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A COMPARISON BETWEEN THE EFFICACY OF SINGLE SUB-TENON'S CAPSULE TRIAMCINOLONE ACETONIDE INJECTION AND PREDNISOLONE ACETATE DROP FOR THE PROPHYLAXIS OF POST-CATARACT SURGERY INFLAMMATION

Silina Abdalahad[1]*, Yusuf Suleiman[2] and Mahmoud Rajab[3]

[1]MD, Department of Ophthalmology, Tishreen University Hospital, Lattakia, Syria.
[2]Professor, Department of Ophthalmology, Tishreen University Hospital, Lattakia, Syria.
[3]Professor, Department of Ophthalmology, Tishreen University Hospital, Lattakia, Syria.

***Corresponding Author: Silina Abdalahad**

MD, Department of Ophthalmology, Tishreen University Hospital, Lattakia, Syria

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ABSTRACT

Objective :To compare the effectiveness of a single injection of triamcinolone acetonide 40 mg with topical prednisolone 1% to prevent inflammation after cataract surgery and compare its effect on intraocular pressure IOP.

Methods: This study was conducted in the Department of ophthalmology at Tishreen University Hospital in Lattakia, in the period from March 2023 until May 2024. This study included 100 patients (100 eyes) with a senile cataract of varying severity, meeting the inclusion and exclusion criteria of this research. All patients underwent Phacoemulsification surgery. The research sample was divided into two groups: the first group patients received a single sub-tenon injection of Triamcinolone Acetonide 40 mg one-time at the end of the surgery. Group II: patients were given an eye drop of prednisolone acetate 1% six times during the first week then reduced for the next six weeks after surgery. The patients have been evaluatd at the days (1,3,7,14,28,56) after surgery, by monitoring AC cell, intraocular pressure *IOP* values and ophthalmological symptoms as(pain, photophobia). **Conclusion** : We did not find statistically significant differences between Triamcinolone Acetonide 40 mg injected sub-tenon and Prednisolone Acetate 1% (eye drops) in patients with cataract undergoing Phacoemulsification surgery by monitoring intraocular pressure, anterior chamber cells in addition to pain and photophobia.

KEYWORDS: Cataract Surgery, SAIDs, TA, PA.

1. INTRODUCTION

Cataract is a growing global health problem and a major cause of visual impairment and blindness worldwide.[1] The World Health Organization estimates that approximately 20 million people are blind due to cataract, which accounts for more than 50% of all cases of blindness globally.[2] The majority of these cases (about 90 of them) were found in developing regions. Cataracts are also the leading cause of visual impairment, with 33% of the world's population suffering from visual impairment caused by cataracts.[3] According to the Centers for Disease Control in the USA in a 2015 study, about 24.4 million people in the United States were diagnosed with cataract, and by 2030 this number is expected to increase to almost 39 million people.[4]

1.1 Post-surgical inflammation

Several theories explain the occurrence of postoperative inflammation, including : *Surgical trauma:* inflammation is a complication that may occur, regardless of the development of surgical methods and techniques, due to post-surgical cellular tissue damage which is usually mild to moderate severity and can be controlled with drug therapy.[5] Foreign substances used during surgery such as medical solutions and surgical sutures are also responsible for post-surgical inflammation.[6]

1.2 IOP after cataract surgery

High intraocular pressure IOP is defined as an increase in intraocular pressure to rates above the normal limit, with a pressure above 21 mmHg, which makes up 4-7% of people over 40 years old.[7-8] High intraocular pressure may occur in cataract patients for several reasons that vary depending on the type of cataract and its stage, where the resulting cataract may cause closure in the angle of the anterior House, and thus acute glaucoma attacks with a significant increase in intraocular pressure, while hypermature cataract causes glaucoma in the affected eye by several mechanisms, the most important of which is the entry of lens proteins into the anterior house through the atrophied or damaged capsule.[9] Numerous studies have also shown the possibility of a mild and self-limiting rise in intraocular pressure after cataract surgery, however, a prolonged and noticeable

rise requires timely and effective treatment.[10] Viscous substances inside the eye after cataract surgery often cause an early postoperative intraocular pressure surge, which peaks within 4-6 hours after surgery. The rise in intraocular pressure often lasts no more than several days and responds well to drug therapy.[11] There are several reasons for high intraocular pressure after surgery, including the closure of the angle of the anterior house caused by mydriasis or lens displacement, which makes vision blurred, and requires repositioning the lens.

