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Comparative Study of Efficacy of Local Preoperative Mitomycin C (MMC) Injection to Intra Operative Application of MMC in the Prevention of Pterygium Recurrence after Surgical Removal

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Abstract

Pterygium is an external eye disease that causes eye's redness and irritation and affects vision in severe cases. Mitomycin C (MMC) is used in Pterygium excision surgery to reduce the recurrence rate. This study compares the efficiency of preoperative sub conjunctiva MMC injection in Pterygium excision vs. intra-operative topical conjunctiva MMC application. 30 eyes were randomly allocated into two groups, 15 eyes for each group. The collected data were analyzed by SPSS program and comparison between both groups in recurrence and complications rates was done by Chi-Square test and P value, with P value of less than 0.05 was considered important statistically. The study showed that no difference of recurrence rates of Pterygium between sub conjunctiva injection of MMC 24 hours preoperatively and its local application intra-operatively, otherwise sub conjunctiva injection of MMC preoperatively is more irritating and patients are less comfort than those who have MMC local application intraoperatively.

Keywords: MMC, Pterygium.

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1. Introduction

A pterygium is a commonly occurring ocular surface disorder, in which a wing-shaped fibrovascular conjunctival growth extends onto the cornea. Conditions that justify surgical intervention include diminished visual acuity, patient discomfort, ocular motility restriction and dysplastic lesions, as well as cosmetic purposes [1]. A pterygium commonly grows from the nasal side of the bulbar conjunctiva within the palpebral fissure and is usually associated with ultraviolet light exposure (eg, sunlight), dry weather, and dust. Symptoms of pterygium include persistent redness, foreign body sensation, tearing, and dry and itchy eyes. In advanced cases, the pterygium may affect vision through obscuring the optical center and inducing astigmatism and corneal scarring [2].

The Pterygium is twice as common in men as women [3] and it is more common with sunlight and dust exposure as with some professions like farmers Pterygium is common in Syria, mostly in men over 40 years.

The surgical treatment of Pterygium focuses on the excision and prevention of recurrence [4]. Recurrent Pterygia are more aggressive and dangerous than primary ones because the underlying cornea may be thinner, the extensive proliferation adversely affects visual acuity, and further recurrence after the second surgery is common [5].

Mitomycin-C, first found its way into ophthalmic use in 1969, in Japan, where recurrent Pterygia were successfully treated with the drug which is an antineoplastic/antibiotic agent isolated from the soil bacterium Streptomyces caespitosus [6].

The purpose of the use of MMC as an adjunctive treatment is to prevent the recurrence of Pterygium after the surgery [7]. Uses of mitomycin C in ophthalmology include: ocular surface tumors, Pterygium surgery, Glaucoma surgery, Dacryocystorhinostomy, Squint surgeries, refractive surgeries, allergic conjunctivitis and vernal keratoconjunctivitis.

Surgical excision is the main treatment of Pterygium with or without Mitomycin C (MMC) application. MMC is a potent alkylating agent after activation, was discovered for the first time in 1958 by Wakkaki, and had been used against many malignant tumors in humans. MMC is commonly used in some ophthalmic surgeries as Glaucoma and Pterygium to improve the success rate, but at the same time MMC can’t be used with concentrations higher than 0.4mg/ml because of higher incidence of complications such as: sclera ulcers and calcifications, corneal ulcers, uveitis, secondary glaucoma, and cataract. Such complications can happen soon after the surgery or few months later.

2. Purpose of Study

To compare the efficacy of preoperative sub conjunctiva MMC injection in Pterygium excision vs. intra operative topical conjunctiva MMC application.

3. Methods and Materials

A sample of 50 patients who came to ophthalmology department in Idleb National Hospital and Damascus Eye Surgical Hospital between October 2012 and January 2013 had been included in this study, 30 eyes of them have primary and recurrent Pterygium . those 30 cases were randomly allocated into two groups;

Group A: 15 eyes received sub conjunctiva injection of 0.1ml MMC 0.15mg/ml using 30 Gauge Insulin syringe 24 hours before Pterygium surgical excision by bare sclera technique.

Group B: 15 eyes had topical MMC (0.15mg/ml) application over bare sclera for 3 minutes intra-operatively during Pterygium excision surgery.

Patients were followed for 6 months post operatively. Differences between both groups were compared by the Chi-square test and p value of less than 0.05 was considered significant. Patients who had: congested Pterygium, dry eyes, uveitis, glaucoma, chronic recurrent blepharitis, were excluded from the study with the non-compliant patients.

4. Surgical Technique

Group A: every eye of this group had usual sterilization and draping, topical anesthetic cotton applicator soaked in propocaine hydrochloride 2% applied to the conjunctiva for 3 minutes, limbal sub conjunctiva injection of 0.1ml of MMC 0.15 mg/ml by 30 Gauge Insulin syringe, then profusely irrigated by normal saline and Levofloxacin antibiotic treatment used 4 times. 24 hours later, under fully sterilized condition, topical anesthesia by cotton applicator soaked in propocaine hydrochloride 2% applied for 3 minutes and sub conjunctiva injection of 0.5ml of same anesthetic solution, then the Pterygium in each eye was excised by bare sclera technique.

