

Terapia pre- e post-operatoria innovativa nella moderna chirurgia della cataratta

Oliverio Giovanni

Università di Messina



Management of patients undergoing cataract surgery



- **Management** of patients undergoing cataract surgery is **not uniform** in Italy
- **Pre-operative** treatments
- Timing and duration of **antibiotics**
- **Anti-inflammatory** therapy



Original research article

Expert consensus on the management of patients undergoing cataract surgery: A Delphi study

Vincenzo Orfeo¹, Pasquale Aragona² , Giovanni Alessio³, Lorenzo Drago⁴, Leonardo Mastropasqua⁵, Scipione Rossi⁶, Paolo Vinciguerra⁷ , Giorgio Ciprandi⁸  and Daniele Tognetto⁹

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Management of patients undergoing cataract surgery



Two main issues:

- Prevent ocular infection
- Post-surgical inflammation

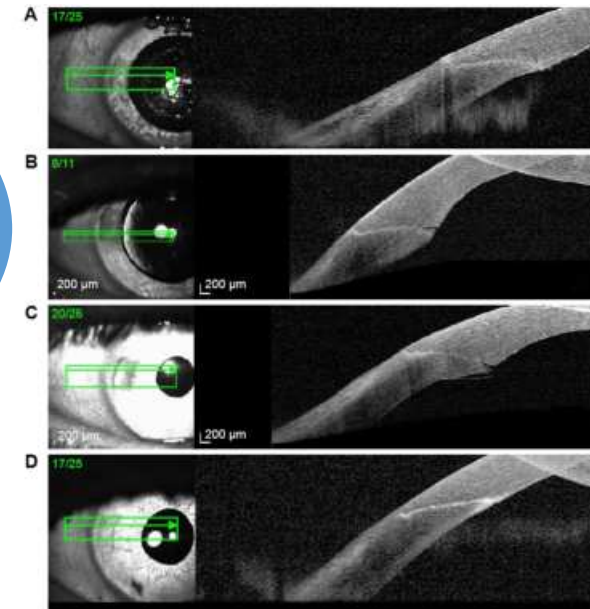
POST-OPERATORIO

- Antibiotici
- Steroidi
- FANS
- Sostituti lacrimali



PRE-OPERATORIO

- Antisettici
- Sostituti lacrimali
- FANS



Pre-operative antibiotics



Prospective Randomized Comparison of 1-Day and 3-Day Application of Topical 0.5% Moxifloxacin in Eliminating Preoperative Conjunctival Bacteria

Lingmin He,¹ Christopher N. Ta,¹ Nan Hu,¹ Shamim Sinnar,¹ and Herminia Miño de Kaspar^{1,2}

Abstract

Purpose: Compare the efficacy of a 1-day versus 3-day application of topical 0.5% moxifloxacin in reducing preoperative conjunctival bacteria.

Methods: Following IRB approval, patients ($n = 144$) scheduled for ocular surgery between 2004 and 2005 were recruited and randomized to receive topical 0.5% moxifloxacin drops four times a day for either 1 day ($n = 63$) or 3 days ($n = 57$) prior to surgery. Conjunctival cultures were obtained at baseline (T0), after application of antibiotic (T1), following povidone-iodine and additional antibiotic applications immediately before surgery (T2), and after surgery (T3). Cultures were inoculated onto blood and chocolate agar plates and in thioglycolate broth, and then incubated at 37°C for 10 days. Bacterial growth were isolated, identified, quantified, and compared.

Results: There were similar ($P = 0.8435$) rates of patients with positive thioglycolate cultures between the 1-day (79.37%) and 3-day groups (82.46%) at T0. At T1, T2, and T3, the number of eyes with positive cultures were again similar (1 day, 3 days, P value [T1: 34.9%, 35.1%, $P = 0.8631$; T2: 14.3%, 7%, $P = 0.3245$; T3: 79%, 3.5%, $P = 0.5199$). No significant differences were found between the colony-forming units (CFU) of bacteria on solid agar media in 1-day and 3-day groups at any of the time points studied (P values: 0.1–0.8). Coagulase-negative *Staphylococcus* was the most commonly isolated (73.3% at baseline).

Conclusions: In patients undergoing intraocular anterior segment surgery, 1-day and 3-day applications of topical 0.5% moxifloxacin appear to have similar efficacy in reducing perioperative conjunctival bacteria.

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ORIGINAL ARTICLE

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Conclusions: In patients undergoing intraocular anterior segment surgery, 1-day and 3-day applications of topical 0.5% moxifloxacin appear to have similar efficacy in reducing perioperative conjunctival bacteria.

Introduction

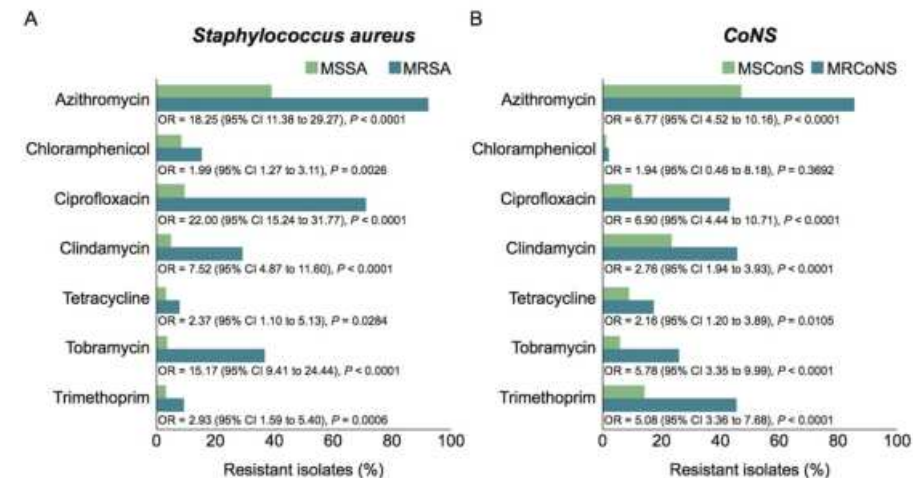
PERIOPERATIVE ENDOPHTHALMITIS IS ONE OF THE MOST serious potential complications of cataract surgery, possibly leading to serious vision loss. Fortunately this occurs relatively rarely, with studies citing a range of 0.08%–0.06% as the prevalence.^{1–4} The bacteria causing infection has been shown to be mostly derived from the flora of the conjunctiva, eyelid, or nose.^{5,7} Additionally, studies have found that a threshold colony count of inoculated bacteria is necessary to overcome host defenses and develop into a fulminant case of endophthalmitis.^{8,9} These observations suggest that reducing the bacterial load on the ocular surface of patients may reduce their risk of developing endophthalmitis.

It has been difficult for studies to prospectively show the efficacy of prophylactic regimens in preventing endophthalmitis because of its low incidence. However, it remains a very important area of investigation because of the severe

consequences of infection. Povidone-iodine is the only agent that has been proven efficacious at reducing the risk of endophthalmitis, likely via reducing the number of bacterial colonies.⁶ Prospective studies have also shown that topical antibiotics and concomitant use of povidone-iodine are able to significantly reduce conjunctival bacterial load, but none have had the power to show their effect on the prevalence of endophthalmitis.⁶ Despite this fact, ~95% of ophthalmologists reported giving topical antibiotics in the perioperative period.^{10,11}

A previous study by Ta et al. demonstrated that a 3-day application of ofloxacin and povidone-iodine is more effective in eliminating conjunctival bacterial flora than a 1-b regimen.¹² However, a 1-day application of the levofloxacin, the L-isomer of ofloxacin, was recently shown to be as effective as a 3-day application in reducing bacterial load.¹³ The purpose of this study was to prospectively compare the

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Resistance to 3 or more antibiotic classes (multi-drug resistance, MDR) in:

- 30.2% of *S. aureus*,
- 39% of CoNS
- >70% of methicillin-resistant *S. aureus* (MRSA) and MR-CoNS

- Evidences?
- Antibiotic resistance!

The ARMOUR (Antibiotic Resistance Monitoring in Ocular Microorganisms) Surveillance Study



Antiseptics

A group of drugs that are able to inhibit the growth, development or lead to death of microorganisms.

Bacteriocidal or bacteriostatic effect depending on the concentration

- Must have a broad spectrum of action
- Rapid onset of action
- Small latency period
- High activity
- Chemically resistant
- High availability and low cost
- Lack of local irritant or allergic effects
- Minimal absorption
- Low toxicity



ADVANTAGES

Absence of reported cases of resistance

Multiple mechanisms of action

Bacteria, Virus, Biofilm

Topical antimicrobials and antiseptics are commonly used perioperatively for the prophylaxis of endophthalmitis post-cataract surgery

Topical **anti-inflammatory** drugs and topical **antibiotics** are the pillars for the treatment of inflammation and for the prevention of infections, respectively. It is advisable to add a treatment of the ocular surface with **preservative-free tear substitutes**, to reduce the stress induced by the surgical procedure and the topical therapy.

