

Difficulties and Challenges in Controlling Microbial Keratitis

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ABSTRACT

Aims & Objectives: To compare between two situations in controlling the microbial keratitis with 5% Povidine-Iodine and antibiotics and to conclude which one is more effective for early stage healing of corneal ulcers. **Study design:** Controlled trial, Quasi experimental study. **Settings:** The study was conducted in DHQ Hospital Faisalabad, Government General Hospital Ghulam Muhammadabad, Faisalabad. **Duration:** From 13 January 2017 to 26 December 2017. **Methodology:** One hundred patients, aged between 25 to 45 years with diagnosis of corneal ulcer were selected for this study. 100 patients with microbial keratitis treated by a comparison groups, Group I (5% Povidine-iodine) and Group II antibiotic agents (ciprofloxacin 0.5%, 0.5% moxifloxacin and fortified antibiotics (tobramycin 13.5%). SPSS version 20 was used to analyze the data. Categorical variables presented as frequency and percentages and numerical variables presented as mean ± standard deviation. **Results:** The mean age of patients was 33.06 year (range from 25-45 years). Male patients in this study were 60 (60%) while 40(40%) were female patients. It was found that, 5% Povidine-Iodine was as effective as antibiotic agents as there was no statistical difference between the healing grades $p < 0.005$. **Conclusion:** This study concluded that in developing countries microbial keratitis can be treated with low cost 5%Povidine-Iodine which is as effective as antibiotic agents.

Keywords: Corneal ulcer, 5% Povidine-iodine, Fortified antibiotics.

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INTRODUCTION

Blindness owing to infectious diseases has been markedly reduced in the last decade. Corneal ulcers are the fourth most common cause of blindness in the world.¹ Available data shows that most cases are present in the developing world as compared to USA where incidence is limited at 11-27 per 100000 while higher number are seen in South Asia, at 113-799 per 100000.^{2,3}

Because of globally increasing temperature we have seen a rise in fungal keratitis. The treatment is often started with antimicrobial agents without any culture. Excessive use of antibiotics is leading to development of resistance.⁴ 5% Povidine-Iodine if used in corneal ulcer resistant to antibiotics and in a situation where antibiotics are not available can change the outcome of corneal ulcer.⁵

METHODOLOGY

Study Design: Comparative study.

Settings: Ophthalmological Department of Govt General Hospital Ghulam Muhammadabad and DHQ Hospital, Punjab Medical College, Faisalabad Medical University, Faisalabad.

Duration: One year from 13-1-2017 to 26-12-2017.

Sample Size: Composed of 100 patients

Inclusion Criteria: In this study Inclusion criteria was patients having age between 25-45 years of both genders presented with microbial keratitis.

Exclusion Criteria: However, patients having corneal dystrophies/degeneration and healed corneal ulcers were excluded.

Methods: Patients who fulfilled the inclusion criteria were enrolled and consent was taken before the start of medications (Ciprofloxacin 0.3%, Moxifloxacin 0.5%, Fortified antibiotics and 5% Povidine-Iodine.

RESULTS

In this study 100 patients with microbial keratitis were treated through comparison groups, Group I 5% Povidine-Iodine and Group II (Antibiotic agents). The mean age of patients in this study was 33.06 year (range from 10-35 years) out of which 40% were females and 60% were males.

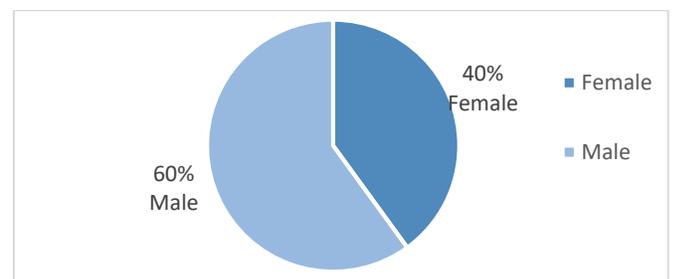


Figure 1: Gender wise distribution of patients

Table 1: Age wise distribution of patients

Descriptive Statistics					
	No. of patients	Minimum	Maximum	Mean	Std. Deviation
Age	100	25	45	33.06	5.554

Table 2: Comparison of treatment Group-I (5% Povidine-iodine) and Group-II (Antibiotic agents)

