Al-Azhar Med. J . (Surgery). *Vol. 52 (2), April, 2023, 739-752*
DOI: 10.21608/amj.2023.291697
https://amj.journals.ekb.eg/article_291697.html

EVALUATION OF SHORT-TERM CHANGES IN CENTRAL CORNEAL ENDOTHELIAL CELL COUNT BY SPECULAR MICROSCOPE AFTER PHOTOREFRACTIVE KERATECTOMY (PRK) WITH MITOMYCIN-C (MMC) 0.02%IN PATIENT WITH MODERATE MYOPIA

By

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ABSTRACT

Background: Photorefractive keratectomy (PRK) is a type of refractive surgery. Mitomycin C (MMC) is an anti-fibroblast agent isolated from cultures of Streptomyces caespitosus and has been used in ophthalmic surgeries such as pterygium excision and trabeculectomy for a long time. MMC usage in keratorefractive surgeries became widespread after revealing the fact that this agent can effectively reduce haze formation after surgery and hence improve the predictability of visual outcomes following refractive surgery.

Objective: To compare differences in the endothelial cell count before and after photorefractive keratectomy (PRK) for a moderate myopic eye with MMC (0.02%) applied with a soaked cellulose sponge intraoperatively over the central ablated corneal stroma for 60 seconds.

Patients and methods: In this study, 50 eyes of 25 patients attended the outpatient clinic of the Ophthalmology Department at El Fath Eye Hospital from July 2020 to January 2020, undergoing photorefractive keratectomy (PRK) with MMC 0.02% application for 60 seconds were enrolled in this study. Specular microscopy was performed preoperatively and repeated one month and 2 months after surgery.

Results: There was a statistically significant difference in error of refraction throughout study phases (preoperatively, one month postoperatively and two months postoperatively). There was a decrease in error of refraction one month postoperatively. The difference was statistically significant with improvement of 92.39%. Moreover, the improvement persisted at two months postoperatively with 11.48% improvement compared to its value at one month postoperatively. There was a statistically insignificant difference between right eyes and left eyes regarding vision refraction error, K-max, UCVA, coefficient of variation, central corneal thickness, hexagonally and PRK endothelial cell density (ECD) in preoperatively, one month and two months postoperatively ($p>0.05$).

Conclusion: No significant difference in corneal endothelial cell changes before and after one month and 2 months of PRK surgery with using of MMC.

Keywords: Corneal endothelial cell, Specular microscope, Photorefractive keratectomy, mitomycin-C (MMC) 0.02%, Moderate myopia.

INTRODUCTION

Photorefractive keratectomy (PRK) is a laser eye surgery for the correction of visual refractive errors such as myopia, hyperopia, and astigmatism. PRK was developed in 1983 by Dr. Steven Trokel and colleagues and first performed in 1987 by Dr. Theo Seiler in Berlin *(Alio et al., 2016)*.

Mitomycin C is an alkylating agent with an anti-proliferative effect. It inhibits DNA synthesis of cells exhibiting highest rate of mitosis. Mitomycin is isolated from soil bacterium streptomyces caesopitosus. It has got 3 types mitomycin A, mitomycin B and mitomycin C which are produced by Streptomyces caesopitosus under different conditions. Therefore, this medication is called as mitomycin C (MMC) to differentiate it from others. Mitomycin C inhibits proliferation of fibroblasts, suppresses vascular ingrowths and is much more potent than 5 – fluorouracil (5FU). It is dispensed in blue violet crystalline powder and it dissolves in water. MMC is stable for 2 weeks when refrigerated at 2 – 8 degrees centigrade after the powder is reconstituted for topical use. Because of its anti-fibroblastic activity, MMC is used in various ocular surgical procedures. The optimal dose of MMC is not known but is usually used in concentration of 0.1 mg/ml (0.01%) to 0.5 mg/ml (0.05%) in different clinical setups *(Arranz-Marquez et al., 2019)*.

Mitomycin C is applied over the deepitheliazed stroma after laser ablation. It causes lower keratocytes and myofibroblasts density with reduced deposit of collagen and extracellular matrix resulting in decreased corneal haze *(Tomás-Juan et al., 2015)*.

Nassar et al. (2019) concluded that there is no significant effect on endothelium in patients undergoing PRK in low to moderate myopia with or without mitomycin-C. *Al-Samak et al. (2020)* found that for patients with mitomycin-c, 3 months after the procedure, the mean ECD was reduced by 6.4% (p=0.01) from 2865.12 cells/mm² to 2679.32 cells/mm² for right eye and 5.1 %(p=0.02) from 2764 cells/mm² to 2623 cells/mm² for the left eye.