86.7% 4.3 (0.7)



In cataract surgery, **topical antibiotics should be employed until the wound closure has occurred**, that can be considered complete after 7 days. To prolong the topical antibiotic beyond wound recovery has no convincing justification, as well as antibiotic tapering is senseless; these practices, leading to the use of doses < MIC, can promote **bacterial resistance development**.

93.3% 4.8 (0.6)

Treatment with corticosteroids capable of penetrating the anterior chamber for > 2 weeks should be avoided, if not needed or in the absence of tonometry, as adverse events (including increase intra-ocular pressure) are age-, dose and time-dependent and may occur even earlier.

86.7% 4.3 (0.9)





The efficacy of a netilmicin 0.3% and dexamethasone 0.1% gel combination

Netilmicin: broad spectrum
of action

Dexamethasone

MRSA e MRSE

Low rate of resistance

✓ Safety on the ocular surface

Table 1 Relative potencies of main corticosteroids (modified from [1])

Corticosteroid	Anti-inflammatory potency	Na ⁺ retaining potency
Cortisol	1	1
Cortisone	0.8	0.8
Fludrocortisone	10	125
Prednisone	4	0.8
Prednisolone	4	0.8
6a-methylprednisolone	5	0.5
Triamcinolone	5	0
Betamethasone	25	0
Dexamethasone	25	0

The numbers in the Table indicate corticosteroid anti-inflammatory and Na⁺ retaining potency relative to cortisol (by convention, cortisol = 1), and have been calculated by the Author on the basis of currently available literature data



Twice
daily

The efficacy of a netilmicin 0.3% and dexamethasone 0.1% gel combination

Adv Ther (2022) 39:5474–5486
<https://doi.org/10.1007/s12325-022-02295-y>

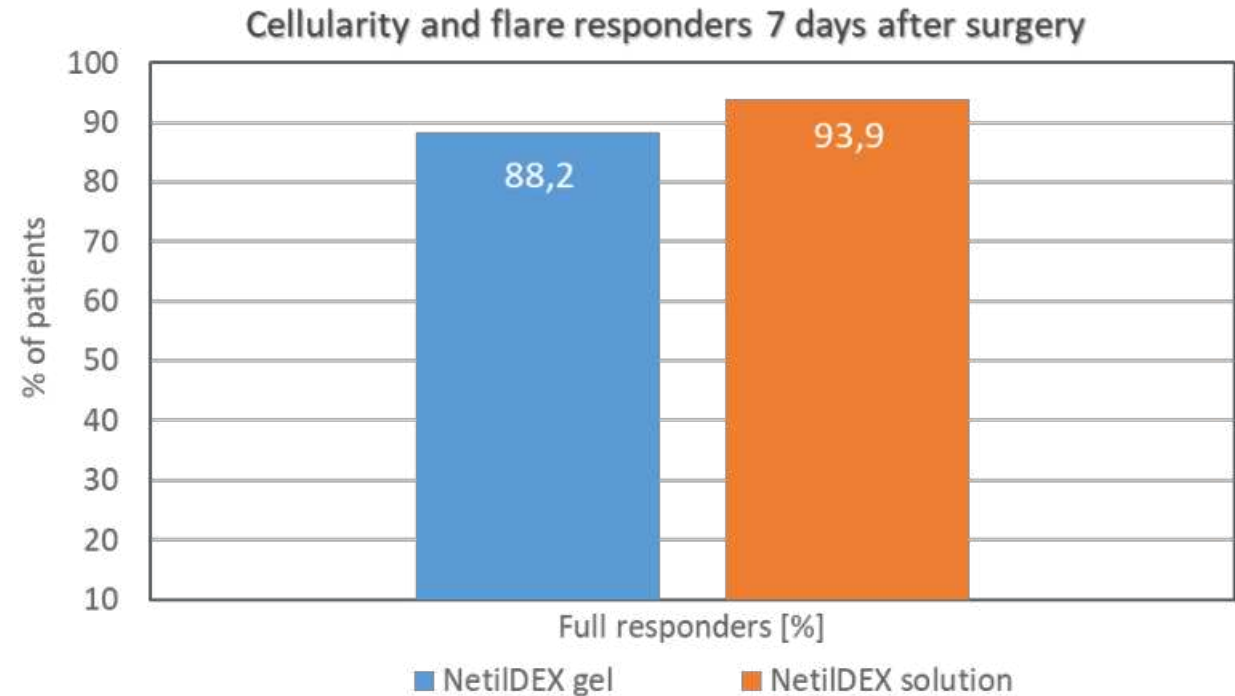


ORIGINAL RESEARCH

Reduced Posology of an Ophthalmic Hydrogel Containing Dexamethasone/Netilmicin to Prevent and Treat Ocular Inflammation After Cataract Surgery: Efficacy and Tolerability

Rita Mencucci · Thomas Ach · Anja Liekfeld · Antonio Scialdone ·
Claudine Civiale · Maria Grazia Mazzone · Aldo Caporossi

Received: June 14, 2022 / Accepted: August 3, 2022 / Published online: October 7, 2022
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Efficacy of the gel reduced posology (twice a day) is not inferior to four times a day eye drops. Both treatments were well tolerated and efficacious. The new reduced posology hydrogel formulation may improve patient compliance and quality of life.

The role of corticosteroids

“ **A brief course of topical corticosteroids** may be helpful for eyelid or ocular surface inflammation such as severe conjunctival infection, marginal keratitis, or phlyctenules.

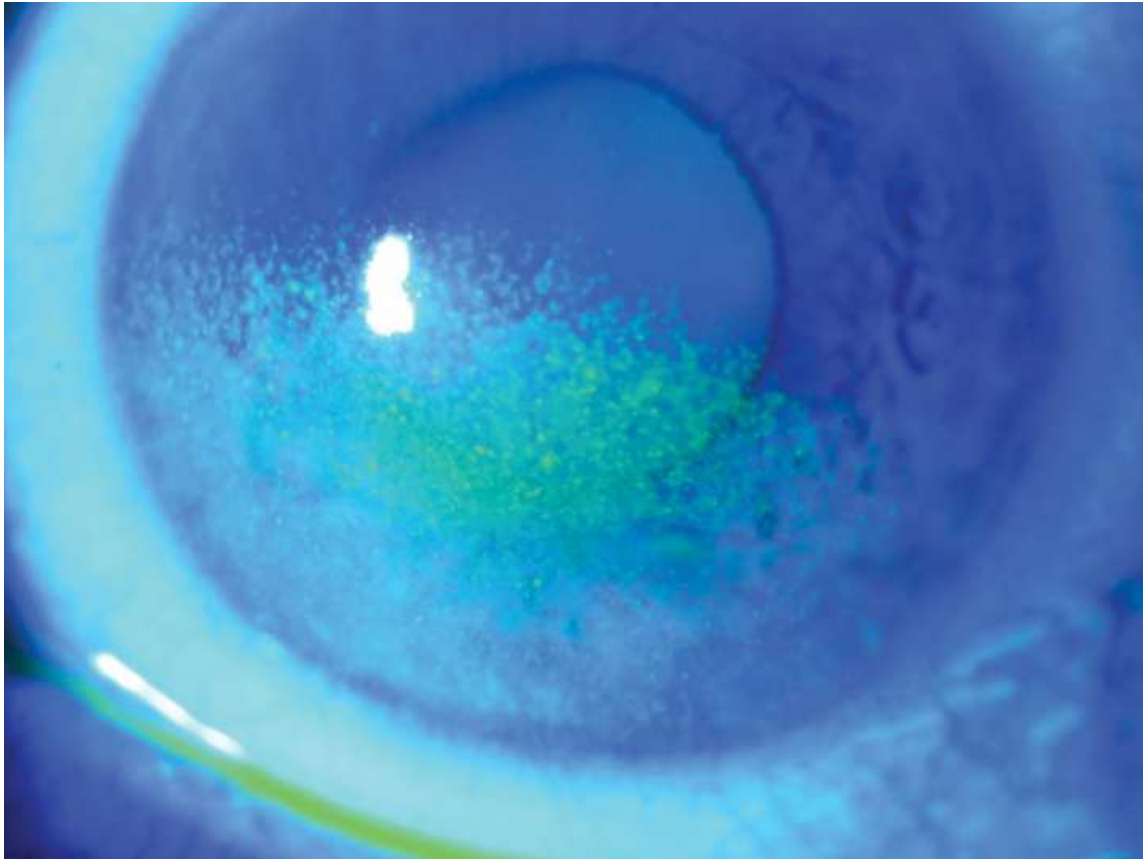
Corticosteroid eye drops or ointments are typically applied several times daily to the eyelids or ocular surface. Once the inflammation is controlled, the corticosteroid can be tapered and discontinued and then used intermittently to maintain patient comfort.”

