

Original Research

Comparative analysis of efficacy of Topical Ofloxacin and Gentamicin for external ocular infection

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ABSTRACT:

Background: All parts of the eye may be infected by bacteria, fungi, parasites, or viruses. Anti-infectives such as antibiotics (ATB), antiseptics, antifungals, anti-helminths or antivirals can be used depending on the type of infection. The aminoglycosides gentamicin and tobramycin are well established as first-line therapy for external ocular infections, and possess a broad spectrum of activity against **Aim of the study:** To compare efficacy of Topical Ofloxacin and Gentamicin for external ocular infection.

Materials and methods: The present study was conducted in the Department of Ophthalmology of the Medical institution. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, a total of 80 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 removed from the study. The patients were randomly grouped into two groups, Group 1 and Group 2. Subjects in group 1 were given topical Ofloxacin for application on the eye with external ocular infection. Subjects in group 2 were given topical Gentamicin 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). **Results:** There were total of 40 patients in each group. Number of male patients in group 1 was 25 and in group 2 was 22. Number of female patients in group 1 was 15 and in group 2 was 18. In group 1, clinical improvement was seen in 44 patients and microbiological improvement was noticed in 43 patients. In group 2, clinical improvement was seen in 43 patients and microbiological improvement was noticed in 44 patients. **Conclusion:** Within the limitations of the present study, it can be concluded that Gentamicin and Ofloxacin are highly effective in treatment of external ocular infections.

Keywords: Gentamycin, Ofloxacin, ocular infection.

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INTRODUCTION:

All parts of the eye may be infected by bacteria, fungi, parasites, or viruses. Anti-infectives such as antibiotics (ATB), antiseptics, antifungals, anti-helminths or antivirals can be used depending on the type of infection. Although ocular infection may be considered to be a minor infection, it can be "vision-threatening". 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.¹⁻
³However, 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*.⁴ 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.⁵⁻⁶ Hence, the present study

was conducted to compare efficacy of Topical Ofloxacin and Gentamicin for external ocular infection.

MATERIALS AND METHODS:

The present study was conducted in the Department of Ophthalmology of the Medical institution. The ethical clearance for the study was approved from the ethical committee. For the study, a total of 80 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 removed from the study. The patients were randomly grouped into two groups, Group 1 and Group 2. Subjects in group 1 were given topical Ofloxacin for application on the eye with external ocular infection. Subjects in group 2 were given topical Gentamicin 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. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

RESULTS:

Table 1 shows demographic data of the patients. There were total of 40 patients in each group. Number of male patients in group 1 was 25 and in group 2 was 22. Number of female patients in group 1 was 15 and in group 2 was 18. The mean age of patients in group 1 was 43.69 years and in group 2 was 46.29 years. Table 2 shows improvement noticed in Group 1 and Group 2. In group 1, clinical improvement was seen in 44 patients and microbiological improvement was noticed in 43 patients. In group 2, clinical improvement was seen in 43 patients and microbiological improvement was noticed in 44 patients.

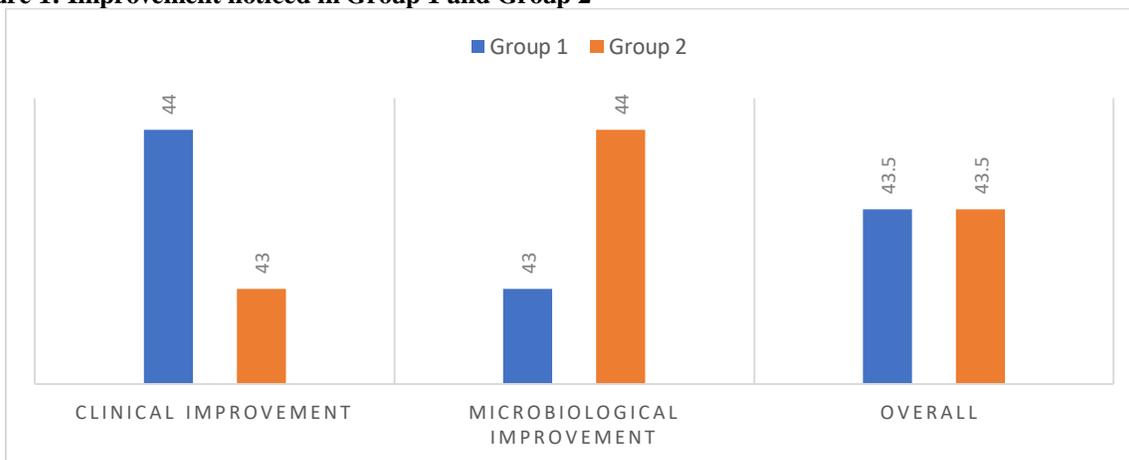
Table 1: Demographic data of Group 1 and 2

