بسم الله الرحمن الرحيم

﴿قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا ۖ إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ﴾

Assessment of corneal endothelial cells changes caused by Mitomycin-C application during pterygium surgery.

Presented by

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Introduction

Pterygium

Pterygium is a fibrovascular tissue encroachment of bulbar conjunctiva onto the cornea

With a high prevalence ranging 1 up to 15% depending to geographic location of population in relation to equatorial regions, pterygium possesses a significant burden among different ocular disorders .

Whether excised for visual affection, recurrent inflammation, limiting ocular motility or just for cosmesis, the most frequent and annoying problem emerging after pterygium removal is a high recurrence rate.

Introduction (cont.)

Pterygium excision

Without implementing adjuvant methods, treatments or techniques to minimize recurrence chances (i.e simple pterygium excision), recurrence rates can hit up to 89%.

Different modalities can be implemented to reduce recurrence rates of pterygium , including conjunctival flaps, conjunctival autografts, amniotic membrane graft, intraoperative ß-irradiation, intraoperative or postoperative topical Mitomyci-C applicaton

Introduction (cont.)

Mitomycin-C

Mitomycin-c is an anti-neoplastic drug with potent anti-proliferative and cytotoxic effects on cells by cross-linking their DNA, it's used primarily in management of some visceral malignancies such as stomach and pancreatic cancers.

Ophthalmic uses of Mitomycin-c include augmented trabeculectomy, photorefractive keratectomy, carcinoma in situ of conjunctiva and cornea, and adjunctive method to decrease pterygium recurrence.

Introduction (cont.)

Mitomycin-C and corneal endothelium

In many of the above-mentioned uses, studies demonstrated a deleterious effect of Mitomycin-C onto corneal endothelium, not only following open globe procedures as augmented trabeculectomy, but also following photorefractive keratectomy procedures.

Corneal endothelium has a cornerstone role in maintenance of corneal transparency by achieving a dynamic state of relative stromal dehydration (i.e: deturgescence) .

Current evidence on the effect of intraoperative Mitomycin-C application during pterygium excision surgery onto corneal endothelium is somewhat contradictory.

Aim of the work

To identify and quantify a possible harmful effect of Mitomycin-C on corneal endothelium and subsequently having better decision-making ability concerning safety of this modality of decreasing recurrence rates of pterygium.

Patients and methods

Type of the study

The study was carried out as prospective comparative study.

Study site

The patients were recruited from the Ophthalmology outpatient clinic in Suez Canal University hospital, Ismailia city, Egypt.

Study population

Patients indicated for pterygium excision surgery were enrolled as follows:--

Patients and methods (cont.)

Inclusion criteria

- ✓ Patients of any gender aged within twenty to seventy years old.
- ✓ Pterygium is essentially primary.
- ✓ Pterygium encroachment onto more than 3 mm of cornea from the limbus, through which episcleral vessels were still visible (atrophic to intermediate primary pterygium according to tan's classification.

Patients and methods (cont.)

Exclusion criteria

- X Patients having corneal endothelial dystrophy.
- X Ongoing ocular pathology negatively affecting corneal endothelial count as glaucoma, uveitis, keratitis.
- X Pseudophakic patients
- X Contact lens wearers.
- X Patients with prior ocular chemical injury.
- X Patients underwent keratoplasty.
- X Patients underwent intravitreal injection intervention.
- X Any patient known to have connective tissue disorders.
- X Pregnancy and diabetes mellitus

Patients and methods (cont.)

Sample size

46 patients were recruited for the study

Study groups

Enrolled Patients were randomly assorted into two groups:

a-Group A (23 patients) was the trial arm in which intraoperative Mitomycin-C application was integrated as a part of the pterygium excision surgery.

b-Group B (23 patients) was the control arm in which the participants underwent standard pterygium excision surgery without adjunctive intervention.

Patients and methods (cont.)

Methods

- ✓ A predesigned check list was used for data collection in conjunction with a designed database computerized program for data entry and analysis.
- ✓ The check list contains full history taking and clinical examination.

Preoperatively

All patients were subjected to a comprehensive preoperative examination which included:

- Complete medical history with emphasis on past history regarding ocular pathologies, surgeries, chemical injuries, contact lens wearing
- Slit-lamp biomicroscopy examination
- Applanation tonometry
- Baseline preoperative corneal endothelial cell density (ECD), standard deviation of cell area (SD), coefficient of variation (CV), percentage of cellular hexagonality (Hex %) as well as central corneal thickness (CCT) were all measured using automated non contact specular microscope NIDEK® CEM-530 device with integrated optical pachymetry (Nidek, Hiroishi, Japan).