Treatment with corticosteroids capable of penetrating the anterior chamber for > 2 weeks should be avoided, if not needed or in the absence of tonometry, as adverse events (including increase intra-ocular pressure) are age-, dose and time-dependent and may occur even earlier.

86.7% 4.3 (0.9)



Post-surgical inflammation



DED vs STODS/SCODS



Review

Solving STODS—Surgical Temporary Ocular Discomfort Syndrome

Matthew T. Hirabayashi ¹ and Brad P. Barnett ^{2,*}

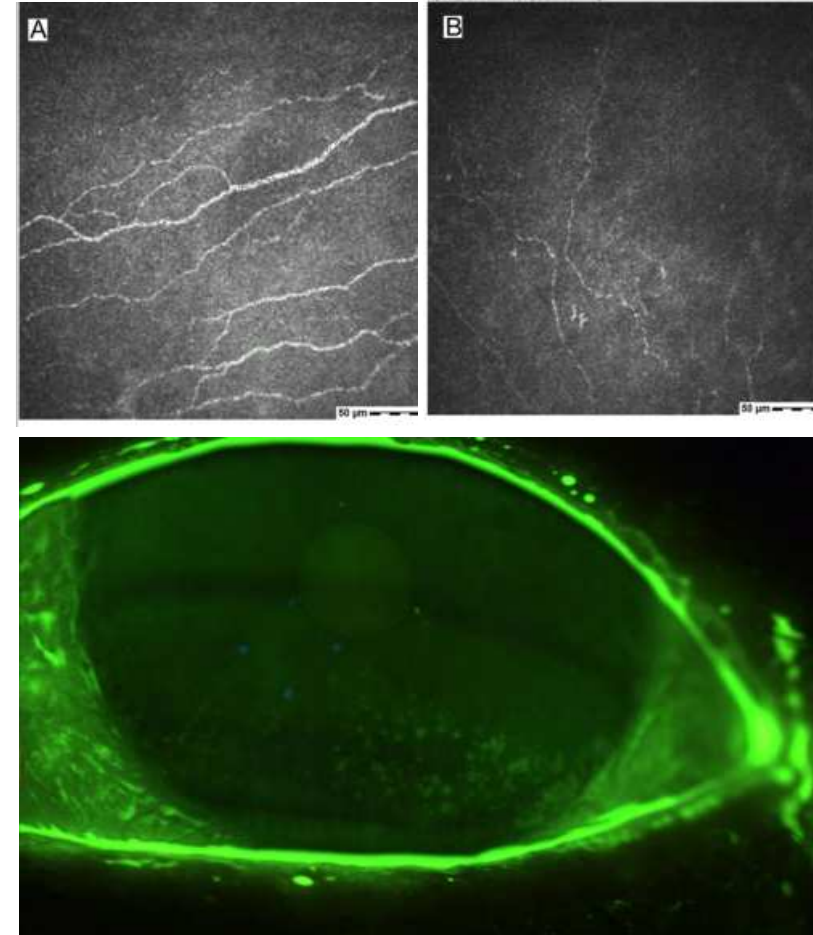
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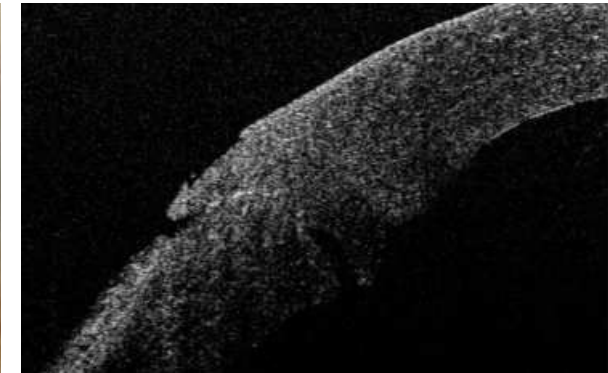
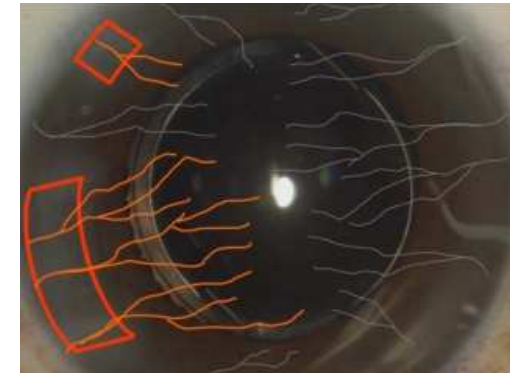
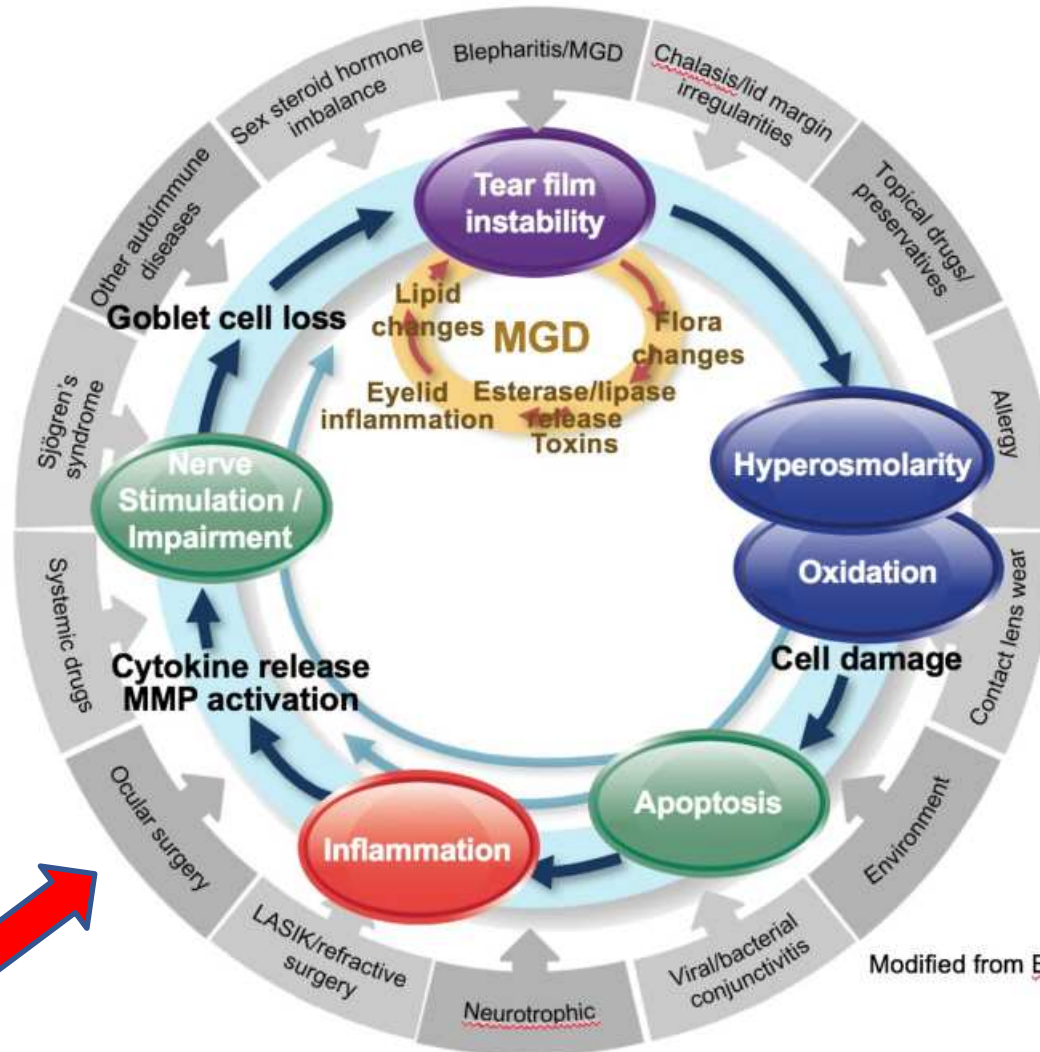
* Correspondence: brad@getoutofglasses.com

Abstract: The term STODS (Surgical Temporary Ocular Discomfort Syndrome) has been coined to describe the ocular surface perturbations induced by surgery. As one of the most important refractive elements of the eye, Guided Ocular Surface and Lid Disease (GOLD) optimization is fundamental to success in achieving refractive outcomes and mitigating STODS. Effective GOLD optimization and the prevention/treatment of STODS requires an understanding of the molecular, cellular, and anatomic factors that influence ocular surface microenvironment and the associated perturbations induced by surgical intervention. By reviewing the current understanding of STODS etiologies, we will attempt to outline a rationale for a tailored GOLD optimization depending on the ocular surgical insult. With a bench-to-bedside approach, we will highlight clinical examples of effective GOLD perioperative optimization that can mitigate STODS' deleterious effect on preoperative imaging and postoperative healing.

