (245) or gentamicin ophthalmic solution 0.3% (243) for one week. Of the patients with positive cultures, 71% (85 of 120) of the norfloxacin-treated patients and 65% (86 of 133) of the gentamicin-treated patients were clinically cured. An additional 25% (30 of 120) of norfloxacin-treated patients and 32% (43 of 133) of gentamicin-treated patients were clinically improved. On the basis of posttreatment cultures, 89% of all cultured bacteria were eradicated (146 of 179 organisms) or suppressed (14 of 179 organisms) after treatment with norfloxacin. The condition of five norfloxacin-treated patients did not clinically improve, compared with the condition of eight gentamicin-treated patients. Both antibiotics had similar efficacy against gram-positive and against gram-negative organisms. They concluded that norfloxacin was clinically and microbiologically similar in activity to gentamicin.<sup>16</sup>

Tabbara KF et al compared the efficacy, local tolerance, and safety of topical lomefloxacin 0.3% and topical ofloxacin 0.3% in the treatment of acute bacterial conjunctivitis. There was no significant difference between the two groups in relation to age or sex. The causative organisms were *Staphylococcus epidermidis* in 16 cases (36%),  $\alpha$ -hemolytic *Streptococci* in 9 (20%), *Haemophilus* spp. 6 (13%), *Staphylococcus aureus* 5 (11%), *Streptococcus pneumoniae* 4 (9%), *Pseudomonas aeruginosa* 3 (7%), and other 2 (4%). The mean CSS for conjunctivitis was 12.1 before therapy in the lomefloxacin group and 12.7 in the ofloxacin group. On the 7th day of therapy, the mean CSS was 0.7 in the lomefloxacin group, and 1.6 for ofloxacin. All patients showed improvement, but a total of 18 out of 20 (88%) in the lomefloxacin group showed complete resolution compared to 15 (75%) in the ofloxacin group. The difference was not statistically significant ( $p = 0.08$ ). Tolerance was excellent in both groups, and no side effects were reported. A burning sensation was noted by two patients, one in each group.<sup>17</sup>

Bron AJ et al investigated the efficacy of 0.3% ofloxacin and 0.5 percent chloramphenicol in treating bacterial ocular infections. In eighty-four culture positive patients, they investigated the clinical and microbiological treatment improvement rate. No difference was observed by the authors in between the two drugs in terms of clinical improvement rate.<sup>18</sup>

## CONCLUSION

The study concluded that clinical improvement was more in ofloxacin group than Gentamicin group in the treatment of external ocular infection. Therefore, ofloxacin was better than Gentamicin.

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