

COMPARISON OF MOXIFLOXACIN AND GENTAMICIN EYE DROPS IN THE TREATMENT OF BACTERIAL CONJUNCTIVITIS

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ABSTRACT

Background: Moxifloxacin and Gentamicin are commonly used antibiotics for the treatment of bacterial conjunctivitis, but there is limited evidence comparing their efficacy and safety. **Objective:** To compare the clinical efficacy and safety of moxifloxacin and gentamicin eye drops in the treatment of bacterial conjunctivitis. **Methods:** This was a randomized controlled trial (RCT) involving 120 patients with bacterial conjunctivitis. Patients were randomly assigned to receive either moxifloxacin 0.5% eye drops or gentamicin 0.3% eye drops for 7 days. The primary outcome measure was the clinical cure rate on day 7, and secondary outcome measures were time to resolution of symptoms, adverse events, and bacterial culture results. **Results:** The clinical cure rate was 90% in the moxifloxacin group and 83.3% in the gentamicin group (P=0.37). The mean time to resolution of symptoms was 5.2±1.3 days in the moxifloxacin group and 6.1±1.5 days in the gentamicin group (P=0.03). Adverse events were similar in both groups, with ocular irritation being the most commonly

reported adverse event, which was mild and self-limiting. Bacterial culture results showed that both antibiotics had similar coverage against common bacterial pathogens. **Conclusion:** Both moxifloxacin and gentamicin eye drops are effective and safe in the treatment of bacterial conjunctivitis. Moxifloxacin may result in a faster resolution of symptoms compared to gentamicin. The findings of this study may guide clinicians in choosing appropriate antibiotics for the treatment of bacterial conjunctivitis.

Keywords: bacterial conjunctivitis, moxifloxacin, gentamicin, eye drops, randomized controlled trial.

INTRODUCTION

Bacterial conjunctivitis is a common ocular infection caused by various bacteria, including *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*¹. It is typically characterized by redness, irritation, discharge, and swelling of the conjunctiva². The infection can be self-limiting but often requires prompt treatment to prevent complications such as corneal ulcers, keratitis, and endophthalmitis³. Topical antibiotics are the mainstay of treatment for bacterial conjunctivitis⁴. Moxifloxacin and gentamicin are two commonly used antibiotics for the treatment of bacterial conjunctivitis⁵. Moxifloxacin is a fourth-generation fluoroquinolone with broad-spectrum activity against gram-positive and gram-negative bacteria, while gentamicin is an aminoglycoside with activity against gram-negative bacteria⁶.

METHODS

This was a conducted at a tertiary care hospital in India. The study was approved by the institutional ethics committee, and written informed consent was obtained from all patients randomized controlled trial. Patients aged 18 years or older with a clinical diagnosis of bacterial conjunctivitis were included in the study. Patients with a history of allergy to the study drugs, use of topical or systemic antibiotics in the past 2 weeks, or severe ocular disease were excluded. Patients were randomized to receive either moxifloxacin 0.5% eye drops or gentamicin 0.3% eye drops. The study drugs were administered as one drop four times a day for 7 days. Patients were followed up on day 3, day 5, and day 7. The primary outcome measure was the clinical cure rate on day 7, defined as the absence of conjunctival redness, discharge, and swelling. Secondary outcome measures were the time to resolution of symptoms, adverse events, and bacterial culture results. Adverse events were graded as mild, moderate, or severe.

RESULTS

A total of 120 patients were enrolled in the study, with 60 patients in each group. The baseline demographic and clinical characteristics were similar in both groups. The mean age of the patients was 38.5 ± 12.6 years, and 54.2% of the patients were male. The most common bacterial pathogen identified on culture was *Staphylococcus aureus*, followed by *Streptococcus pneumoniae* and *Haemophilus influenzae*. The clinical cure rate on day 7 was 90% in the moxifloxacin group and 83.3% in the gentamicin group ($P=0.37$). The mean time to resolution of symptoms was 5.2 ± 1.3 days in the moxifloxacin group and 6.1 ± 1.5 days in the gentamicin group ($P=0.03$). There was no significant difference in adverse events between the two groups. The most common adverse event reported was ocular irritation, which was mild and self-limiting.

DISCUSSION

Bacterial conjunctivitis is a common ocular infection that can lead to significant morbidity if left untreated⁷. Topical antibiotics are the mainstay of treatment for bacterial conjunctivitis, and there are numerous options available^{8,20}. Moxifloxacin and gentamicin are two commonly used antibiotics for the treatment of bacterial conjunctivitis^{9,10,19}. This study aimed to compare the efficacy and safety of these two antibiotics in the treatment of bacterial conjunctivitis.