Keywords: LASIK; Keratopathy; dry eye; STODS; LALEX; SMILE

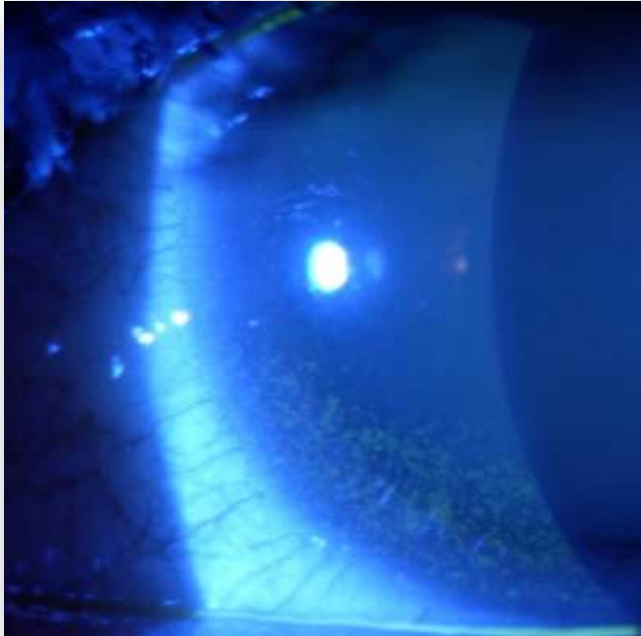


Dry eye disease and cataract surgery

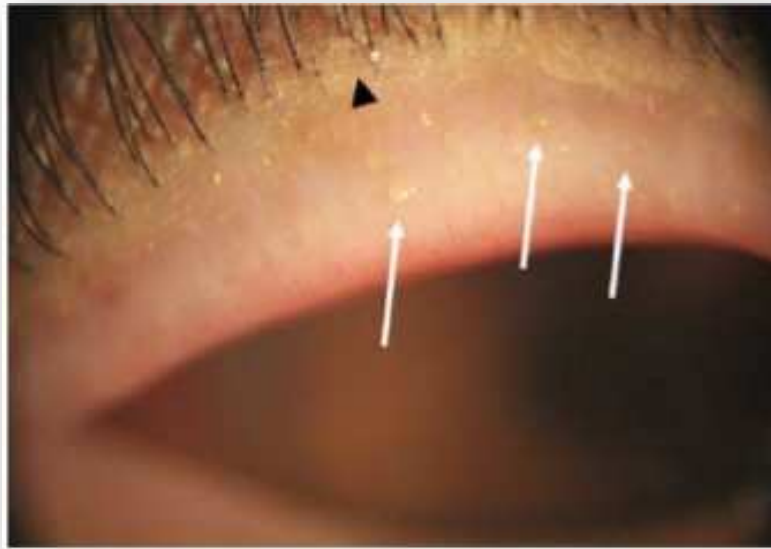


Modified from Baudouin C, Aragona P et al. Ocul Surf 2013.