2. MATERIALS AND METHODS

2.1 Sample Characteristic

We divide the sample into two groups: **Group A:** patients received a single sub-tenon injection of triamcinolone acetonide 40 mg one-time at the end of surgery. **Group B:** patients were given an eye drop of prednisolone acetate 1% six times a day during the first week after surgery, and the dose was reduced by one drop every week for six weeks from the date of surgery. An examination and follow-up were conducted for all patients as follows (1,3,7,14,28,56) and then Intraocular pressure values were monitored after 3 months and 6 months in patients of both groups, and the results were recorded for every patient.

Study Design: Randomized Prospective Study.

2.2 Objective

Comparing the effectiveness of a single injection of triamcinolone acetonide 40 mg under the tenon capsule with a 1% prednisolone drop for the Prevention of inflammation after cataract surgery and its effect on intraocular pressure IOP.

2.3 Inclusion Critiria

Patients attending the ophthalmology department at Tishreen University Hospital, undergoing cataract surgery using Phacoemulsification.

2.4 Exclusion criteria

- Age is less than 40 years
- BCVA is less than 0.2 with the other eye.
- Diabetes Mellitus.
- Patients with glaucoma and high intraocular pressure.
- Mature and hypermature cataract.
- Uveitis.
- Autoimmune Diseases.
- Non-cooperative patients.

3. Statistical analysis

- Graphs and tables were used to characterize data.
- Averages, standard deviations and measures of central tendency were used to characterize quantitative data.
- Continuous variables were analyzed using a Microsoft Excel with ANOVA and t-test, to calculate p-value. The statistical differences between the two study groups were considered significant when the value of $p \leq 0.05$.

4. RESULTS

4.1 Distribution of the sample according to age and gender

The research sample included 100 patients (100 samples), including 58 males and 42 females aged 46-79 years.

Table 1: Distribution of the sample according to age and gender.

Variable		Group A	Group B
Gender	Males	27 (54%)	31 (62%)
	Females	23 (46%)	19 (38%)
Age		62.86±7.23	61.22±8.65

4.2 Distribution of the sample according to anterior chamber cells

Patients were evaluated with Slit-lamp, and the degree of inflammatory reaction were determined according to the number of AC cells:

Table 2: Distribution of the Sample According To AC Cells.

Patients						
Day-56	**Day-28**	**Day-14**	**Day-7**	**Day-3**	**Day-1**	**AC cell**
Group A						
(100%) 50	**(100%) 50**	**-**	**-**	**-**	**-**	**-**
(100%) 50	**(100%) 50**	**-**	**-**	**-**	**-**	**+0.5**
-	**-**	**(%40) 20**	**(%16) 8**	**-**	**-**	**+1**
-	**-**	**(%44) 22**	**(%40) 20**	**(%14) 7**	**(%14) 7**	**+2**
-	**-**	**(%12) 6**	**(%28) 14**	**(%40) 20**	**(%34) 17**	**+3**
-	**-**	**(%4) 2**	**(%16) 8**	**(%46) 23**	**(%52) 26**	**+4**
0	**0**	**1.912**	**3.14**	**3.87**	**4.102**	**Mean**
Group B						
(100%) 50	**(100%) 50**	**-**	**-**	**-**	**-**	**-**
(100%) 50	**(100%) 50**	**-**	**-**	**-**	**-**	**+0.5**

-	-	(%38) 19	(%12) 6	-	-	+1
-	-	(%50) 25	(%38) 19	(%14) 7	(%12) 6	+2
-	-	(%10) 5	(%32) 16	(%42) 21	(%38) 19	+3
-	-	(%2) 1	(%18) 9	(%44) 22	(%50) 25	+4
0	0	1.88	3.23	3.84	4.07	Mean
1	1	0.506	0.485	0.5	0.504	P-value

4.3 Distribution of the sample according to IOP values

The value of intraocular pressure was taken before surgery for all patients during the preparation for surgery, recorded in the form for each patient, and follow-up of all study patients at intervals of up to 6 months after surgery, the averages of the pressure values were as follows:

Table 3: Distribution of the sample according to IOP values.

