

Post–Ocular Surgeries Dry Eye

An Essay

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By

Esraa Hosny Abu Al Yazed Metwalli
M.B.B.Ch

Supervised by

Prof. Dr. Fatma Mohamed Shafik El Hennawi

Professor of Ophthalmology
Faculty of Medicine – Ain Shams University

Prof. Dr. Tamer Mohamed El-Raggal

Professor of Ophthalmology
Faculty of Medicine – Ain Shams University

Prof. Dr. Abdelrahman Gaber Salman

Professor of Ophthalmology
Faculty of Medicine – Ain Shams University

Faculty of Medicine
Ain Shams University
Cairo
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

<i>Abbr.</i>	<i>Full-term</i>
Ach	: Acetylcholine
ADDE	: Aqueous tear deficient dry eye
ARDE	: Age-Related Dry Eye
BAC	: Benzalkonium chloride
BM	Basement membrane
BSS	: Balanced salt solution
CGRP	: Calcitonin gene related peptide
CL	: Contact lens
CLSM	: Confocal laser scanning microscopy
CMC	: Carboxy methyl cellulose
CME	: Cystoid macular edema
CO	: Cornea
DEWS	: Dry Eye Workshop
DED	: Dry eye disease
DHA	: Docosahexaenoic acid
DMEK	: Descment membrane endothelial keratoplasty
DPA	: Diphenylamine
EDE	: Evaporative dry eye

EPA	: Eicosapentaenoic acid
FCT	: Fluorescein clearance test
FS-LASIK	: Femtosecond laser assisted in situ keratomileusis
FU	: Fluorouracil
FVA	: Functional visual acuity
GVHD	: Graft versus host disease
HPMC	: Hydroxypropyl methylcellulose
HSV	: Herpes simplex virus
IBI	: Inter blink interval
IL	: Interleukin
LASIK	: Laser-assisted in situ keratomileusis
LG	: Lissamine green
MALT	: Mucosa associated lymphoid tissue
MGD	: Meibomian gland dysfunction
MMP	: Matrix metalloproteinase
MMC	: Mitomycin C
NSAID	: Non-steroidal anti-inflammatory drops
OCT	: Optical coherence tomography
OPI	: Ocular protection index
OSDI	: Ocular Surface Disease Index
PEG	: Poly ethyl glycol

PRK	: Photorefractive keratectomy
PROSE	: Prosthetic replacement of the ocular surface ecosystem
PUFA	: Poly unsaturated fatty acids
PVA	: Poly vinyl alcohol
RANTES	: Regulated on activation normal T-cell expressed and secreted
RK	: Radial keratotomy
sIgA	: Secretory immunoglobulin A
SPK	: Superficial punctate keratitis
SSDE	: Sjögren's syndrome dry eye
SSRIs	: Selective serotonin reuptake inhibitors
ST	: Schirmer test
TBUT	: Tear breakup time
TFI	: Tear function index
TM	: Tear meniscus
TMH	: Tear meniscus height
TMS	: Tear film analysis system
TNF	: Tumor necrosis factor
UTM	: Upper tear meniscus
VEGF	: Vascular endothelial growth factor

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Introduction

In 2007, the International Dry Eye Workshop defined dry eye disease as “a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface” (**Lemp et al., 2007**).

There are many causes and factors leading to dry eye, including aging, female gender, connective tissue diseases, diabetes mellitus, contact lens usage, drugs like antihistamines, anticholinergics, antidepressants, oral contraceptives and topical eye drops containing preservatives and ocular diseases like blepharitis, chronic conjunctivitis, meibomitis and pterygium (**De Paiva et al., 2006**) (**Shoja & Besharati, 2007**) (**Moss et al., 2008**). The symptoms observed in dry eye syndrome include dryness, irritation, burning, foreign body sensation, heaviness of the eyelids, redness, reflex lacrimation, ocular pain and fatigue. It may cause punctate keratitis, persistent epithelial defect, filamentary keratopathy, superior limbic keratoconjunctivitis and reduced visual acuity (**Li et al., 2007**) (**Garcia-Catalan et al., 2009**).

Some surgical interventions related to anterior segment may also cause dry eye and aggravate the symptoms in pre-existing dry eye, like PRK, LASIK and cataract surgery

(Hardten,2008) (Khanal et al., 2008) (Albietz & Lenton, 2004).

Clear cornea phacoemulsification has become one of the safest, most successful, and most frequently performed outpatient surgeries nowadays; however, as with other corneal surgeries, it may alter the ocular surface and disrupt normal tear function **(Liu et al., 2002).**

Moreover, keratorefractive surgery seems to cause tear-deficient dry eye by a neural-based mechanism **(Ang et al., 2001).** Corneal sensitivity is essential for the maintenance of normal corneal structure and function but inevitably surgical procedures such as PRK and LASIK induce loss of normal sensitivity which may compromise protective blink reflex, delay epithelial wound healing and even induce neurotrophic keratitis or sterile corneal melts **(Matsui et al., 2001).**

Pre-operative recognition of patients with ocular surface disease provides an opportunity to optimize the surface before proceeding with surgery. The patient history is often one of the most important elements in the diagnosis of patients with dry eyes. The clinical exam of the patient can provide additional clues that suggest tear film insufficiency. These include findings such as debris in the tear film, a low tear meniscus height, evidence of lid margin disease, and conjunctival inflammation **(Nichols et al., 2000).**

Diagnostic testing is greatly valuable for the detection of early changes due to dry eyes. The most commonly

performed tests include Schirmer test (ST), tear breakup time (TBUT) and ocular surface staining (***Hay et al., 1998***).

Management of ocular surface disease may be done most effectively by following established treatment guidelines (***Behrens et al., 2006***).

Aim of the Work

The aim of this study is to review the factors causing dry eye after various ocular surgeries, the way to decrease its occurrence and the best approach for its treatment.