Dry eye disease and cataract surgery

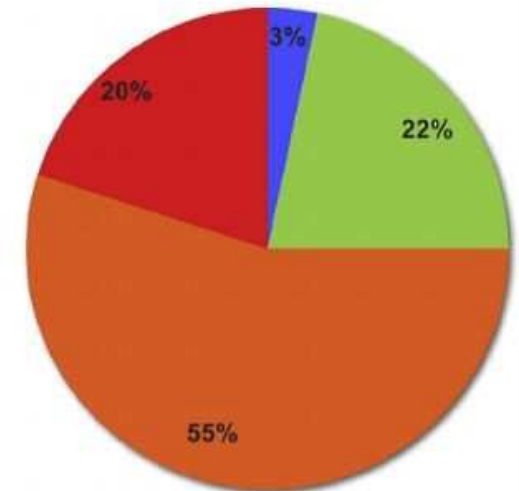


- - 50% Epithelial changes
- - 63% Tear film instability

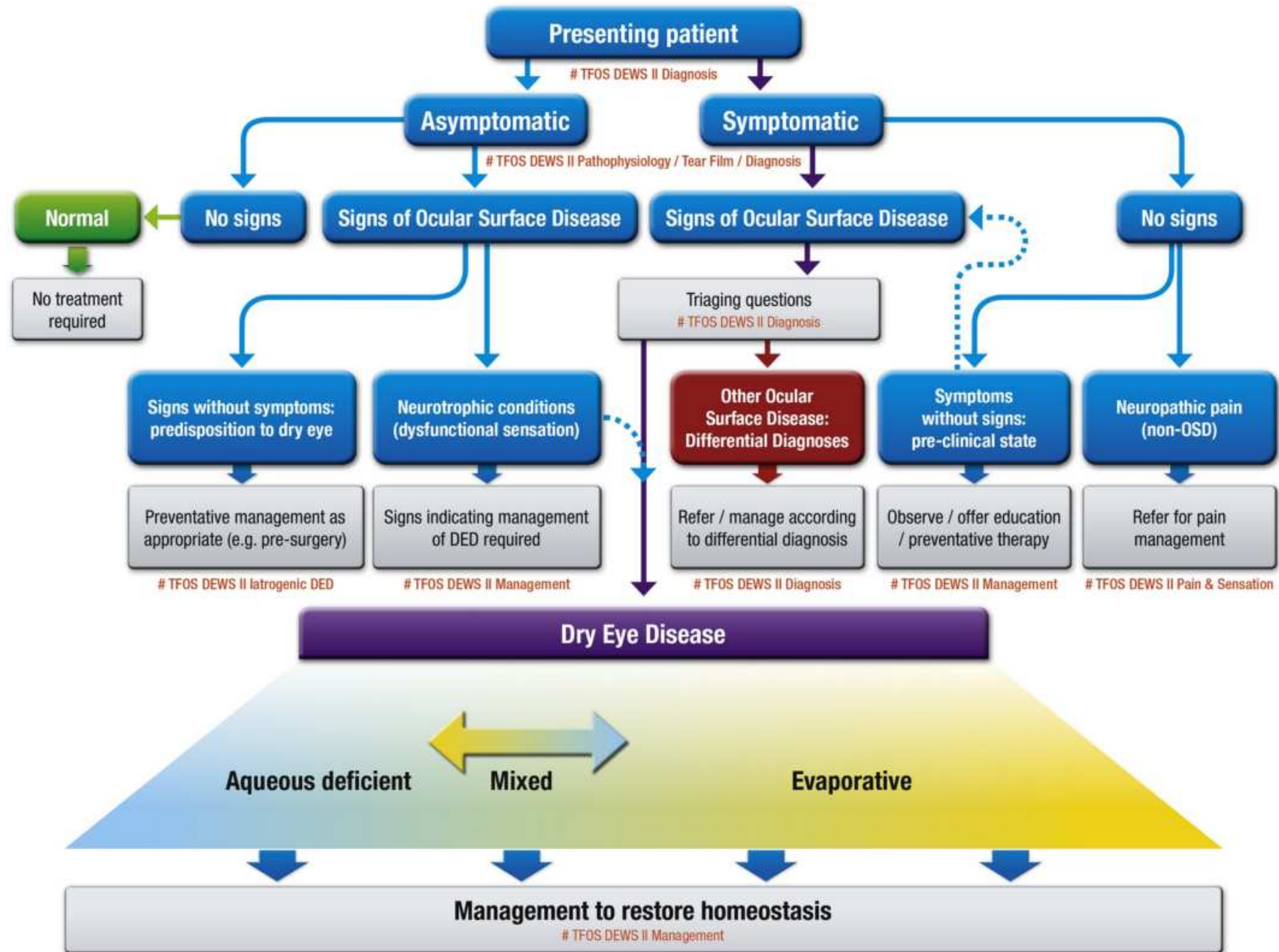


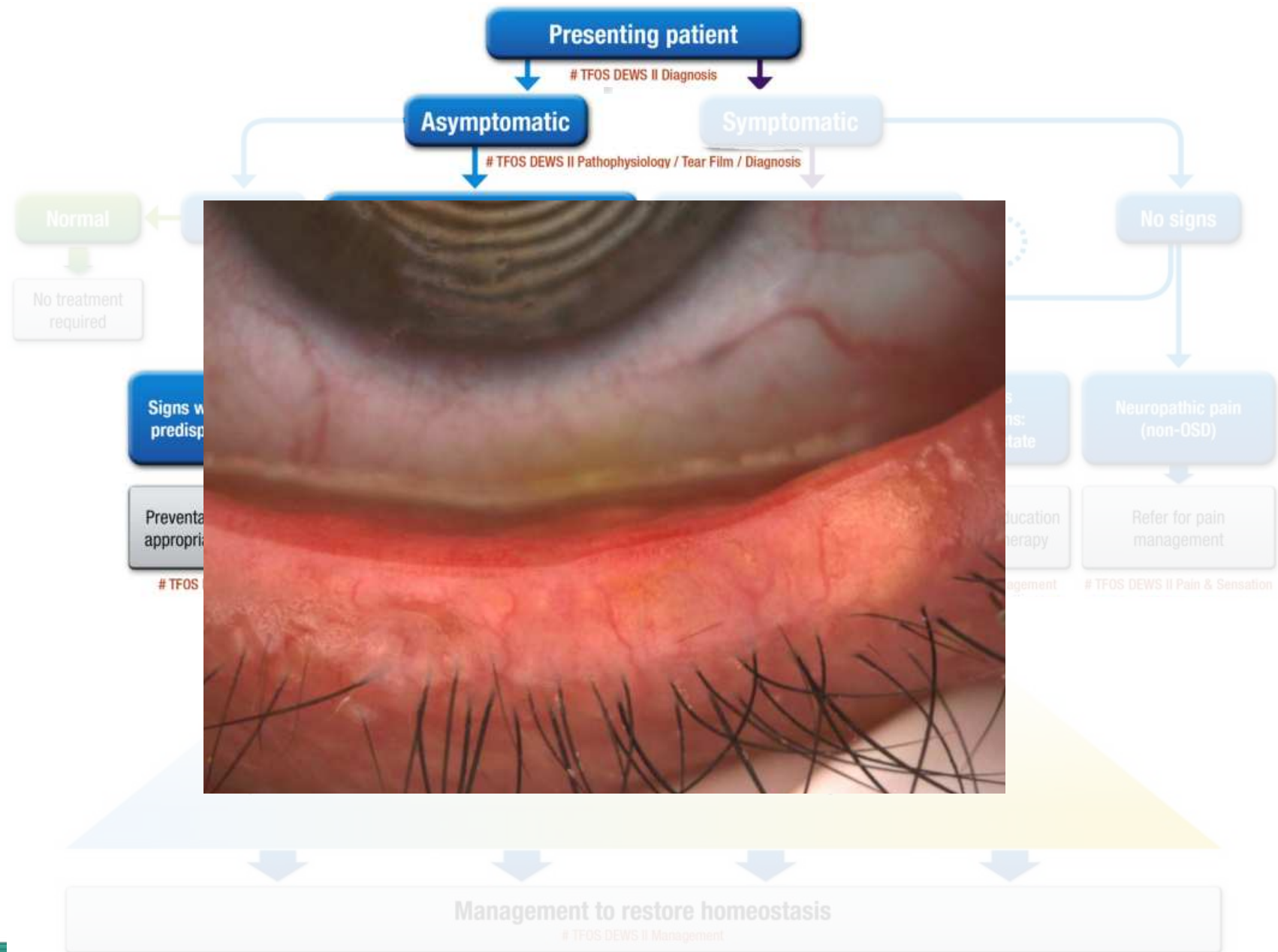
- 52% MGD

- SPEED <8 and MGE ≤18 and/or atrophy ≥1
- SPEED ≥8 and MGE ≤18 and/or atrophy ≥1
- SPEED <8 and MGE >18 and/or atrophy 0
- SPEED ≥8 and MGE >18 and/or atrophy 0



Asymptomatic:
to detect +++





Topical **anti-inflammatory** drugs and topical **antibiotics** are the pillars for the treatment of inflammation and for the prevention of infections, respectively. It is advisable to add a treatment of the ocular surface with **preservative-free tear substitutes**, to reduce the stress induced by the surgical procedure and the topical therapy.

86.7% 4.3 (0.7)



In cataract surgery, **topical antibiotics should be employed until the wound closure has occurred**, that can be considered complete after 7 days. To prolong the topical antibiotic beyond wound recovery has no convincing justification, as well as antibiotic tapering is senseless; these practices, leading to the use of doses < MIC, can promote **bacterial resistance development**.

93.3% 4.8 (0.6)

Treatment with corticosteroids capable of penetrating the anterior chamber for > 2 weeks should be avoided, if not needed or in the absence of tonometry, as adverse events (including increase intra-ocular pressure) are age-, dose and time-dependent and may occur even earlier.

86.7% 4.3 (0.9)



Meibomian gland dysfunction

Original research article

EJO European Journal of Ophthalmology

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1–6
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The efficacy of a netilmicin/dexamethasone gel combination in the treatment of posterior blepharitis in moderate-severe dry eye patients

Giovanni William Oliverio¹, Leandro Inferrera²,
Elisa I Postorino¹, Paola Palino¹ and Pasquale Aragona¹

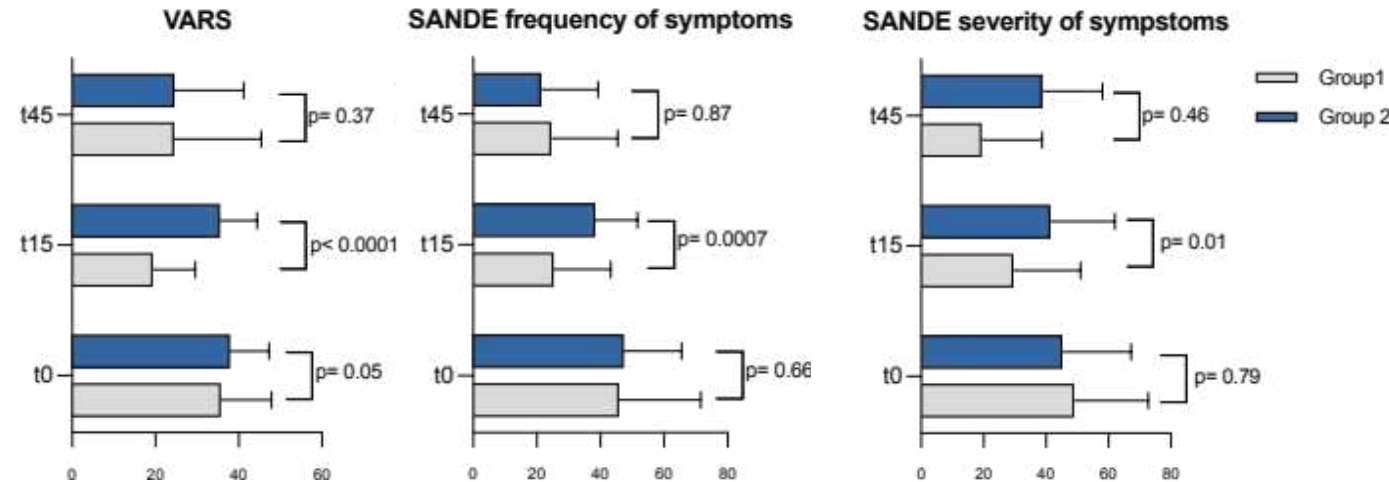
Abstract

Purpose: To evaluate the safety and efficacy of netilmicin/dexamethasone combination in the treatment of meibomian gland dysfunction (MGD)-associated posterior blepharitis.

Methods: In this prospective and controlled study were enrolled 40 patients with MGD and symptoms of dry eye disease. Two groups were established: 20 patients (group 1) received netilmicin 3 mg/ml and dexamethasone 1 mg/ml eye gel, whereas in group 2 (20 patients) received vehicle for 15 days. Patients were evaluated at baseline, 15 and 45 days, including SANDE and VARS questionnaire, non-invasive tear film breakup time (NIBUT), tear meniscus height (TMH), ocular redness and meibography score. Moreover, fluorescein tear-film breakup time (TBUT), fluorescein ocular surface staining, lid margin evaluation including hyperemia, edema and meibum expressibility and quality examinations were carried out. Furthermore, intraocular pressure (IOP) and best-corrected visual acuity (BCVA) were considered as safety parameters.

Results: In group 1, at 15 and 45 days there were statistically significant changes in VARS and SANDE score ($p < 0.0001$) as well as lid margin parameters, TBUT and fluorescein ocular surface staining ($p < 0.0001$). Comparing the two groups, a significant improvement of SANDE score was observed at 15 days in group 1 as well as lid margin parameters, TBUT and fluorescein ocular surface staining at 15 and 45 days (all $p < 0.0001$).

Conclusion: Netilmicin/dexamethasone combination is effective and safe to treat MGD-associated posterior blepharitis improving both symptoms and ocular surface signs.



