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Original Research

Assessment of short-term bactericidal potential of a steroid-antibiotic combination versus steroid in the treatment of conjunctivitis

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***ABSTRACT*:**
Background: Acute and chronic superficial ocular inflammation of bacterial origin is a common problem characterized by irritation, itching, and burning of the eyelids. The present study was conducted to assess short-term bactericidal potential of a steroid-antibiotic combination versus steroid in the treatment of conjunctivitis. **Materials & Methods:** 68 patients of conjunctivitis of both genders were divided into 2 groups of 34 each. Group I patients were given combination of neomycin sulphate 3500 lU/mL, polymyxin-B sulphate 6000 lU/mL with dexamethasone 0.1% and group II were given 0.1% dexamethasone. The symptoms evaluated included foreign body sensation, lacrimation, photophobia, and itching. **Results:** Treatment in group I significantly reduced the incidence of Gram-positive and negative species by approximately 75%. Group II had none to minimal effects in eradicating Gram-positive bacteria. The difference was significant (P< 0.05). There was significant difference in reduction in clinical features in group I and II in respect to lacrimation, foreign body sensation, itching, photophobia, erythema, conjunctival discharge and bulbar conjunctiva hyperaemia from baseline to day 4. The difference was significant (P< 0.05). **Conclusion:** Use of a fixed dose combination steroid-antibiotic product was more effective for bacterial control and therapeutic efficacy in the treatment of conjunctivitis.
Key words: Conjunctivitis, Gram-positive bacteria, Erythema

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INTRODUCTION

Acute and chronic superficial ocular inflammation of bacterial origin is a common problem characterized by irritation, itching, and burning of the eyelids.[1] The accompanying presence of dry or greasy scales on the upper and lower lid margins, in addition to alterations of the ocular surface, is a direct consequence of bacterial colonization and the secondary immune mediated phenomena. Chronic cases, especially blepharitis, can persist for periods of years, requiring prolonged therapy.[2]

Conjunctivitis, or conjunctival inflammation, is a common eye condition that accounts for ;1% of all primary care visits in the United States. It carries a significant burden of symptoms and imposes a considerable economic burden.[3] Conjunctivitis can be infectious or non-infectious: 1. Infectious: viral or bacterial; 2. Non-infectious: allergic, mechanical, toxic, immune mediated, and neoplastic. Adenoviral conjunctivitis is a major cause of acute infectious conjunctivitis cases among adults. Infections are generally self-limited and do not require antibiotic treatment. There is no approved treatment, but topical corticosteroids may be helpful in alleviating symptoms of adenoviral conjunctivitis and may prevent scarring in severe cases.[4]

Maxitrol is a multiple dose ophthalmic suspension containing neomycin and polymyxin B sulphates and dexamethasone, whereas Maxidex contains dexamethasone alone.[5] Neomycin sulphate has a wide antibacterial spectrum primarily against Gram-positive organisms such as Staphylococcus spp, but is often inactive against Gram-negative pathogens including Pseudomonas aeruginosa. Polymyxin B sulphate is active against Pseudomonas aeruginosa and other Gram-negative organisms. The combination

of neomycin and polymyxin B is considered to be synergistic.[6] The present study was conducted to assess short-term bactericidal potential of a steroid-antibiotic combination versus steroid in the treatment of conjunctivitis.

MATERIALS & METHODS

The present study comprised of 68 patients of conjunctivitis of both genders. All were enrolled after they agreed to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 34 each. Group I patients were given combination of neomycin sulphate 3500 lU/mL, polymyxin-B sulphate 6000 lU/mL with dexamethasone 0.1% and group II were given 0.1% dexamethasone. Patients were instructed not to scrub or cleanse their eyelids or skin lash margins within 24 hours of enrolment. On Day 1, baseline ocular signs and symptoms were recorded, and baseline bacterial cultures obtained from both eyes. Bacteriological samples were collected from both eyes, both baseline and post-dose. The symptoms evaluated included foreign body sensation, lacrimation, photophobia, and itching. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	Neomycin sulphate 3500 lU/mL, polymyxin-B sulphate 6000 lU/mL with dexamethasone 0.1%	0.1% dexamethasone
M:F	20:14	18:16

Table I shows that group I had 20 males and 14 females and group II had 18 males and 16 females.

Table II Distribution of bacteria

Bacteria	Group I		Group II		P value
Gram +ve	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	
S. aureus	12	2	8	6	0.02
S. epidermidis	8	5	7	4	
S. Pneumoniae	4	1	3	1	
Streptococcus spp	2	0	2	1	
K. Pneumoniae	1	0	1	0	
Bacillus spp	1	1	1	0	
Micrococcus spp	1	0	1	1	
Gram -ve					
H. Influenza	2	0	2	0	
Neisseria spp	1	0	3	1	
K. Pneumoniae	3	0	2	0	
P. Aeruginosa	2	1	1	0	
P. Mirabilis	1	0	1	1	

Table II shows that treatment in group I significantly reduced the incidence of Gram-positive and negative species by approximately 75%. Group II had none to minimal effects in eradicating Gram-positive bacteria. The difference was significant (P< 0.05).