Patients and methods (cont.)

Surgical procedure in group A

- ✓ Pterygium excision procedure with intraoperative topical application of a surgical microsponge moistened with 0.02% Mitomycin-C solution onto the bare scleral area for three mintues.

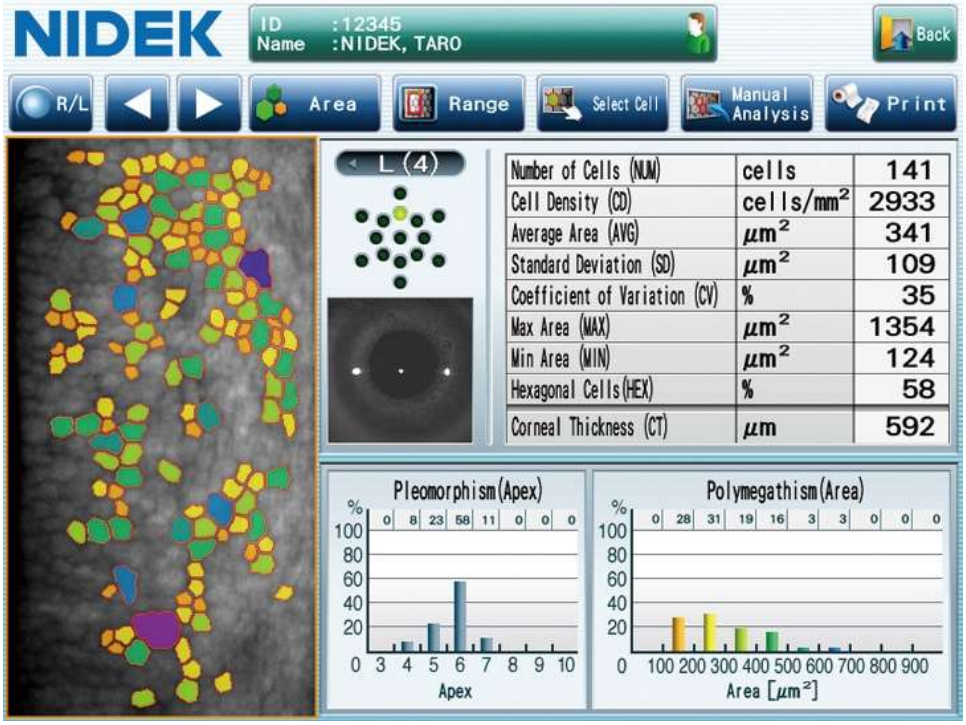
Surgical procedure in group B

- ✓ Standared pterygium excision surgery without adjunctive technique.

Patients and methods (cont.)

Postoperatively

- ✓ The same postoperative treatment was prescribed to the patients in both groups.
- ✓ Same preoperative clinical examinations were performed again at day one , one week, one month and three months postoperatively including slit lamp examination and tonometry.
- ✓ The average of three postoperative measurements of ECD, SD, CV, Hex, CCT at each follow up visit starting from one week, to one month and three months postoeratively was calculated.
- ✓ Preoperative as well as postoperative data were all gathered and fed into the analysis software.



Results

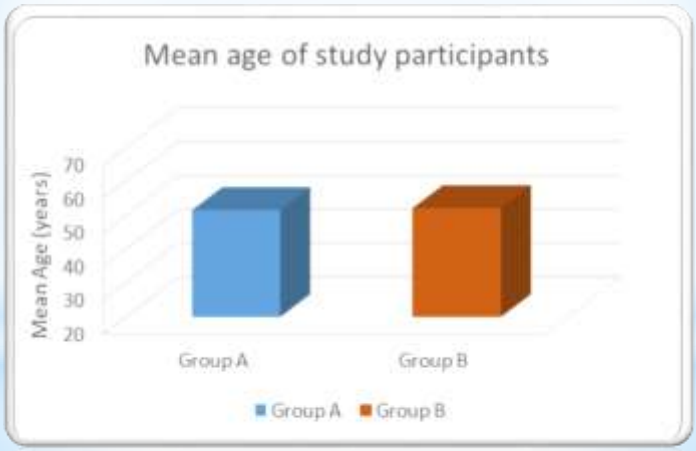
Distribution of age, sex and side of the eye among the studied patients.

Parameter \ Group		Group A	Group B	p-value
Age:	Mean ± SD	51.50 ± 7.98 years.	52.10 ± 8.35 years.	0.7602*
	Median (range)	56 (37 - 65) years.	55 (41 - 63) years.	
Gender: Males (%)		50%	45.45%	0.7627**
Side (Right eye %)		45.5%	59%	0.3652**

* Student's *t*-test.
**Chi-square test.