	Group 1					Group 2					Group 2 vs Group 1		
	Baseline	15 days	45 days	p-value 15 days vs baseline	p-value 45 days vs baseline	Baseline	15 days	45 days	p-value 15 days vs baseline	p-value 45 days vs baseline	p-value baseline	p-value 15 days	p-value 45 days
TBUT	2±1.2	3.5±0.9	3.7±0.5	<0.0001	<0.0001	2±0.8	2.2±0.7	2.5±0.8	0.001	0.005	0.91	<0.0001	<0.0001
Staining	1.5±0.9	0.7±0.5	0.5±0.5	<0.0001	<0.0001	1.6±0.7	2.5±0.7	1.7±0.6	0.26	0.66	0.51	<0.0001	<0.0001
TMH	0.2±0.1	0.2±0.1	0.2±0.1	0.5	0.37	0.2±0.1	0.2±0.1	0.2±0.1	0.05	0.12	0.67	0.29	0.47
NIKBUT	3.6±2.7	3.7±1.9	7.4±4.9	0.77	0.002	3.9±1.8	2.3±0.6	4.1±1.3	0.03	0.35	0.55	0.15	0.0001
Hyperemia	1.7±0.7	1.3±5.2	1.4±0.8	0.07	0.05	1.7±0.5	2.4±0.5	1.9±0.4	0.001	0.008	0.84	0.09	0.0003
Meibography	2.2±0.4	2.2±1.1	2.3±0.9	0.21	0.17	2.1±0.5	2.1±0.6	2.2±0.6	0.16	0.12	0.36	0.001	0.01

All data are reported as mean ± standard deviation. Results were considered statistical significant for $p < 0.05$.

Biometry and dry eye disease



Clinical Ophthalmology

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ORIGINAL RESEARCH

Causes and correction of dissatisfaction after implantation of presbyopia-correcting intraocular lenses

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Tayyeba K Ali
Daniel P Waren
Kendall E Donaldson

Department of Ophthalmology,
Bascom Palmer Eye Institute,
University of Miami Miller School
of Medicine, Miami, FL, USA

Purpose: The purpose of this study was to assess the causes and possible solutions for patient dissatisfaction after the implantation of presbyopia-correcting intraocular lenses (IOLs).

Methods: This study was a retrospective review of clinical records. All patients who were seen between January 2009 and December 2013 whose primary reason for consultation was dissatisfaction with visual performance after presbyopia-correcting IOL implantation were included in the study. A single treating physician, who determined the most probable cause of dissatisfaction, decided which interventions to pursue following the initial consultation.

Results: Data from 74 eyes of 49 patients were analyzed. The most common cause for complaint was blurry or foggy vision both for distance and near (68%). Complaints were most frequently attributed to residual refractive error (57%) and dry eye (35%). The most common interventions pursued were treatment of refractive error with glasses or contact lenses (46%) and treatment for dry eye (24%). Corneal laser vision correction was done in 8% of eyes; 7% required an IOL exchange. After the interventions, 45% of patients had completed resolution of symptoms, 23% of patients were partially satisfied with the results, and 32% remained completely dissatisfied with the final results.

Conclusion: The most identifiable causes of dissatisfaction after presbyopia-correcting IOL implantation are residual refractive error and dry eye. Most patients can be managed with conservative treatment, though a significant number of patients remained unsatisfied despite multiple measures.

Keywords: intraocular lens, cataract, presbyopia, multifocal intraocular lens

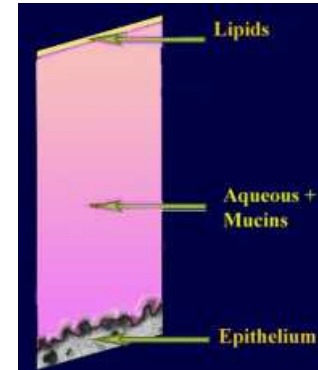


Table 5 Chief complaint of patients presenting to our clinic dissatisfied with presbyopia-correcting IOLs

Presumed cause of dissatisfaction	N (%)
Preoperative issues	
Dry eyes	26 (35)
Other preexisting pathologies ^a	15 (20)
Unreasonable expectations	6 (8)
Intraoperative issues	
Evidence of surgical complications	6 (8)
Postoperative issues	
Residual refractive error	42 (57)
Visual disturbance	19 (26)
Postoperative complications	3 (4)

Note: ^aOther preexisting pathologies: Fuchs' endothelial dystrophy, epiretinal membrane, cystoid macular edema, age-related macular degeneration, anterior basement membrane dystrophy, strabismus.

Abbreviation: IOL, intraocular lens.

The role of corticosteroids



Protecting Sight. Empowering Lives.™

Blepharitis Preferred
Practice Pattern®

“ **A brief course of topical corticosteroids** may be helpful for eyelid or ocular surface inflammation such as severe conjunctival infection, marginal keratitis, or phlyctenules.

Corticosteroid eye drops or ointments are typically applied several times daily to the eyelids or ocular surface. Once the inflammation is controlled, the corticosteroid can be tapered and discontinued and then used intermittently to maintain patient comfort.”

Treatment with corticosteroids capable of penetrating the anterior chamber for > 2 weeks should be avoided, if not needed or in the absence of tonometry, as adverse events (including increase intra-ocular pressure) are age-, dose and time-dependent and may occur even earlier.

86.7% 4.3 (0.9)

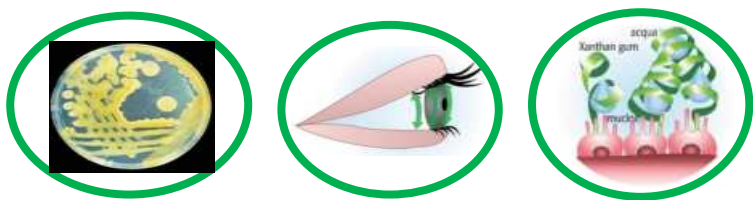


PREVENZIONE DEL DISCOMFORT POST-OPERATORIO: RIGENERARE L'OMEOSTASI OCULARE E CONTROLLARE L'INFIAMMAZIONE



Scopo: Studiare gli effetti di un collirio a base di gomma xantana 0,2% + Desonide sodio fosfato 0,025% collirio su segni e sintomi di OSD nei pazienti dopo l'intervento di cataratta

Xanthan gum



Origine naturale Pseudoplastico Mucoadesivo

Desonide sodio fosfato

Corticosteroide non fluorurato, a bassa potenza

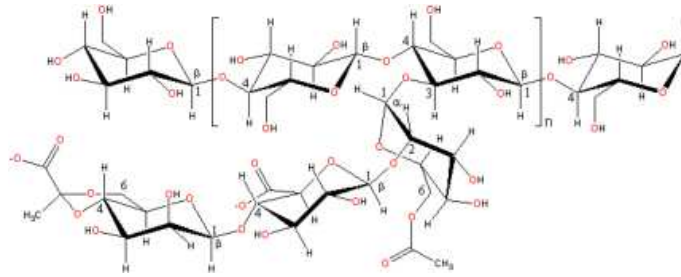
- Antinfiammatorio a basse concentrazioni, superiore all'idrocortisone

Desonide

Table 1 Relative potencies of main corticosteroids (modified from [1])		
Corticosteroid	Anti-inflammatory potency	Na ⁺ retaining potency
Cortisol	1	1
Cortisone	0.8	0.8
Fludrocortisone	10	125
Prednisone	4	0.8
Prednisolone	4	0.8
6a-methylprednisolone	5	0.5
Triamcinolone	5	0
Betamethasone	25	0
Dexamethasone	25	0

The numbers in the Table indicate corticosteroid anti-inflammatory and Na⁺ retaining potency relative to cortisol (by convention, cortisol = 1), and have been calculated by the Author on the basis of currently available literature data

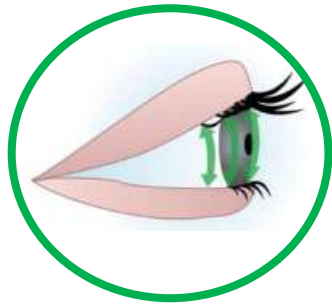
VANTAGGI DELLA FORMULAZIONE GEL A BASE DI XANTHAN GUM