Mean +SD			
P-value	Group B	Group A	IOP
0.67	13.5±3.24	13.8±3.3	Before surgery
0.225	14.61±3.4	14.1±3.34	Day-1
0.424	14.66±3.38	14.79±3.36	Day-3
0.169	14.6±3.5	15.3±3.79	Day-7
0.367	14.51±3.5	14.75±3.6	Day-14
0.47	14.48±3.3	14.52±3.25	Day-28
0.463	14.36±3.27	14.42±3.25	Day-56
0.5	13.92±3.43	13.96±3.1	3 months later
0.48	13.82±3.23	13.84±2.9	6 months later

4.4 Distribution of the sample according to symptoms (pain, photophobia)

The primary ocular symptoms reported by the study patients included pain and photophobia, and were classified into degrees of varying severity from mild to severe .We found that the majority of patients in the first and second groups had mild to moderate pain during the first seven days after surgery, and no case of severe pain was recorded among patients in both study groups without statistically significant differences between the two groups.

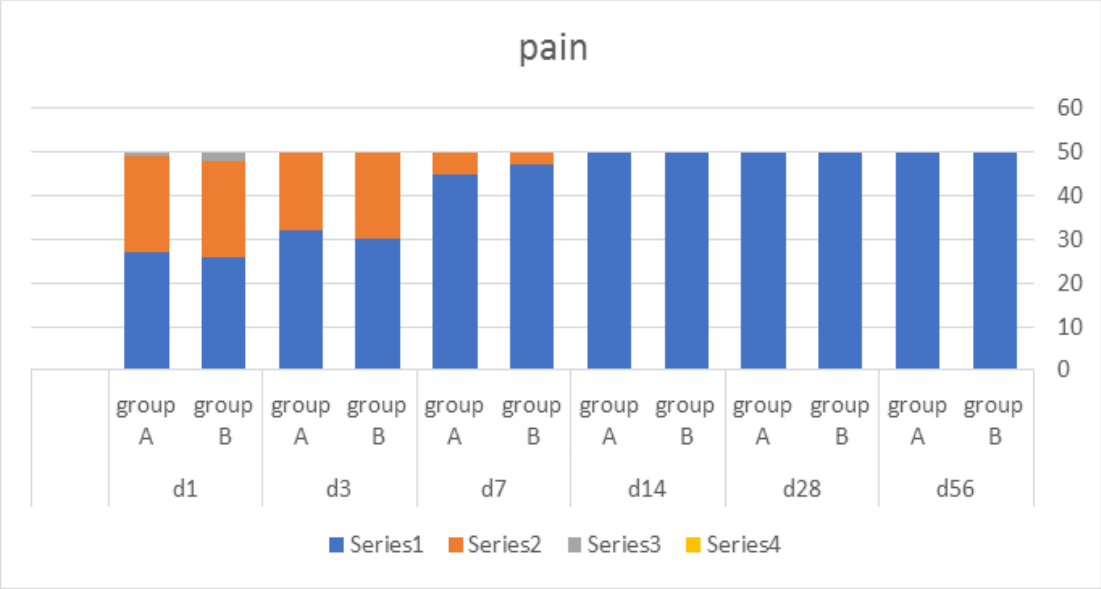

Fig. 1: Distribution of the sample according to pain.

Among the patients, 4 cases of severe photophobia were found on the day after surgery, distributed equally between the two study groups, and photophobia was eliminated in all study patients on the day 28 from the date of surgery, regardless of the type of medication used.