Variables	Group 1	Group 2
No. of patients	40	40
Sex:		
• Male	25	22
• Female	15	18
Mean age (years)	43.69	46.29

Table 2: Improvement noticed in Group 1 and Group 2

Groups	Number of patients with improvement		
	Clinical improvement	Microbiological improvement	Overall
Group 1	44/50	43/50	43.5/50
Group 2	43/50	44/50	43.5/50

Figure 1: Improvement noticed in Group 1 and Group 2



DISCUSSION:

In the present study, we evaluated the efficacy of Gentamycin and Ofloxacin for ocular infection. The study was performed on a total of 80 patients. The subjects were grouped randomly in two groups. It was observed that clinical and microbiological efficacy was similar with both the drug groups. The results were compared with previous studies from the literature. Gwon A et al ⁷ compared effectiveness and safety of 0.3% ofloxacin solution 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%). They concluded that Ofloxacin proved to be an effective, safe, and comfortable therapy for external bacterial ocular infection. Bron AJ et al ⁸ compared the safety and efficacy of 0.3% ofloxacin in treating bacterial ocular infections with that of 0.5% chloramphenicol in a parallel-group, randomised clinical trial at five sites. Clinical and microbiological improvement rates were studied in 84 culture-positive patients. All patients completing the study (79 assigned ofloxacin, and 74 chloramphenicol) showed clinical improvement. Clinical improvement in the culture-positive groups was 100% (41/41) after ofloxacin treatment, and 95% (41/43) after chloramphenicol treatment. Microbiological improvement rates were similar for the two drugs: 85% (33/39) improved with ofloxacin, and 88% (38/43) improved with chloramphenicol. Both drugs were well tolerated. Adverse reactions possibly due to the study medication occurred in 1% (1/89) of those who received ofloxacin, and in 4% (4/93) of those who received chloramphenicol.

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. Jensen HG et al ¹⁰ assessed the in vitro susceptibility of ocular bacterial isolates from North and South America to anti-infectives that are commonly used in the treatment of external ocular infection. Ocular isolates (n = 1,291) from 12 laboratories in the United States, Canada, Mexico, and Argentina were tested for their susceptibility to ofloxacin, ciprofloxacin, norfloxacin, gentamicin, tobramycin, chloramphenicol, tetracycline, and erythromycin using both disk-diffusion and broth-dilution methods. When the results from disk-diffusion and broth-dilution testing were combined, the relative overall in vitro efficacy was (in decreasing order): ofloxacin, ciprofloxacin, norfloxacin, gentamicin, chloramphenicol, tobramycin, tetracycline, and erythromycin. Against gram-positive organisms it was: ofloxacin, ciprofloxacin equivalent to chloramphenicol, norfloxacin, tetracycline, gentamicin, and erythromycin equivalent to tobramycin. Against gram-negative organisms it was: ofloxacin equivalent to ciprofloxacin and norfloxacin, gentamicin, tobramycin, chloramphenicol, and tetracycline comparable to erythromycin. They concluded that the fluoroquinolones ofloxacin, ciprofloxacin, and norfloxacin had higher overall in vitro efficacy than the other antibiotics tested. Of the fluoroquinolones, ofloxacin had the highest in vitro efficacy against gram-positive organisms. All three fluoroquinolones were equivalent in efficacy against gram-negative organisms.

CONCLUSION:

Within the limitations of the present study, it can be concluded that Gentamicin and Ofloxacin are highly effective in treatment of external ocular infections.

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