mucoadesivo



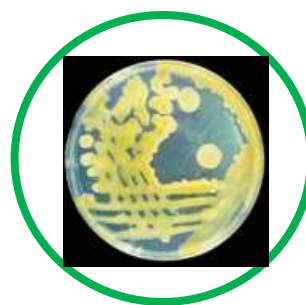
**PERMANENZA
PROLUNGATA**



pseudoplastico



**LUBRIFICAZIONE E
COMFORT OCULARE**



**origine
naturale**



**ASSENZA DI
CITOTOSSICITA'**



trasparente



**NON INTERFERISCE
CON LA VISIONE**



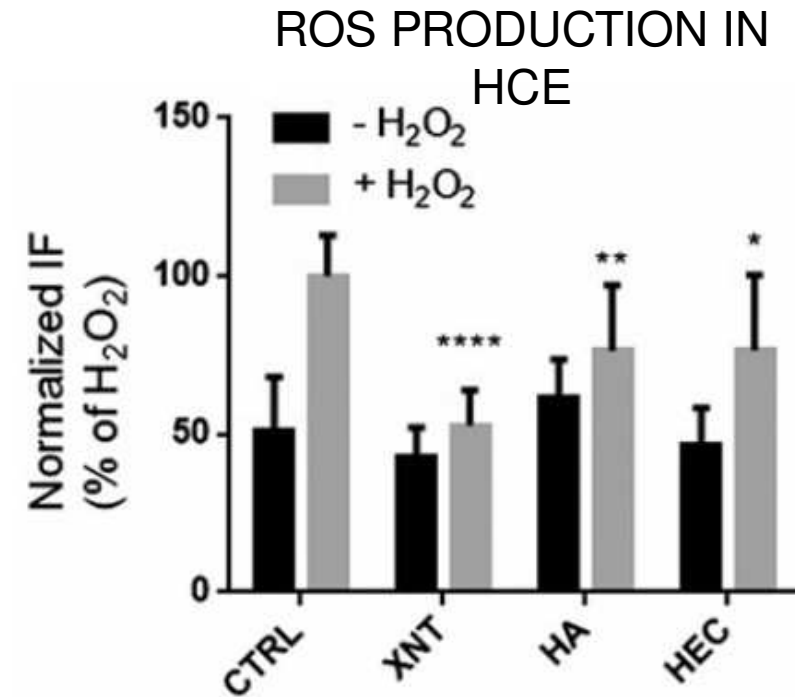
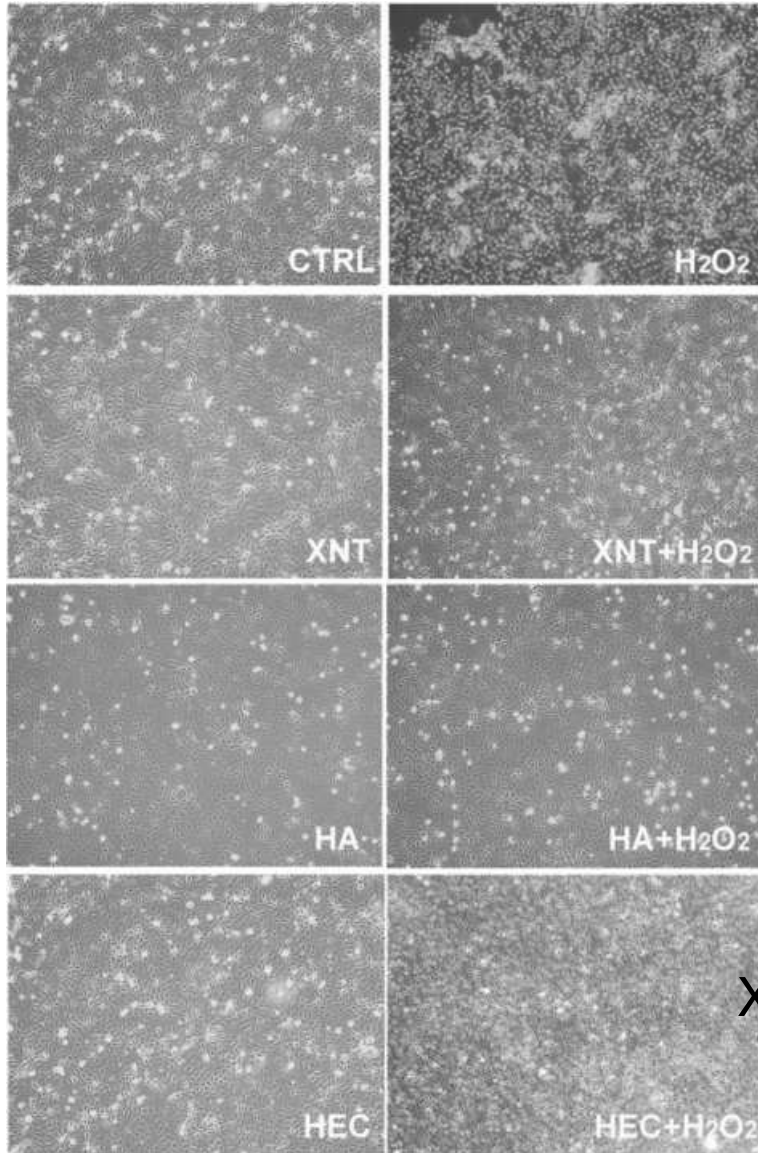
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**MAGGIOR
COMFORT**



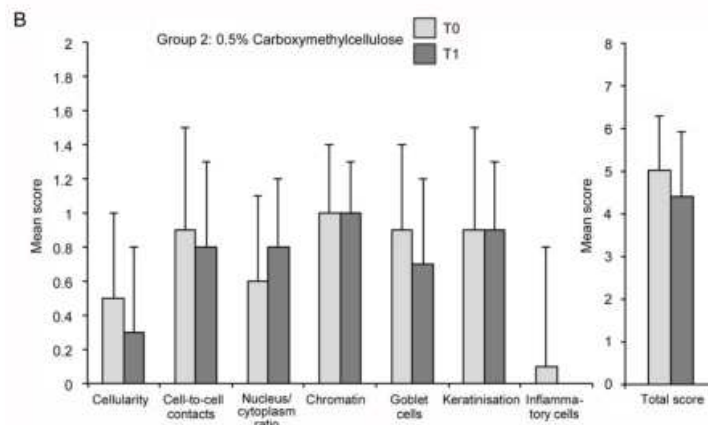
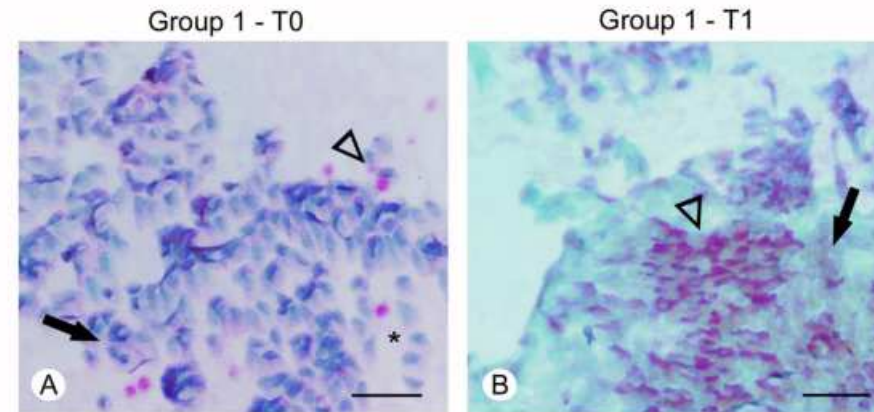
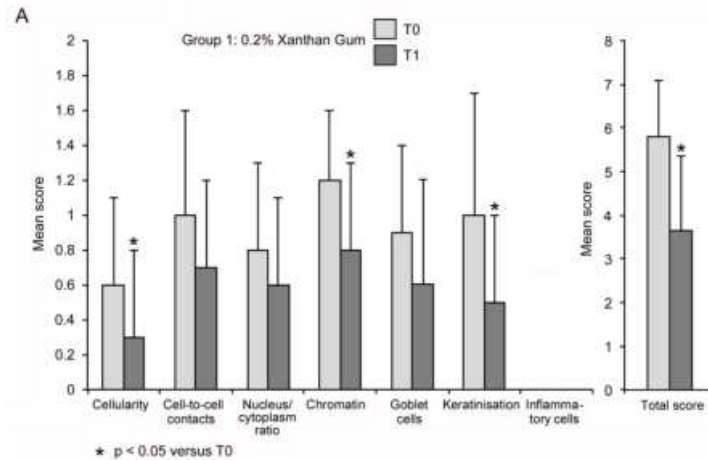
Xanthan Gum and Oxidative Stress



XG Protects HCE cultures from oxidative stress



Conjunctival epithelial cells changes after the treatment with 0.2% xanthan gum eye drops in moderate dry eye