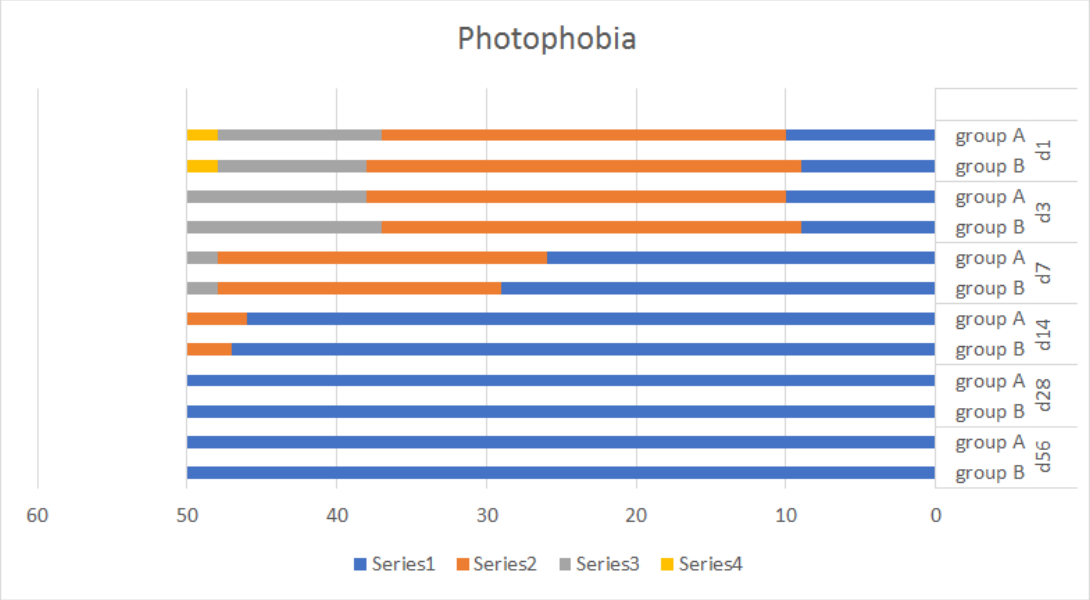

Fig. 2: Distribution of the sample according to photophobia

5. DISCUSSION

Our study showed an increase in the average values of IOP intraocular pressure on the first postoperative day in patients treated with prednisolone acetate drops compared to the values before surgery, this can be explained by the presence of remnants of sticky substances within the anterior chamber that may be the result of lack of good eye washing, and when the patient was given appropriate treatment, all values returned to normal, while the values of intraocular pressure in one patient from the first group increased on the 7th day after surgery to record an average (15.3±3.79), and then returned to stability in the following visits without this is a statistically significant difference, according to a study (Carrillo et al, 2009) that found an increase in pressure values inside The eye when treating with Triamcinolone Acetonide. The Japanese study[15] showed an increase in IOP intraocular pressure values by 14.7% in STTA patients, and recommended the use of sub-tenon Triamcinolone Acetonide with monitoring of intraocular pressure values.

When evaluating the ocular symptoms in the patients of our study during clinical follow-up, no case of severe pain was recorded, and the majority of cases were mild to moderate severity, especially in the first seven days after surgery, while severe cases of photophobia were limited to the day after surgery equally between patients of both groups regardless of the type of medication used, and all these symptoms decreased on the 28th day of surgery without statistically significant differences, which corresponds to (Carrillo et al., 2009) study in Brazil and (chopping et al., 2016) study in Thailand.[13][14]

By evaluating the inflammatory reaction within interior chamber in our study, we found that it was distributed into three degrees (+2,+3,+4) ، it gradually decreased until returning to normal in all patients on Day 28 regardless of the type of treatment used. No case of Grade (+4) was recorded and all cases decreased on Day 28 in patients treated with sub-tenon Triamcinolone Acetonide, while they completely decreased in patients treated with Prednisolone Acetate drop on day 56, without statistically significant differences between the two study groups, which corresponds to all international studies.[15-14-13-12]

6. CONCLUSION AND RECOMMENDATIONS

We did not find statistically significant differences between the use of Triamcinolone Acetonide 40 sub-tenon capsule injection and treatment with eye drops containing Prednisolone Acetate 1% in cataract patients undergoing f Phacoemulsification surgery by monitoring the values of intraocular pressure, inflammatory reflex as well as pain and photophobia. It was found that triamcinolone acetonide and prednisolone acetate %1 are similar in terms of pharmacological efficacy, the ability to control the inflammation and relieve edema after cataract operations.

We recommend the following:

- The use of Triamcinolone Acetonide is considered an effective treatment after cataract operations with intraocular pressure control, so it is recommended to conduct more comprehensive studies in the future and for a longer period of time; due to the prevalence of cataract surgery and the importance of follow-up after surgery.
- Triamcinolone Acetonide is recommended to be used parenterally STTA in patients who are not committed to the use of eye drops after surgery.

7. Ethicall Approval

This research received approval from the scientific research ethics committee at Tishreen University and Tishreen University Hospital.

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