Group B: same sterilization and anesthesia techniques were used, then each eye in this group had Pterygium excision by bare sclera method, thermal cauterization at the Pterygium site, then application of cotton applicator soaked in 0.15 mg/ml MMC solution over bare sclera for 3 minutes with profuse irrigation by normal saline after that.

5. Results

Table 1 shows the number of success and recurrence cases in both groups after 6 months. Figure 1 shows recurrence and success rate in group A. Figure 2 shows recurrence and success rate in group B.

Table 1: Number of success and recurrence cases in both groups after 6 months

	Group A	**Group B**
Success rate	29 (96.67%)	28 (93.33%)
Recurrence cases	1 (3.33%)	2 (6.67%)

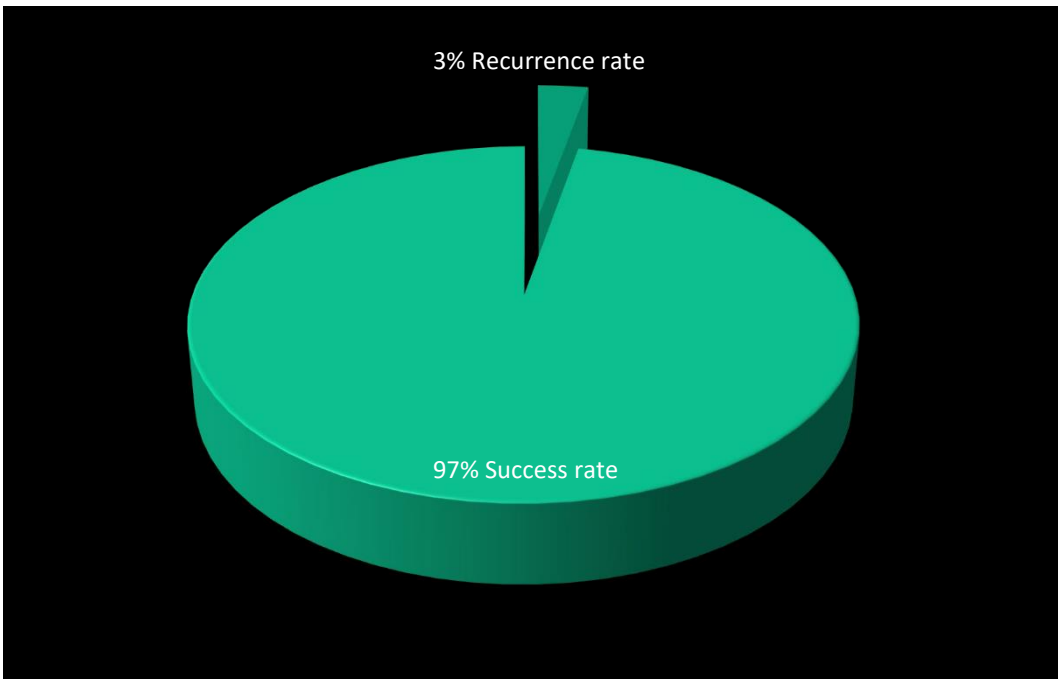

Figure 1: Recurrence and success rate in group A

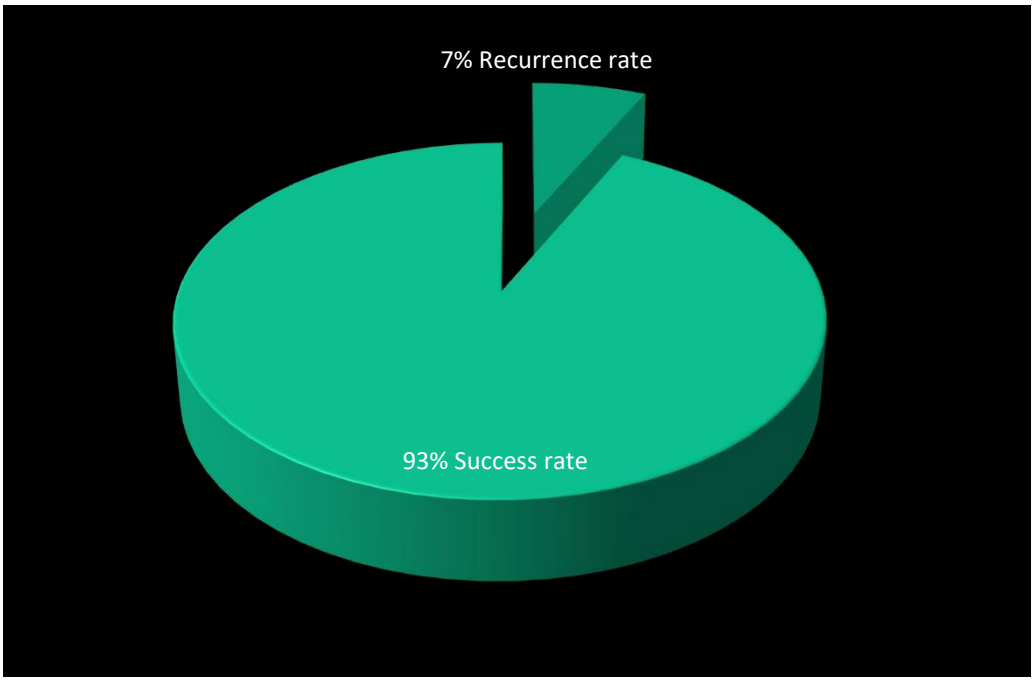

Figure 2: Recurrence and success rate in group B

Recurrence is defined as a growth of conjunctiva tissue that crosses the corneal limbus by more than 1mm. P value was 0.8, so the difference in the results was of no statistical importance. Table 2 shows the number and complication rates in both groups. Data were analyzed by SPSS program, comparison between both groups in recurrence and complication rates was done by Chi-square test and P value. P value of less than 0.05 was considered important statistically. Tables 3-7 show patients follow up during the study.

Table 2: Number and complication rates in both groups

	Group A	Group B	P value
Conjunctiva irritation	7 (23.3%)	5 (16.6%)	0.55
Sub conjunctiva hemorrhage	8(26.6%)	7 (23.3%)	0.67
Sclera thinning	0 (0.0%)	1 (3.3%)	0.9
Punctuate epithelial keratopathy	0 (0.0%)	1 (3.3%)	0.5
Cataract formation	0 (0.0%)	0 (0.0%)	1.00
Corneal thinning	0 (0.0%)	0 (0.0%)	1.00
Photophobia	3 (10%)	5 (16.6%)	0.5

Table 3: Complications numbers in both groups first day post operatively

First day	Group A	Group B
Conjunctiva irritation	7	5
Conjunctiva hemorrhage	8	7
Photophobia	3	5

Table 4: Complications numbers in both groups first week post operatively

First week post operatively	Group A	Group B
Conjunctiva irritation	5	3
Conjunctiva hemorrhage	6	6
Photophobia	1	1

Table 5: Complications numbers in both groups first month post operatively

First month post operatively	Group A	Group B
Fibro vascular growth	1	2
Sclera thinning	-	1
Cataract formation	-	-

Table 6: Complications numbers in both groups 3 months post operatively

Third month post operatively	Group A	Group B
Fibro vascular growth	1	2
Sclera thinning	-	-
Cataract formation	-	-

Table 7: Complications numbers in both groups 6 months post operatively

Six month post operatively	Group A	Group B
Fibro vascular growth	1	2
Sclera thinning	-	-