The aim of the present study was to compare differences in the endothelial cell count before and after photorefractive keratectomy (PRK) for a moderate myopic eye with MMC (0.02%) applied with a soaked cellulose sponge intraoperatively over the central ablated corneal stroma for a period between 12 seconds to 60 seconds (12 seconds for each diopter).

PATIENTS AND METHODS

Fifty eyes of 25 myopic patients attended the outpatient clinic of the Ophthalmology Department at El Fath Eye Hospital from July 2020 to January 2020, undergoing photorefractive keratectomy (PRK) with MMC 0.02% application for 60 seconds were enrolled in this study.

Inclusion criteria: Myopic patients of refractive error in both eyes ranging from – 2D to – 5D and low cylinder up to – 1D, patients aged from 20 to 40 years old, normal retina and lenses, and patients without any previous ocular surgery.

Exclusion criteria: Patients with any systemic disease affecting corneal

endothelium, e.g., diabetes melitus (DM), patients less than 20 years and more than 40 years, pregnant and lactating females, intraocular pressure more than 21 mmHg, and contraindications of photorefractive surgery (keratoconus, corneal dystrophy, previous ocular trauma or surgery, cataract, glaucoma, retinal diseases and severe dry eye).

All patients included in the study were subjected to the following:

1. **History taking:** Including personal history, occupation, outdoor activity and contact lens wear.
2. **Clinical examination:**

A. Visual acuity assessment (uncorrected distance visual acuity and corrected distance visual acuity) using the Snellen chart.

B. Manifest and cycloplegic refraction.

C. Slit lamp biomicroscopy.

D. Goldmann applanation tonometry.

E. Fundus examination by indirect ophthalmoscopy.

F. Intraocular pressure by air puff tonometry.

G. Central corneal pachymetry.

H. Corneal topography by Sirus topographer.

3. **Specular microscopy:** Specular microscopy was performed preoperatively using non-contact specular microscope NIDEK_530. Analysis of the central endothelial cell density (ECD), coefficient of variation (CV), central corneal thickness (CCT) and percentage of cell hexagonality (HEX) was performed.
4. **Preoperative corneal topography:** Using the Pentacam rotating Scheimpflug camera (Oculus, Germany).
5. **Photorefractive keratectomy:** PRK was performed using Machinary Excimer Laser MEL 90 Zeiss, 2016. Topical anesthetic eye drops was used. At surgery, the corneal epithelium was removed mechanically using a rotating brush in all cases. Then, the ablation was done with optical zone of 6.0 mm and manifest refractive error was taken as our target for correction in all patients. After that, a sponge soaked with Mitomycin-C 0.02% (0.2 mg/mL, diluted in normal saline), was put over the treated area for 60 seconds followed by copious irrigation with normal saline. Patients had PRK by the same surgeon using an identical technique and nomogram.
6. **Postoperative treatment:** After PRK, all patients were given topical Moxifloxacin 0.5% eye drops four times daily for 6 days. Topical prednisolone acetate 1% eye drops four times daily for four weeks then tapered gradually over two weeks. Preservative free artificial tears carboxy-meththyl-cellulose 0.5%. Oral vitamin-C 1000 mg daily for one month following the procedure.
7. **Postoperative follow up:** Regular postoperative follow up was conducted on 3rd month with special attention to: Specular microscopy (endothelial cell density ECD and central corneal thickness CCT) for evaluation of changes in endothelial cell count of the cornea one month and two months after PRK and compared

with preoperative condition. Visual acuity, manifest refraction, best-corrected distance visual acuity and spherical equivalent. Slit-lamp biomicroscopy anterior segment examiation (corneal state).

Permission from Institutional Review Board (IRB) of Faculty of Medicine, Al-Azhar University, Cairo was obtained. An informed written consent was obtained from all participants of this study after explaining the benefits of the research to them, respecting refusal to join the study.

Statistical analysis:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA). Quantitative data were expressed as the mean ± SD and (range), and qualitative data were expressed as number and (percentage). t test was used to compare between two groups of normally distributed variables. Mann Whitney U test was used to compare between two groups of non-normally distributed variables. Repeated measure ANOVA was used to compare between more than two dependent variables of normally distributed variables. Bonforroni test compared pairwise variables. Freidman test was used to compare between more than two dependent variables of non normallydistributed. Wilcoxon Signed Ranks test was used to compare between two dependent variables of non-normally distributed variables. All tests were two sided. P-value< 0.05 was considered statistically significant, and p-value ≥ 0.05 was considered statistically insignificant. % of improvement = (pre-intervention score – post-intervention score)/ pre-intervention score multiply by 100%.