Treatment Groups	Time Period	Number of Patients	Mean mm	Std. Deviation
Group I Povidine-iodine	Baseline	50	6.25mm	0.866
	One week	50	5.17mm	0.718
	Third week	50	4mm	0.853
	One month	50	3.17mm	1.115
Group II Antibiotics	Baseline	50	6.08mm	1.165
	One week	50	4.58mm	1.084
	Third week	50	3.5mm	0.905
	One month	50	2mm	1.044

The tabulated values of results of two comparison groups showed healing time period and size of corneal ulcer, Group I (5% Povidine-iodine) values 6.25mm ± 0.866 on baseline time period and on visit after one week 5.17mm ± 0.718, after 3rd week 4mm ± 0.853 and after one month 3.17mm ± 1.115. Group II (Antibiotics) values 6.08mm ± 1.165 on baseline time period and on visit after one week 4.58mm ± 1.084, after 3rd week 3.5mm ± 0.905 and after one-month 2mm ± 1.044. These results showed $p < 0.05$ that mean 5% Povidine-iodine and antibiotics are equally significant in the treatment of microbial keratitis.

DISCUSSION

Total number of blind people in the world are approximately 1.5 million. Majority of those blind live in developing countries. Corneal ulcers are the fourth most common cause of blindness in the whole world. Corneal opacification due to microbial keratitis is preventable.⁶ Low cost, efficacy and lack of microbial resistance make povidine iodine an attractive drug for treating eye infections, especially in developing countries. In many developing countries people have become blind due to non-availability of expensive topical antibiotics. In Manila, a study to compare price of 10ml bottle of an ocular type ophthalmic solution containing Neomycin-Polymycin B and 5% Povidine-iodine was conducted, which showed that the Neomycin-Polymycin B containing solution was expensive as compared to 5% Povidine-iodine.⁷ Even in United States the 5% Povidine-iodine has been seen an attractive alternative to topical antibiotics in certain situations.⁸

5 % Povidine-iodine has an extremely broad spectrum of antimicrobial activity, including all bacteria, chlamydia and fungi given enough contact time.⁹ It is not only inexpensive but also widely available in underdeveloped countries.

In our study, we conducted a comparative study of two groups, Group I (5% Povidine-iodine) and Group II (antibiotic agents) to control microbial keratitis. We decided to conduct this study in the Department of Ophthalmology Government General Hospital Ghulam Muhammadabad and Government District Headquarter affiliated with Punjab Medical College, Faisalabad Medical University.

Patients were registered from January 2017 to December 2017. The patient was aged between 25-45 years with a diagnosis of the corneal ulcer. All participants were alternatively assigned to

one of the two treatment groups, Group I (5% Povidine-iodine), and Group II of antibiotic agents, 0.5% ciprofloxacin, 0.5% neomycin-polymycin, 0.5% moxifloxacin and fortified antibiotics. In another study conducted at Philippine General Hospital affiliated with University of Philippines, a double-masked, controlled prospective clinical trial was conducted showing comparison of 5% Povidine-iodine and topical antibiotics on the treatment of corneal ulceration.^{10,11} In a similar study in Nairobi, the 5% Povidine-iodine was prepared by the local pharmacist inexpensively.¹²

Treatment groups were compared for several days until the infection was resolved. The groups were compared by wilcoxon anmannwhitery or χ^2 test. Treatment groups were compared at 1, 2 and 3 weeks intervals using the χ^2 test. There was no significant age, gender and mean standard deviation 7.0 (7.0) ± 6.0 (6.1) differences between the two groups. 5% Povidine-iodine was used by 230 patients (129 males, 101 females) and antibiotics by 229 patients (129 Male, 100 female). The results of this study were reported by the two groups. The treatment period was 7 to 21 days. The mean ± SD number of days until cure was 9.4 ± 3.6 for all 5% Povidine-iodine tested eyes and 9.1 ± 3.2 for all antibiotic-treated eyes. There was no significant difference between treatment groups for 7 days ($p = 0.057$), 14 days (0.001) % and the total number of days to recovery ($p = 0.0001$), the proportion cured was 97.2% for Group I 5% Povidine-iodine and 99.4% for Group II antibiotics. According to the healing grades $p = 0.157-0.981$.