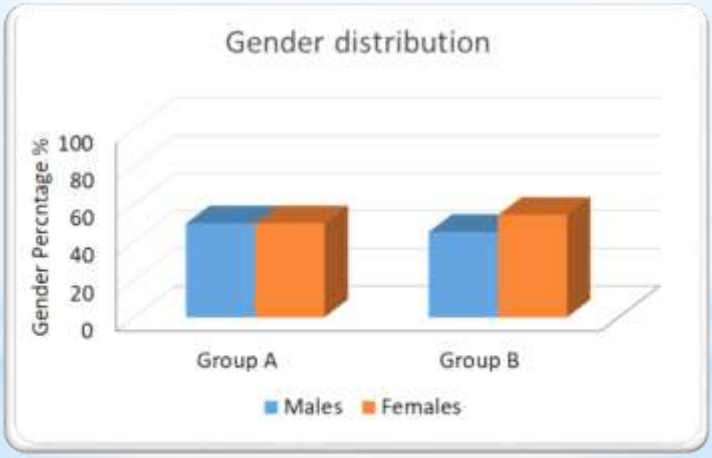
Results (cont.)

Distribution of age, sex and side of the eye among the studied patients (Cont.)



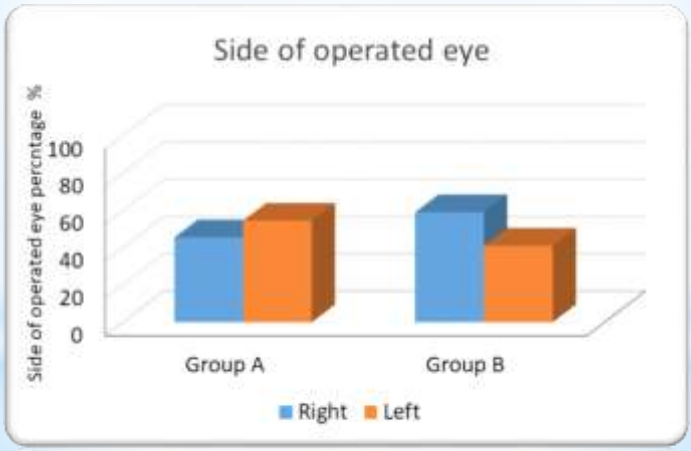
Results (cont.)

Distribution of age, sex and side of the eye among the studied patients (Cont.)



Results (cont.)

Distribution of age, sex and side of the eye among the studied patients (Cont.)



Results (cont.)

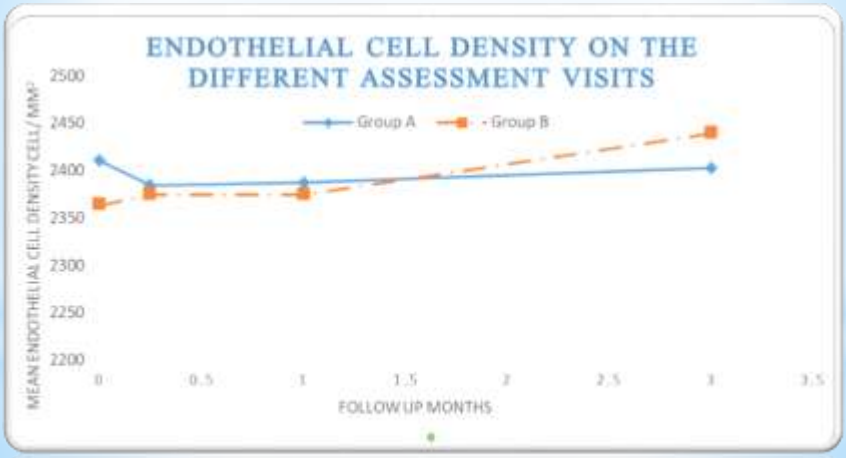
Comparison between the two study groups regarding endothelial cell density

Endothelial cell density (cell/mm²)	Group A (n= 20)	Group B (n= 20)	t*	p
Preoperative mean ± SD.	2411.45 ± 226.91	2364.06 ± 219.55	0.704	0.485
Postoperative one week mean ± SD.	2384.98 ± 207.75	2375.20 ± 214.18	0.154	0.878
Postoperative one month mean ± SD.	2388.11 ± 222.45	2374.85 ± 229.50	0.195	0.847
Postoperative three months mean ± SD.	2402.58 ± 219.24	2439.83 ± 374.04	0.403	0.689
F**	3.096	1.116		
p	0.06	0.349		