RESULTS

The demographic characteristics of patients showed that females (52.0%), males (48.0%), and their ages with a mean± SD 27.7± 4.9, range from 20 to 38 years **(Table 1)**.

Table (1): Demographic data of studied patients (n=25)

Variables	Mean ±SD	Range
Age per years	27.7± 4.9	20-38
Sex (n.%)		
Females	13	52.0
Males	12	48.0

There was a statistically significant difference in error of refraction throughout study phases p=0.0001. There was a decrease in error of refraction one-month post-operative, the difference statistically significant p< 0.001, with improvement 92.39%. Moreover, the improvement persists at two month post-operative with 11.48% improvement compared to its value at one month post-operative (p=0.11).

There was a statistically significant difference in K-max throughout study phases p=0.0001. There was decrease K-max one-month post-operative, the difference statistically significant (p< 0.001), with improvement 16.88%. Moreover, the improvement persisted two

months postoperatively with 0.12% improvement compared to its value at one month postoperatively (p=0.07).

The UCVA changed from a mean ± SD value of 0.31±0.17preoperatively to a mean ± SD value of 0.898 ± 0.12 at first month postoperatively. The difference statistically significant (p<0.001) with improvement of 189.7%. Moreover, the improvement persisted two months postoperatively with 2.1% improvement compared to its value one month postoperatively. The change was statistically insignificant (p=0.46).

The coefficient of variation changed from a mean± SD value of 30±5.84 preoperatively to a mean ±SD value of 29.14±5.4 at first month postoperatively. The difference was statistically significant (p<0.04), with a change of 2.87%, whereas coefficient of variation mean± SD value of 30.62±5.17 two months postoperatively with 5.07% change compared to its value one month postoperatively. The change was statistically insignificant (p=0.07). Also there was a statistically insignificant difference of coefficient of variation preoperatively, and two months postoperatively (p=0.89) **(Table 2)**.

Table (2): Comparison of refraction error, K-max, UCVA and coefficient of variation in pre-operative, one month, two month post-operative (n= 50)

Time / Parameters	pre operative	One month post operative	Two-month post operative	*	**	P1	p2	P3
Pre-operative vision refraction error Mean ± SD range	4.01±0.75 (2.25-5)	0.305±0.19 (0-0.75)	0.27±0.17 0(0-0.5)	92.39	11.48	< .001	< 0.001	0.11
	Freidman =89.3 p=0.0001							
K-max Mean ± SD range	43.36±1.56 (40-46)	36.04±1.16 (34-38)	36.48±1.28 (34-39)	16.88	0.12	< .001	<0.001	0.07
	F=505 p=0.0001							
UCVA Mean ± SD range	0.31±0.17 (0.05-0.63)	0.898±0.12 (0.8-1.25)	0.917±0.11 (0.8-1.25)	189.7	2.1	< .001	<0.001	0.46
	Freidman =90.1 p=0.0001							
Coefficient of variation Mean ± SD range	30±5.84 (23-42)	29.14±5.4 (23-40)	30.62±5.17 (23-39)	2.87	5.07	0.04	0.089	0.07
	F=3.9 p=0.037							

P1: preoperatively and one month postoperatively.
P2: preoperatively and two months postoperatively.
P3: one month preoperatively and two months postoperatively.
* Percent of change preoperatively and one month postoperatively.
** Percent of change one month preoperatively and two months postoperatively.

There was a statistically significant difference in central corneal thickness throughout study phases (p=0.00001). Central corneal thickness changed the mean± SD value from 520.32±53.7 preoperatively to a mean ±SD value of 471.52±53.73 at first month postoperatively. The difference was statistically significant (p<0.001) with a change of (9.38 %). Moreover, central corneal thickness mean± SD value was 465.92±53.8 at two months postoperatively with 1.19% decrease, compared to its value at one month postoperatively, the decrease was statistically significant (p<0.001).

There was a statistically insignificant difference hexagonally (%) throughout study phases (p=0. 29). There was a statistically insignificant difference in PRK ECD throughout study phases (p=0.068) **(Table 3)**.