Our study was similar to the study of Philippine, the treatment groups were compared to a number of days until the microbial keratitis was resolved. Comparison groups were passed through the Levene's test for equality in variance or T-test for equal means (independent samples test) treatment groups. The treatment groups were compared on the number of the subjects who completed treatment. Group I (5% Povidine-iodine) corneal ulcer size was 6.25 ± 0.866 and Group II antibiotics group corneal ulcer size was 6.08 ± 1.165 in the start. After One-week time period, similarly corneal ulcer size was 5.17 ± 0.718 in Group I and 4.58 ± 1.084 in Group II, after the third week, corneal ulcer size in Group I was 4 ± 0.853 and in Group II corneal ulcer size was 3.5 ± 0.905 and after one-month size of corneal ulcer was 3.17 ± 1.115 in Group I and 2 ± 1.044 in Group II. A standard deviation of baseline 0.866 to have 80% power to detect a difference of 1 day with a significance level of at least 0.05.

There were no statistically significant age, gender and standard deviation differences between the two groups. Gilgiotti and co-workers also studied a comparative group of antibiotics (tobramycin and ciprofloxacin, polymycin-bactracin) and 5% Povidine-iodine. Their results showed positive effects ($p = 0.057$).¹³

CONCLUSION

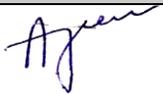
In conclusion, when we compare Group I 5% Povidine-iodine ophthalmic solution with the Group II antibiotic group, (ciprofloxacin 0.3%, moxifloxacin 0.5%, fortified antibiotics for treatment of microbial keratitis they show similar results in

treating a corneal ulcer. Our study show that early start of antimicrobial agent will benefit our patients. In remote areas general practitioners can be educated to start 5 % povidone iodine as a treatment of corneal ulcer which will benefit the patient. Antibiotics can be added later on their availability.

REFERENCES

1. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. Br J Ophthalmol. 2012;96(5):614-8.
2. Erie JC, Nevitt MP, Hodge DO, Ballard DJ. Incidence of ulcerative keratitis in a defined population from 1950 through 1988. Arch Ophthalmol. 2008;111(4):1663-71.
3. Jeng BH, Gritz DC, Kumar AB, et al. Epidemiology of ulcerative keratitis in Northern California. Arch Ophthalmol. 2010;128(8):1022-8.
4. Lalitha P, Srinivasan M, Manikandan P, et al. Relationship of in vitro susceptibility to moxifloxacin and in vivo clinical outcome in bacterial keratitis. Clin Infect Dis 2012;54(10):1381-7.
5. McDonald EM, Ram FS, Patel DV, McGhee CN. Topical antibiotics for the management of bacterial keratitis: an evidence-based review of high quality randomised controlled trials. Br J Ophthalmol. 2014;98(11):1470-7.
6. Steinkuller PG, Du L, Gilbert C, Foster A, Collins ML, Coats DK. Childhood blindness. J AAPOS. 1999;3:26-32.
7. Isenberg SJ, Apt L, Valenton M, et al. Prospective, randomized clinical trial of povidone-iodine 1.25% solution Venus topical antibiotics for treatment of bacterial keratitis. Am J Ophthalmol. 2017;176(2):244-53.
8. Block SL, Hedrick J, Tyler R, et al. Increasing bacterial resistance in pediatric acute conjunctivitis (1997-1998). Antimicrob Agents Chemother. 2000;44:1650-4.
9. Getshen K, Srinivasan M, Upadhyay MP, Priyadarsini B, Mahalaksmi R, Whitcher JP. Corneal ulceration in South East Asia. I: A model for the prevention of bacterial ulcers at the village level in rural Bhutan. Br J Ophthalmol. 2006;90(3):276-8.
10. Gonzales CA, Srinivasan M, Whitcher JP, Smolin G. Incidence of corneal ulceration in Madurai District, South India. Ophthalmic Epidemiol. 2009;3(3):159-66.
11. Upadhyay MP, Karmacharya PC, Koirala S, et al. The Bhaktapur eye study: ocular trauma and antibiotic prophylaxis for the prevention of corneal ulceration in Nepal. Br J Ophthalmol. 2001; 85(4):388-92.
12. Saad-Hussain A, El-Mofty HM, Hassanien MA. Climate change and predicted trend of fungal keratitis in Egypt. East Mediterr Health J. 2011;11(6):468-73.
13. Gigliotti F, Hendley JO, Morgan J, Michaels R, Dickens M, Lohr J. Efficacy of topical antibiotic therapy in acute conjunctivitis in children. J Pediatr 1984;104:623-6.

AUTHORSHIP AND CONTRIBUTION DECLARATION

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