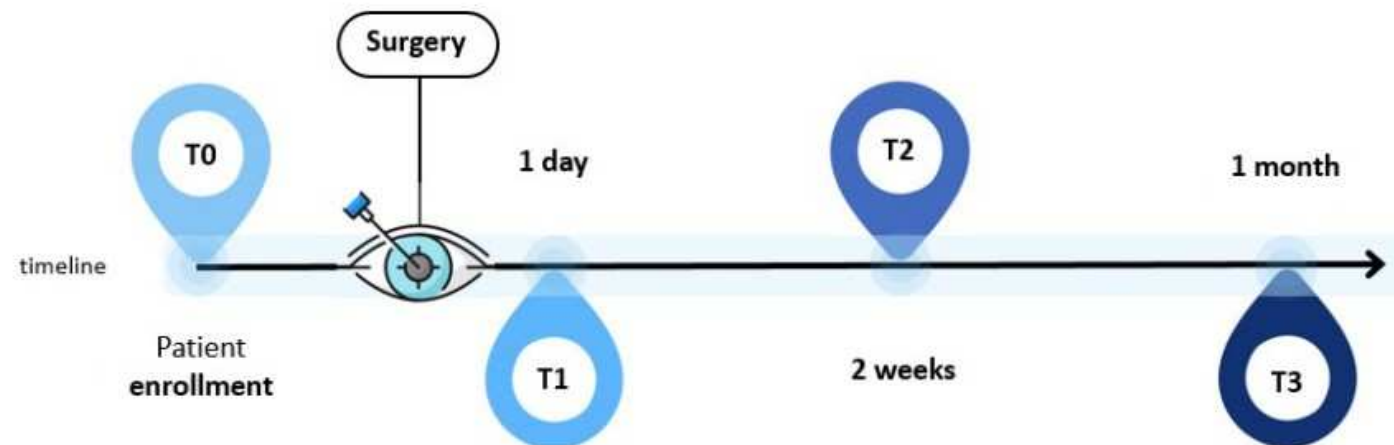
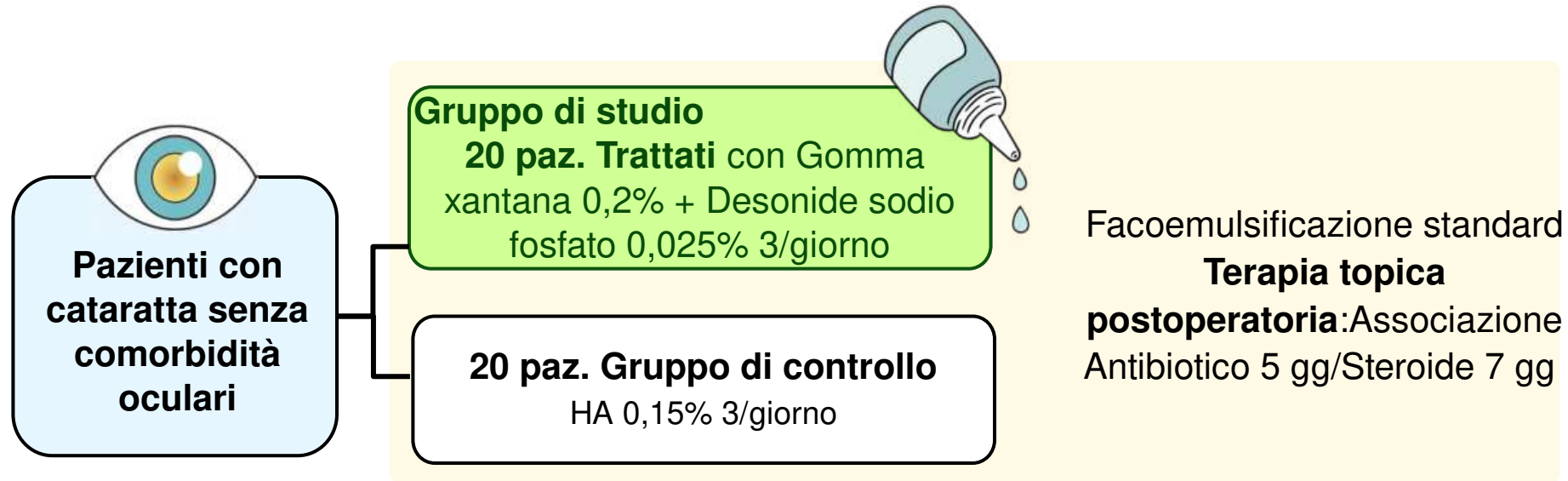
Group 1	OSDI	VAS	Conjunctival hyperemia	MGD	BUT	Corneal stain	Conjunctival stain
T0	24.5±5.5	52.8±16.9	0.6±0.8	1.3±0.9	3.2±1.8	1.1±1.4	1.3±1.2
T1	26.6±18.5	48.9±21.9	0.2±0.4	1±1	3.3±1.8	0.5±0.7 ^a	1±1.3

Group 2	OSDI	VAS	Conjunctival hyperemia	MGD	BUT	Corneal stain	Conjunctival stain
T0	22.7±5.8	60.1±15.4	0.6±0.6	1.4±1	3.7±1.5	0.8±1.1	1.1±1.3
T1	21.2±14.4	50.1±25.1	0.2±0.4	1.3±0.7	4.3±2.5	0.6±1.3	0.8±1.2

Gestione del discomfort oculare post operatorio in pazienti operati di cataratta

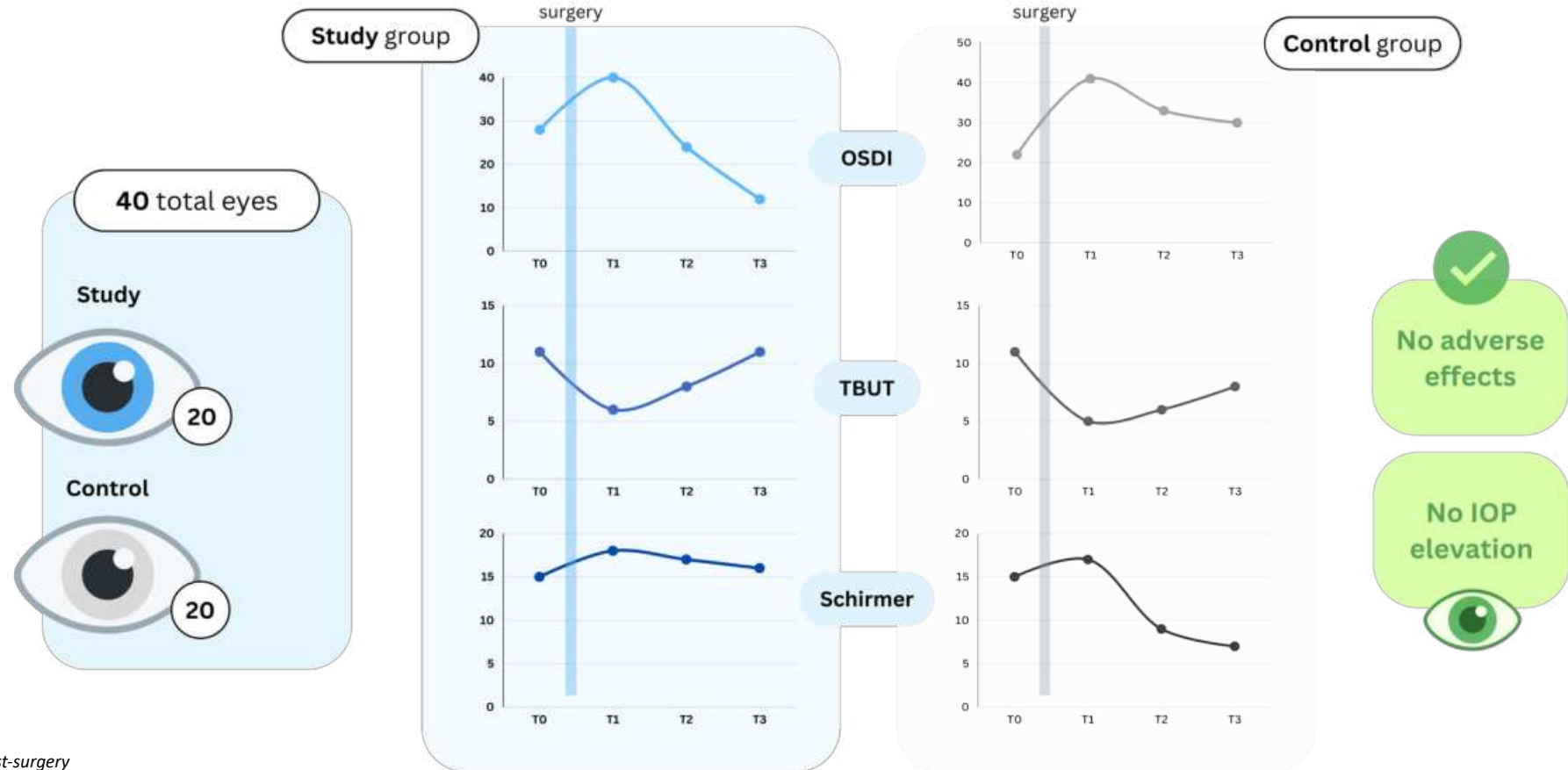


METODI:



Gestione del discomfort oculare post operatorio in pazienti operati di cataratta

RISULTATI:



T1= 1 day post-surgery
T2= 2 weeks post-surgery
T3= 3 weeks post-surgery

Take Home Messages



- Le disfunzioni della superficie oculare sono estremamente frequenti sia prima che dopo intervento chirurgico (cataratta, chirurgia refrattiva.....)
- Se studiati attentamente in fase preoperatoria, la maggior parte dei pazienti può presentare alterazioni (sub)cliniche
- L'ottimizzazione della gestione preoperatoria del paziente può migliorare i difetti refrattivi e della superficie oculare dopo l'intervento
- Ricordarsi di utilizzare una adeguata terapia antinfiammatoria e lubrificante post-operatoria per controllare l'infiammazione ed i sintomi di discomfort oculare