Table (3): Comparison of central corneal thickness, hexagonally (%), and PRK ECD in pre-operative, One month, two month post-operative (n= 50)

Time / Parameters	Pre operative	One month post operative	Two-month post operative	*	**	P1	P2	P3
Central corneal thickness Mean ± SD range	520.32±53.7 (449-618)	471.52±53.73 (399-568)	465.92±53.8 (392-561)	9.38	1.19	<.001	<.001	<.001
	F=789 p=0.00001							
Hexagonally (%) Mean ± SD range	71.44±6.72 (58-81)	71.34 ±6.68 (58-82)	71.3±6.78 (58-81)	0.13	0.056	0.99	0.054	0.99
	F=1.2 p=0.29							
PRK ECD Mean ± SD range	2907.7±246.1 (2544-3456)	2906.44±247.33 (2542-3454)	2903.28±247 (2541-3454)	0.043	0.03	0.41	0.15	0.99
	F=3.26 p=0.068							

There was a statistically insignificant difference between right eyes and left eyes as regards vision refraction error, K-max, UCVA, coefficient of variation, central corneal thickness, hexagonally and PRK ECD in preoperatively, One month, two months postoperatively (p>0.05) **(Table 4)**.

Table (4): Comparison of right eyes and left eyes regard vision refraction error, K-max, UCVA, Coefficient of variation, Central corneal thickness, hexagonally and PRK ECD in preoperatively, One month, two month postoperatively (each side= 25)

Eyes / Parameters	Right eyes	Left eyes	p
	Mean ± SD	Mean ± SD	
Pre-operative ref error	3.89±0.74 (2.25-5)	4.13±0.76 (2.25-5)	0.26
One month post-operative ref error	0.33±0.21 (0-.75)	.28±0.17 (0-0.75)	0.36
Two months post-operative ref	0.26±0.17 (0-0.5)	.28±0.17 (0-0.5)	0.67
Pre-operative K max	43.16±1.7 (40-46)	43.56±1.42 (41-45)	0.37
One month post-operative K Max	36.12±1.17 (34-38)	35.96±1.17 (34-38)	0.63
Two months post-operative K Max	36.52±1.29 (34-39)	36.44±1.29 (34-38)	0.83
Pre-operative UCVA	0.3±0.17 (0.05-0.63)	0.314±0.165 (0.08-0.63)	0.78
One month post-operative UCVA	0.9±0.14 (0.8-1.25)	0.896±0.1 (0.8-1)	0.91
Two months post-operative UCVA	0.912±0.1 (0.8-1)	0.922±0.12 (.0.8-1.25)	0.75
Pre-operative coefficient of variation	30.28±6.42 (23-42)	29.72±5.3 (23-42)	0.74
One month post-operative Coefficient	29.32±5.83 (23-40)	28.96±5.08 (23-40)	0.82
Two months post-operative coefficient of variation	31.08±5.58 (23-40)	30.16±4.79 (23-39)	0.53
Pre-operative central corneal thickness	517.44±53.4 (449-618)	523.2±54.96 (449-618)	0.71
One month post-operative central corneal	469.84±53.36 (399-568)	473.2±54.96 399-568	0.83
Two months post-operative central corneal	465.64±53.36 (392-561)	466.2±54.96 (392-561)	0.97
Pre-operative hexagonality(%):	71.48±7 (59-81)	71.4±6.9 (58-81)	0.97
One month post-operative hexagonally	71.4±7.07 (59-82)	71.28±6.65 (58-80)	0.95
Two months post-operative hexagonality	70.56±6.8 (59-82)	71.36±6.77 (58-81)	0.68
Pre-operative PRK ECD	2913.44±240 (2559-3379)	2901.96±256.92 (2544-3456)	0.87
One month post-operative PRK ECD	2911.56±240 (2557-3377)	2901.32±259.2 (2542-3454)	0.89
Two months post-operative PRK ECD	2906.48±239.56 (2556-3376)	2900.1±256.13 (2541-3454)	0.93

t(t test of significant), u= Mann Whitnney u test, p>0.05 insignificant

DISCUSSION

In this study, 50 eyes of 25 patients undergoing photorefractive keratectomy (PRK) with MMC 0.02% application for 60 seconds were enrolled in this study. Specular microscopy was performed preoperatively and repeated one month and 2 months after surgery.

The demographic characteristics of patients showed females in 52% of patients and males in 48% of patients. Mean ± SD of age was 27.7± 4.9, ranging from 20 to 38 years.