*t: student t test with p value significant if < 0.05
** F: F test (ANOVA) with repeated measures, p value significant if < 0.05

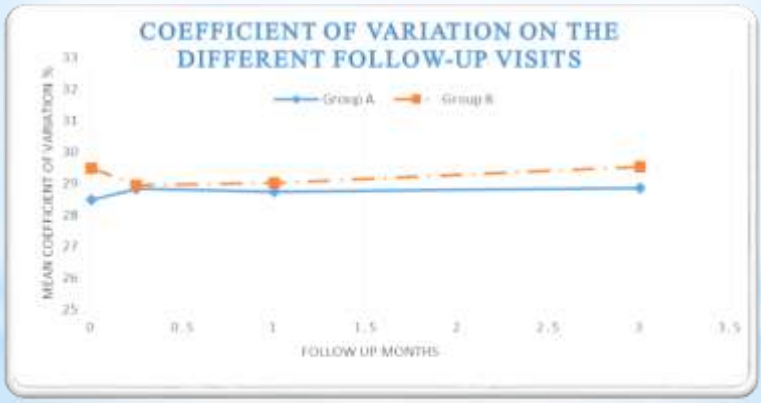
Results (cont.)

Comparison between the two study groups regarding endothelial cell density



Results (cont.)

Comparison between the two study groups regarding standard of deviation of cell area.

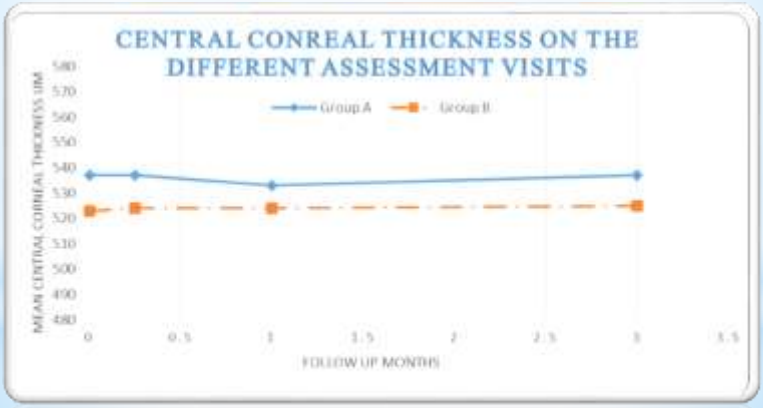


Results (cont.)

Comparison between the two study groups regarding percentage of cellular hexagonality.

Results (cont.)

Comparison between the two study groups regarding central corneal thickness.



Results (cont.)

No statistically-significant difference was found between the preoperative ECD, CV, SD, Hex, and CCT values between both groups.

The follow up visits of the patients in each group haven't demonstrated a change of statistical significance in the above-mentioned corneal endothelial cell parameters .

Summary and conclusion

Pterygium surgery per se has no deleterious effect onto corneal endothelium.

Pterygium excision surgery with intraoperative topical application of 0.02% Mitomycin-C solution for three minutes was proved to be safe concerning its effect onto corneal endothelium provided that meticulous care not to expose the cornea to such solution was achieved.

Novelty of the work?

Take-home messages

Mitomycin-C and corneal endothelium

Implementing a meticulous care about concentration, duration, location of application of Mitomycin-C and moistening not soaking the surgical microsponges is mandatory in order to avoid unnecessary, prolonged application or exposing the epithelium-denuded cornea to Mitomycin-C with the resulting hazard of intraocular penetration of such cytotoxic agent.

Avisar et al, 2008 24.26%

Bahar et al, 2009 ..6%

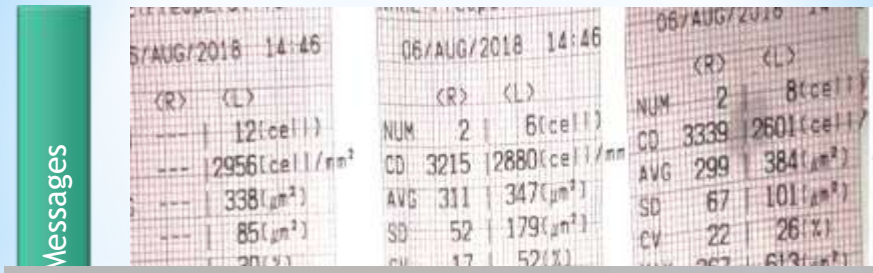
Pérez-Rico et al, 2009 0.0%

0.0%

Young, 2013...0.0%

Take-home messages (Cont.)

Messages



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