Cataract formation	-	-

6. Discussion

Recurrence is the most important complication that faces ophthalmology surgeons during pterygium treatment, and many adjunctive treatments had been suggested to reduce recurrence, these adjunctive treatments have different effects and complications, and using MMC in different ways (sub conjunctiva injection, conjunctiva flap, conjunctiva graft, etc.) is the most recent of these adjunctive treatments.

In this study we compared the results of sub conjunctiva MMC injection 24 hours preoperatively with MMC application intra-operatively. MMC of 0.15mg/ml was used that is less than the concentration of MMC used in other studies (0.2mg/ml) which caused more complications in those studies. The concentration of MMC used in our study (0.15mg/ml) is between the lowest limit needed to suppress fibroblasts (0.1 mg/ml) and the highest limit (0.3mg/ml) that causes cellular death.

30 cases of 50 eyes were studied and were randomly allocated into two groups, 15 cases for each group. Recurrence rate in group A was 33.3% (one patient) and was 6.67% (two patients) in group B, during 6 months follow up, this difference was of no importance statistically.

Most of the post-operative complications were related to surgical technique more than using MMC itself, 8 cases (26.6%) of sub conjunctiva hemorrhage in group A were reported, and 7 cases (23.3%) of sub conjunctiva hemorrhage were reported in group B. Hemorrhage was resolved completely within one month of follow up in both groups.

7 cases (23.3%) of group A, 5 cases (16.6%) of group B resulted in conjunctiva irritation, resolved during a month of follow up. Photophobia and congestion were reported in 3 cases (10%) of group A and 5 cases (16.6%) of group B, resolved during one week of follow up. One case of sclera thinning was found in group B, and was treated by artificial tears and ointments until improvement within 3 months. No case of Cataract formation or corneal thinning or sclera perforation was reported during our study.

7. Conclusion

Your text goes here Pterygium is one of the most common diseases of the eye and its recurrence is the most problem facing ophthalmology surgeons with many treatments had been tried to reduce its recurrence (Mitomycin C sub conjunctiva injection, conjunctiva flap, conjunctiva graft, etc.)

No difference of recurrence rates of Pterygium between sub conjunctiva injection of MMC 24 hours preoperatively and its local application intra-operatively, otherwise sub conjunctiva injection of MMC preoperatively is more irritating and patients are less comfort than those who have MMC local application intraoperatively.

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