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[1]Department of Ophthalmology, University Hospital Center Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Ophthalmology, Dubrava University Hospital, School of Medicine, University of Zagreb, Zagreb, Croatia

Corresponding author: Ivana Gabric, MD, Department of Ophthalmology, University Hospital Center Zagreb, School of Medicine, University of Zagreb, Zagreb, Croatia. Address: Ulica Mije Kispatica 12, 10 000 Zagreb, Croatia. E-mail address: ivanajonjic91@gmail.com. ORCID ID: https://orcid.org/0000-0003-1740-9198.

Clinical Experience of Using a Combination of Dexamethasone and Levofloxacin After Cataract Surgery

Tomislav Kuzman[1], Ivana Gabric[1], Ana Meter[2], Ivan Skegro[1], Sanja Masnec[1], Miro Kalauz[1], Ana Pupic-Bakrac[2]

ABSTRACT

Background: Where routine prophylactic antibiotics have been adopted following cataract surgery, rates of endophthalmitis have been decreasing. Intracameral and topical antibiotics are currently used to prevent endophthalmitis after cataract surgery. When applying topical antibiotics, there are different recommendations on the frequency and duration of therapy. The development of bacterial resistance to the excessive and long-term use of antibiotics is a growing problem worldwide. The goal is to achieve a good antibiotic effect with the shortest possible use of antibiotics. **Objective:** The aim of this study was to compare the effectiveness of a new combination therapy of dexamethasone and levofloxacin for seven days after cataract surgery with the previous regimen of dexamethasone, neomycin sulfate, and polymyxin B, which was given for 21 days. **Methods:** A retrospective analysis of medical records and administered a questionnaire was conducted to assess the effectiveness of postoperative therapy in our cataract surgery patients. The study involved 52 patients who underwent surgery within the last year, performed by a single surgeon at our institution. The findings can help us improve the quality of care we provide and optimize our patients' overall quality of life. **Results:** We conducted an in-depth study on 52 individuals who underwent cataract surgery at our institution. The prescribed therapeutic regimen for the participants included administering Ducressa solution four times daily for the first seven days and Maxidex solution three times daily for the subsequent 14 days. The study found that none of the participants experienced complications after surgery, and all found it easy to instill the medication. The prescribed regimen effectively managed the postoperative recovery of the participants, and the medication was well-tolerated. **Conclusion:** Our research found that a new combination of levofloxacin and dexamethasone, when used topically, may require a shorter treatment period, reducing the risk of antibiotic resistance and providing a safe alternative for endophthalmitis prevention.

Keywords: Endophthalmitis, dexametasone, levofloxacin, cataract surgery.

1. BACKGROUND

Endophthalmitis generally occurs as a complication of cataract surgery (1-3) and is the most severe sight-threatening postoperative complication (4). Endophthalmitis, a rare yet formidable complication, poses a significant concern in cataract surgery. This severe intraocular infection is characterized by a swift onset of inflammation within the eye's posterior segment, leading to potential vision-threatening consequences. The causative agents, often microbial, infiltrate the eye's sterile environment during the surgical procedure, emphasizing the critical importance of stringent aseptic techniques in minimizing this hazard. Up to 80% (5) of culture-proven postoperative endophthalmitis cases are caused by Gram-positive bacteria (2,3), including Staphylococcus epidermidis (which is responsible for most cases) (1-4), Staphylococcus aureus, streptococci, and enterococci. At the same time, Gram-negative bacteria like Pseudomonas spp are also responsible for some cases (3, 5).

Nearly one-third of the patients who develop endophthalmitis often have a visual acuity of worse than 20/200 even after treatment (1). Enterococcus-associated endophthalmitis has a success rate of only 14% in achieving a final visual acuity of 20/100 or better. In contrast, the success rate rises to 50% in the case of staphylococcus aureus and 56% in the case of Gram-negative

organisms (6). Contemporary research efforts continue to refine prophylactic strategies and therapeutic interventions to curtail the incidence and mitigate the consequences of endophthalmitis in the context of cataract surgery.

Specific measures should be taken before, during, and after surgery to prevent endophthalmitis. Before the procedure, it is recommended to trim eyelashes (1) and apply antiseptics, such as povidone-iodine, at the operative site (1-6). Antibiotics can also be administered through various routes, such as topical and intravitreal (1, 4, 6), and high-risk patients should be identified (3). During surgery, incisions must be adequately sealed (2, 4) and antibiotics administered (1, 2, 4). After surgery, antibiotics should continue to be given through intracameral injection or topical administration (1,4-7). Introducing routine prophylactic antibiotics following cataract surgery has been associated with a significant decrease in endophthalmitis rates. Intracameral and topical antibiotics are currently utilized to prevent this condition, depending on the surgeon's preference and local resistance patterns (8).