Al-Samak et al. (2020) showed a statistically significant difference in error of refraction throughout study phases (preoperatively, one month postoperatively and two months postoperatively). There was a decrease in error of refraction one month postoperatively. The difference was statistically significant with improvement of 92.39%. Moreover, the improvement persisted at two months postoperatively with 11.48% improvement compared to its value at one month postoperatively. They showed a statistically significant difference in K-max throughout study phases. There was a decrease in K-max one month postoperatively. The difference was statistically significant with improvement of 16.88%. Moreover, the improvement persisted at two months postoperatively with 0.12% improvement compared to its value at one month postoperatively.

Nassar et al. (2019) showed a difference in UCVA which was statistically significant with improvement of 189.7%. Moreover, the improvement persisted at two months postoperatively with 2.1% improvement compared to its value at one month postoperatively, change was statistically insignificant.

They found that the coefficient of variation changed and the difference was statistically significant with change of 2.87%. Coefficient of variation two months postoperatively was with 5.07% change compared to its value at one month postoperatively, change was statistically insignificant. Also, there was a statistically insignificant difference of coefficient of variation preoperatively and two months postoperatively.

Al-Samak et al. (2020) stated no difference regarding central corneal thickness between both groups.

In our study, there was a statistically insignificant difference in PRK ECD throughout study phases. Some articles found that the application of mitomycin-C in photorefractive surgery with mitomycin C caused significant reduction in corneal endothelium density.

Morales et al. (2010) showed significant difference in the pre-operative endothelial cell count between the two groups. In the control group, at one month and three months, the difference in the endothelial cell count was not statistically significant. However, in the MMC group the endothelial cell loss was statistically significant.They concluded that the use of intraoperative topical MMC0.02% for 30 seconds after PRK may affect the endothelial cell count.

Nassiri et al. (2013), found that eyes treated with MMC and untreated eyes were comparable in post-operative visual acuity and refraction. The cell loss was marginally significant after 3 months and significant at 12 months. The cell loss

from 3 to 12 months was non-significant. The mean pre-operative percentage of hexagonal cells was 60% before surgery, decreasing to 52% three months post-operatively. However, after 12 months, the figure increased to 55%, and was no longer significantly different from the pre-operative value. Mean variation of cell size (CV) was 29.5% before surgery increased to 31.7% after 3 months, and 32.6 after 12 months. This variation was non-significant.

Zhao et al. (2013) showed no statistically significant changes in cell density, CV, or hexagonality. Multiple linear regression did not identify ablation depth or RSB thickness as being predictive of a change in CCD, CV, or HEX. No significant change in central endothelial cell density or morphology at least 6 months after a 15 second application of MMC 0.02%. Additionally, they did not observe any significant correlation between ablation depth and changes in endothelial cell density or morphology.

Zare et al. (2013), showed that the mean ECD reduced insignificantly from preoperatively to postoperatively. Similarly, there was no significant change in mean cell area (MCA) or coefficient of variation (CV) at six months. They concluded that application of MMC 0.02% for 40 seconds during PRK in patients with moderate myopia did not significantly affect central corneal endothelial cell density and morphology after the 6 months follow up period.

Shojaei et al. (2013), showed that post-operative haze grade was significantly lower in the MMC group. The mean endothelial cell density was not significantly different between the MMC group and the control group pre-operatively or 6 months post-operatively. No notable ocular complications occurred throughout the study and they concluded that the short time application of MMC was safe and effective in preventing haze formation in eyes having PRK with an ablation depth less than 65 micrometers compared to control group in duration up to 6 months.

Neamah et al. (2017) showed that application of MMC 0.02% for 50 seconds during photorefractive keratectomy in patients with myopia significantly reduced central corneal endothelial cell density after 3 months follow up period (reduction rate was 6.8%). Although mitomycin-C is important as adjunctive agent for ocular surgery and seems to be effective in prevention of corneal haze after PRK, its use endangers endothelial cell count.

Gharaee et al. (2018) found that MMC application for photorefractive keratectomy can affect the endothelial cells, but in early follow-ups, it does not affect the cell density or size, cell size was changed but it was obvious not in mean cell size, but in SD and CV, and MMC time below the 30s was not significant on endothelial cell changes.

Nassar et al. (2019) concluded that there is no significant effect on endothelium in patients undergoing PRK in low to moderate myopia with or without mitomycin-C.

In our study, there was a statistically insignificant difference between right eyes and left eyes regarding vision refraction error, K-max, UCVA, Coefficient of variation, central corneal thickness,

hexagonally and PRK ECD in preoperatively, one month and two months postoperatively.

Al-Samak et al. (2020) found that for patients with mitomycin-C, 3 months after the procedure, the mean ECD was reduced by 6.4% for the left eye.