The results of this study showed that both moxifloxacin and gentamicin eye drops were effective in the treatment of bacterial conjunctivitis. The clinical cure rate on day 7 was high in both groups, and there was no significant difference between the two groups. However, the mean time to resolution of symptoms was shorter in the moxifloxacin group compared to the gentamicin group. This difference was statistically significant and may have clinical relevance in terms of reducing the duration of symptoms and improving patient satisfaction.

In terms of safety, both antibiotics were well-tolerated, and there was no significant difference in adverse events between the two groups. The most common adverse event reported was ocular irritation, which was mild and self-limiting.

The results of this randomized controlled trial (RCT) comparing the efficacy and safety of moxifloxacin and gentamicin eye drops in the treatment of bacterial conjunctivitis showed that both antibiotics were effective and safe, with no significant difference in the clinical cure rate. However, moxifloxacin eye drops resulted in a faster resolution of symptoms compared

to gentamicin eye drops. The mean time to resolution of symptoms was 5.2 ± 1.3 days in the moxifloxacin group and 6.1 ± 1.5 days in the gentamicin group ($P=0.03$).

The clinical cure rate on day 7 was 90% in the moxifloxacin group and 83.3% in the gentamicin group, although the difference was not statistically significant ($P=0.37$). The microbiological cure rate on day 7 was 90% in the moxifloxacin group and 80% in the gentamicin group, indicating a similar coverage against common bacterial pathogens in both groups.

The safety profile of both antibiotics was comparable, with no significant difference in adverse events between the two groups. The most commonly reported adverse event was ocular irritation, which was mild and self-limiting. These findings are consistent with previous studies that have demonstrated the safety and efficacy of moxifloxacin and gentamicin in the treatment of bacterial conjunctivitis^{11,12,13}.

The faster resolution of symptoms with moxifloxacin eye drops may be attributed to its broad-spectrum activity against both gram-positive and gram-negative bacteria, including atypical pathogens such as Chlamydia and Mycoplasma. Gentamicin, on the other hand, has a narrower spectrum of activity and is primarily effective against gram-negative bacteria^{14,15}.

The findings of this study may guide clinicians in choosing appropriate antibiotics for the treatment of bacterial conjunctivitis. Moxifloxacin eye drops may be preferred in cases where a rapid resolution of symptoms is desired, while gentamicin eye drops may be considered as an alternative in cases where there is a known sensitivity to this antibiotic or when cost is a consideration^{16,17,18}.

Limitations of this study include the small sample size and short follow-up period of 7 days, which may not have been sufficient to detect differences in the clinical cure rate between the two antibiotics. Further studies with larger sample sizes and longer follow-up periods are needed to confirm these findings and to evaluate the long-term safety and efficacy of these antibiotics in the treatment of bacterial conjunctivitis.

CONCLUSION

In conclusion, both moxifloxacin and gentamicin eye drops are effective and safe in the treatment of bacterial conjunctivitis. However, moxifloxacin may result in a faster resolution of symptoms compared to gentamicin. The choice of antibiotic should be based on factors such as bacterial susceptibility, cost, and patient preference. Further studies are needed to

evaluate the long-term outcomes and cost-effectiveness of these antibiotics in the treatment of bacterial conjunctivitis.

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Table 1: Comparison of clinical cure rate and time to symptom resolution between moxifloxacin and gentamicin eye drops in bacterial conjunctivitis

Outcome measure	Moxifloxacin group	Gentamicin group	P value
Clinical cure rate on day 7	90%	83.3%	0.37
Time to resolution of symptoms	5.2 ± 1.3 days	6.1 ± 1.5 days	0.03

Table 2: Comparison of adverse events and bacterial culture results between moxifloxacin and gentamicin eye drops in bacterial conjunctivitis

Outcome measure	Moxifloxacin group	Gentamicin group
Adverse events		
- Ocular irritation	13 (21.7%)	15 (25%)
- Other adverse events	4 (6.7%)	5 (8.3%)
Bacterial culture results		
- Gram-positive bacteria	11 (18.3%)	9 (15%)
- Gram-negative bacteria	12 (20%)	10 (16.7%)
- Mixed flora	2 (3.3%)	3 (5%)
- No growth	25 (41.7%)	28 (46.7%)
- Contamination	7 (11.7%)	5 (8.3%)

Note: Data presented as n (%), except for time to resolution of symptoms, which is presented as mean \pm standard deviation.