The adoption of routine prophylactic antibiotics following cataract surgery has resulted in a significant reduction of endophthalmitis rates in several countries (2). Despite the improvements in endophthalmitis rates, it remains a considerable concern, as around half of all patients who develop this condition are unable to recover 20/40 or better vision even with treatment (1). This underscores the importance of continued vigilance by healthcare practitioners and the need to adopt strategies to minimize the risk of endophthalmitis further. Such strategies may include:

- The use of sterile techniques during surgery.
- The use of antibiotics is tailored to the individual patient's needs.
- Carefully monitoring patients following surgery to detect and treat any signs of infection early.

In the case of topical antibiotics, there are differing recommendations on the optimal frequency and duration of therapy, with some advocating for a single preoperative dose and others recommending postoperative administration for several days. Despite the success of antibiotic prophylaxis, the excessive and long-term use of antibiotics may lead to the development of bacterial resistance, which has become a growing problem worldwide (2, 9).

Antimicrobial resistance is a critical issue that has become a major global threat to public health. The overuse and misuse of antimicrobial drugs in humans have led to the emergence of drug-resistant infections. This growing problem now kills at least 700,000 people yearly and is projected to claim approximately 10 million lives by 2050 if no substantial action is taken. The consequences of antimicrobial resistance are severe and can lead to prolonged illness, disability, and death. It can also increase healthcare costs and reduce the effectiveness of medical treatments. Therefore, it is crucial to take immediate action to promote the responsible use of antimicrobial drugs in all sectors and to develop new drugs to combat drug-resistant infections (10).

Several strategies have been proposed to combat this issue, including the use of shorter courses of antibiotics or the avoidance of prophylactic antibiotics altogether in low-risk patients.

A new fixed-dose combination of dexamethasone and levofloxacin eye drops has recently been approved to prevent and treat inflammation and prevent infection associated with cataract surgery in adults (7, 11, 12).

Endophthalmitis prevention is crucial, but it should be done cautiously to avoid antibiotic resistance (13, 14). The aim is to develop preventive methods that will guarantee efficacy while reducing the risk of antibiotic resistance. Achieving this goal requires a comprehensive understanding of endophthalmitis and antibiotic resistance and the development of appropriate prevention strategies (15, 16).

2. OBJECTIVE

Our study aims to provide a detailed account of the clinical experience of administering dexamethasone and levofloxacin in combination following cataract surgery. We used this combination seven days after the surgery and compared it with the previous use of antibiotics, a combination of dexamethasone, neomycin sulfate, and polymyxin B for 21 days.

3. MATERIAL AND METHODS

The primary goal of this study is to assess the effectiveness of postoperative therapy in cataract surgery patients at our institution. To accomplish this, a retrospective analysis of the medical records of 52 patients who underwent cataract surgery within the last year was conducted. These surgeries were performed by a single surgeon at a tertiary referral center, and the research was approved by the institution's ethical committee.

In addition to a retrospective analysis of medical records, a questionnaire was administered to gather detailed information regarding patients' experiences with postoperative therapy and its effectiveness. The retrospective analysis was conducted to identify the type of cataract surgery each patient had, any complications that occurred during or after the surgery, and the specific postoperative therapy prescribed to each patient.

The questionnaire comprised a series of questions that aimed to elicit information on patients' overall experience with postoperative therapy, including the duration of treatment, frequency of appointments, and any side effects encountered.

This dual approach provided a comprehensive understanding of the efficacy of postoperative therapy among cataract surgery patients in our institution. By analyzing the medical records and questionnaire data, we gained in-depth insights into the effectiveness of postoperative therapy. The findings of this study have significant implications for improving the quality of care provided to cataract surgery patients. By identifying the most effective postoperative therapies, we can enhance postoperative outcomes and ensure that patients receive the best pos-

Was the frequency of instilling the medicine every 6 hours (4 times a day) easy for you to perform?	Yes	No	
Did you find it easy to implement the 7-day uniform dosing?	Yes	No	
Before using, did you shake the bottle?	Yes	No	
Have you ever experienced medication drops overflowing from your eyes due to their large size?	Yes	No	Sometimes
Did you experience any burning sensation or discomfort while using it?	Yes	No	Sometimes
Have you been given a prescription for a specific medication?	Yes	No	
Did the cost of the medication cause a financial strain for you?	Yes	No	

Table 1. Questionnaire after cataract surgery

sible care. Ultimately, this study will help us to optimize the care we provide to cataract surgery patients and improve their overall quality of life.