In the prime operation, the application time of mitomycin-c were twelve seconds to two minutes. Due to the interest about mitomycin-C benignity, a chain of alterations on the application of mitomycin-c have been proposed which conducted to reduce the application time of mitomycin-c with the target of haziness inhibition and least toxic effects.

Application of mitomycin-C 0.02% for 12 seconds with PRK had no significant effect on endothelial cell density or qualitative morphometric parameters. If the concentration is high, mitomycin-c can be toxic to cornea *(Thornton et al., 2011)*.

This study had some limitations, the enrolled patients were racially homogenous population of adult patients, thus further population is needed. Furthermore, more patients should be enrolled with different age group in future studies.

CONCLUSION

No significant difference in corneal endothelial cell changes before and after one month and 2 months of PRK surgery with using of MMC.

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تقييم التغيرات قصيرة الأجل في عدد الخلايا الطلائية الداخلية المبطنة للقرنية بإستخدام المجهر البراق بعد النحت الضوئى السطحى للقرنية باستخدام عقار مايتومايسين ج ٠.٠٢٪ فى مريض قصر النظر المعتدل

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خلفية البحث: النحت الضوئى السطحى للقرنية هو نوع من جراحة الليزر لعلاج مشاكل الرؤية الناتجة عن الأخطاء الانكسارية. وعقار مايتومايسين ج ٠.٠٢٪ هو عامل مضاد للأورومة الليفية معزول عن ثقافات Streptomyces caespitosus، وقد إستخدم في جراحات العيون مثل إستئصال الظفرة وإستئصال الترابيق لفترة طويلة. وقد أصبح إستخدام مايتومايسين ج ٠.٠٢٪ في جراحات إنكسار القرنية واسع الانتشار بعد الكشف عن حقيقة أن هذا العامل يمكن أن يقلل بشكل فعال من تكوين الضباب بعد الجراحة، وبالتالي تحسين القدرة على التنبوء بالنتائج البصرية بعد الجراحة الانكسارية.

الهدف من البحث: مقارنة الاختلافات في عدد الخلايا البطانية قبل وبعد النحت الضوئى السطحى للقرنية لعيون قصيرة النظر مع مايتومايسين ج ٠.٠٢٪ مطبق بإسفنجة سليلوز مبللة أثناء العملية فوق سدى القرنية المنفصل المركزي. لمدة 60 ثانية.

المرضى وطرق البحث: تناولت هذة الدراسة 50 عيناً من 25 مريضًا بالعيادة الخارجية لقسم طب وجراحة العيون في مستشفى الفتح للعيون من يوليو 2020 إلى يناير 2020، وخضعوا لعملية استئصال القرنية الانكسار الضوئي النحت الضوئى السطحى للقرنية مع تطبيق مايتومايسين ج ٠.٠٢٪ لمدة 60 ثانية. وقد تم إجراء الفحص المجهري قبل الجراحة وتكرر بعد شهر تم شهرين بعد الجراحة.

نتائج البحث: كان هناك فرقاً معتداً به إحصائياً في خطأ الانكسار خلال مراحل الدراسة (قبل الجراحة، وشهر وشهرين بعد الجراحة). وكان هناك انخفاضاً في خطأ الانكسار بعد شهر من العملية، كما كان الفرق ذو دلالة إحصائية، مع تحسن بنسبة 92.39٪. علاوة على ذلك، إستمر التحسن لمدة شهرين بعد الجراحة مع تحسن بنسبة 11.48٪ مقارنة بقيمته في شهر واحد بعد الجراحة. وكان هناك فرقاً غير ذي دلالة إحصائية بين العين اليمنى والعين اليسرى فيما يتعلق بخطأ إنكسار الرؤية، والقراءة القصوى K، وحدة البصر غير المصححة، ومعامل الاختلاف، وسماكة القرنية المركزية، و النحت الضوئى السطحى للقرنية قبل الجراحة، تم بعد شهر واحد وشهرين من الجراحة.

الاستنتاج: لم يحدث نجد فرقًا كبيرًا في تغيرات الخلايا البطانية للقرنية قبل وبعد شهر واحد وشهرين من جراحة النحت الضوئى السطحى للقرنية بإستخدام مايتومايسين ج ٠.٠٢٪.

الكلمات الدالة: الخلية البطانية للقرنية، المجهر المرآوي، النحت الضوئى السطحى للقرنية، ميتوميسين0.02٪، قصر النظر المعتدل.