Table III Assessment of clinical findings

Features	Group I		Group II		P value
	Baseline	Day 4	Baseline	Day 4	
Lacrimation	0.98	0.54	0.96	0.40	0.05
Foreign body sensation	0.74	0.17	0.56	0.31	
Itching	0.75	0.37	0.60	0.27	
Photophobia	1.28	0.62	1.24	0.51	
Erythema	1.42	0.58	1.54	0.58	
Conjunctival discharge	0.66	0.19	0.55	0.31	
Bulbar conjunctiva hyperaemia	1.0	0.41	0.72	0.22	

Table III, graph I shows that there was significant difference in reduction in clinical features in group I and II in respect to lacrimation, foreign body sensation, itching, photophobia, erythema, conjunctival discharge and bulbar conjunctiva hyperaemia from baseline to day 4. The difference was significant (P< 0.05).

DISCUSSION

Mild bacterial conjunctivitis typically resolves spontaneously, but topical antibacterial therapy is generally preferred as it is associated with a shorter infectious period and earlier resolution of clinical signs and symptoms.[7] Allergic conjunctivitis is

typically treated with antihistamines and mast cell stabilizers, but if the symptoms persist, therapy may be supplemented with topical corticosteroids.[8] Corticosteroids are extensively used to treat ocular inflammatory conditions and are among the most prescribed class of drugs in ophthalmology.[9] The present study was conducted to assess short-term bactericidal potential of a steroid-antibiotic combination versus steroid in the treatment of conjunctivitis.

In present study, group I had 20 males and 14 females and group II had 18 males and 16 females. Shulman et al[10] assessed effects of four days' treatment with topical Maxitrol (neomycin sulphate 3500 lU/mL, polymyxin-B sulphate 6000 lU/mL with dexamethasone 0.1%) were compared with those of Maxidex@ (dexamethasone 0.1% alone) in a double-masked study in 111 patients with bacterial blepharitis or conjunctivitis, 95 of whom were evaluable for efficacy. The majority of patients (N=80) had chronic blepharitis. Maxitrol treatment resulted in a significantly greater reduction (90%) in bacterial counts and bacterial eradication (50%) compared with Maxidex (34% and 17% respectively). Maxitrol treatment also produced a significantly greater reduction in conjunctival discharge than did Maxidex, while the treatments were equally effective in alleviating other ocular signs and symptoms. It was concluded that use of a fixed dose combination steroid-antibiotic product was more effective for bacterial control and therapeutic efficacy in the treatment of chronic blepharitis and conjunctivitis patients than treatment with steroid alone. However, in the long-term treatment of chronic blepharitis the well-known toxic problems of neomycin sulphate have to be taken into account.

We found that treatment in group I significantly reduced the incidence of Gram-positive and negative species by approximately 75%. Group II had none to minimal effects in eradicating Gram-positive bacteria. There was significant difference in reduction in clinical features in group I and II in respect to lacrimation, foreign body sensation, itching, photophobia, erythema, conjunctival discharge and bulbar conjunctiva hyperaemia from baseline to day 4. In combination with appropriate anti-microbial therapy, corticosteroids are of value in the treatment of infections in which there is considerable ocular involvement or vision is compromised. The bacteria implicated in these infections include both Gram-positive and Gram-negative cocci and rods and the use of a broad spectrum antibiotic or multiple antibiotics is therefore required. The risks associated with antibiotic treatment include toxic and allergic reactions and the induction of drug resistance among microorganisms. The development of drug resistance, however, is usually limited to prolonged and excessive antibiotic administration. The ideal treatment agent therefore should include an antibiotic with a broad-spectrum bactericidal effect, in combination with a steroid that will decrease both inflammatory and immune-mediated reaction.[11]

Holland et al[12] stated that Conjunctivitis, or inflammation of the conjunctiva, is a common condition that can be caused by infectious (eg, bacterial or viral infections) and noninfectious (eg, allergy) etiologies. Treatment involves diagnosis of the underlying cause and use of appropriate therapies. A broad-spectrum therapy that can address multiple etiologies, and also the accompanying inflammation, would be very useful. Topical corticosteroids are useful in treating ocular inflammation, but most treatment guidelines recommend steroid use generally in severe cases of conjunctivitis. This is partly due to risks associated with steroid use. These risks include potential for prolonging adenoviral infections and potentiating/worsening herpes simplex virus infections, increased intraocular pressure, glaucoma, and cataracts. Most of these perceived risks are not, however, supported by high-quality clinical data. They are also associated with long-term steroid uses that are dissimilar to applications for infectious conjunctivitis. Clinical data show that ophthalmic formulations that combine corticosteroids with broad-spectrum anti-infectives could be effective and well tolerated when used for short-term treatment (#2 weeks). Corticosteroids, in combination with anti-infectives, could be a promising treatment option for acute conjunctivitis subject to development of further evidence on their effectiveness and safety in conjunctivitis treatment.

CONCLUSION

Authors found that use of a fixed dose combination steroid-antibiotic product was more effective for bacterial control and therapeutic efficacy in the treatment of conjunctivitis.

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