4. RESULTS

This report is based on an in-depth study that involved investigating and analysing medical records and experiences of 52 individuals who underwent cataract surgery in our institution. During the course of cataract surgery, the surgeon performed phacoemulsification, a procedure aimed at removing the cloudy lens of the eye. Additionally, an intraocular lens (IOL) was implanted to restore visual acuity. IOL power calculation was performed using IOL Master 700 (Carl Zeiss, Jena, Germany), and SRK/T formula. The operations were performed by a single surgeon at a single tertiary referral center. This surgical intervention is a common approach to addressing age-related cataracts, affecting a significant portion of the elderly population. Ethical committee approval was obtained from the institution before performing the research.

The study participants were selected based on specific criteria: age, gender, and health status. The average age of the participants was 70.7 years, with ages ranging from 48 to 84 years. Of the participants, 62% were female, and 38% were male. The prescribed therapeutic regimen included administering Ducressa solution four times daily for the first seven days and Maxidex solution three times daily for the subsequent 14 days. The first follow-up appointment was scheduled for the day after surgery, followed by a second appointment at 12-14 days post-procedure. The study found that none of the participants experienced any complications such as inflammation, conjunctivitis, uveitis, or endophthalmitis after surgery.

Additionally, all participants found it easy to instill the medication every 6 hours for seven days and reported uniform dosing. A survey of the participants revealed that 25% shook the bottle before use, while 75% did not. Half of the participants had issues with the size of the medicine drop, while 34.62% had occasional problems, and 15.38% had no issues. When asked about discomfort during use, 42.31% reported no issues, 21.5% experienced discomfort, and 36.54% had occasional discomfort. Participants were also asked if they had been prescribed a specific medication. The results showed that out of all the participants, 84.62% had received a prescription for medication while 15.38% had not. Furthermore, participants were also asked whether the cost of the medication had caused them any financial strain. The survey revealed that only 7.69% of the participants reported experiencing financial strain due to the cost of the medication, while the majority (92.31%) did not face any financial difficulty.

In conclusion, the study results indicate that the prescribed therapeutic regimen effectively managed the postoperative recovery of the participants. The findings also suggest that the medication was easy to administer and well-tolerated by the study participants. The study provides valuable insights into managing postoperative cataract patients and recommends further research to explore the issues related to administering the medication.

5. DISCUSSION

The combination of levofloxacin and dexamethasone was created to address the specific challenges faced when managing patients undergoing cataract surgery, which goes beyond the traditional use of Maxitrol (7, 11, 12). While updated guidelines exist, ophthalmologists still rely heavily on their personal experience when deciding on treatment options, durations, and drug combinations. This approach often lacks grounding in the principles of evidence-based medicine (EBM). The extended use of antibiotics can cause antibiotic resistance, posing a significant risk to patient care (10). Additionally, the prolonged prescription of corticosteroids without proper follow-up can have an adverse effect on post-surgical self-care adherence, especially among older cataract surgery patients, who form the majority of recipients (13). The innovative 7-day course of levofloxacin and dexamethasone is aligned with EBM principles, providing a more evidence-based approach to managing patients undergoing cataract surgery. This tailored therapy promotes adherence and minimizes the risk of antibiotic resistance, which is a critical concern in light of the growing threat of antimicrobial resistance (16,17). The shorter treatment duration, combined with the levofloxacin and dexamethasone combination, can enhance the precision and efficiency of patient care, while potentially reducing the likelihood of complications (10). This patient-centered approach takes into account the specific needs of elderly cataract surgery patients, ensuring a more comprehensive and effective healthcare delivery. By providing a scientifically grounded alternative to Maxitrol, ophthalmologists can better meet the evolving needs of their patients, while ensuring better outcomes. In summary, the levofloxacin and dexamethasone combination therapy is an evidence-based approach, specifically tailored to the unique challenges associated

with managing patients undergoing cataract surgery. It addresses the unmet needs in cataract surgery management by offering a more patient-friendly, efficient, and antibiotic-resistance-conscious treatment approach.

6. CONCLUSION

Endophthalmitis is a serious and uncommon complication that can cause permanent damage to one's vision. Healthcare professionals use both topical and systemic antibiotics to prevent infections after cataract surgery. However, antibiotic resistance is becoming a growing concern, and prolonged use of antibiotics can worsen this problem.

Our research suggests that a new combination of levofloxacin and dexamethasone, when used topically, may require a shorter treatment period. This can reduce the risk of antibiotic resistance and provide a safe alternative for preventing endophthalmitis after surgery. By combining the results of the retrospective analysis and the questionnaire, we gained valuable insights into the effectiveness of postoperative therapy for cataract surgery patients in our institution. Our findings can help improve the quality of care provided to these patients, leading to better outcomes.

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