Phaco-refractive Surgery & Dry Eye

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No Financial Interest
**Tear Film**

**Lipid Layer**
- 0.1 µm
- Meibomian glands
- Prevent evaporation of tears

**Aqueous layer**
- 7.0 - 8.0 µm
- Lacrimal gland
- Provides nutrition and oxygen to cornea
- Hydrates and provides smooth optical surface
- Bacteriostatic

**Mucin layer**
- 0.02 - 0.05 µm
- Conjunctival goblet cells
- In gradient throughout aqueous layer
- Decreases corneal surface tension, making it wettable
- Fills surface irregularities
Definition and prevalence of DED

“Multifactorial disease of tears & ocular surface that leads to symptoms of discomfort, visual disturbance with damage to ocular surface.

• Accompanied by ↑ osmolarity of tears & ocular surface inflammation”.

• 5-30% > 50 yrs.
• Females more commonly affected.
DED

Aqueous
Reduced lacrimal tear secretion

Lipid
Excess evaporation

86% of patients with DED have MGD

14% ADDE [Aqueous deficient DED]
36% Mixed
50% MGD [Evaporative Dry Eye = Lipid deficient DED]
Causes of Dry eye

**Traditional**
- Post menopausal
- Taking glaucoma medications with BAK
- Age Environment
  - Existing Immunology Conditions (Sjogrens, Arthritis)

**Environment**
- Long hours in front of computer
- Air-conditioned environment
- Contact Lens User
- Active Lifestyle
  - Visual Tasking

**Surgical**
- Corneal nerves affected
- Older Visual Tasking
- Active Lifestyle
  - Visual Tasking
• Up to 30% of patients undergoing cataract surgery have underlying dry eye (> 50 yrs)

• Elderly patients are more sensitive to medications given before & during cataract surgery, particularly NSAIDs.
• During clear corneal cataract, large portion of corneal nerves are cut.

• 1ry incision 3.0 mm, paracentesis about 1.0 mm —— total arc length of 4.0 mm of full-thickness incisions.

• Additional incisions for astigmatic correction, as LRIs, cutting of more nerves.
• Surgery induces ocular inflammation, —— — adversely affect tear-film production & stability.

• Postoperative medications —— — ocular irritation & tear-film disruption.

• Fluoroquinolones —— — "medicamentosa", where drug or its solvent cause tear film disruption, PEE & ocular surface inflammation.
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<th>Severity I</th>
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<td>Symptoms</td>
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<td>Visual symptoms</td>
<td>Conjonctival stains</td>
<td>Conjonctival scarring</td>
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DIAGNOSING Dry eye
A practical test sequence based on DEWS

**General tests**
- Questionnaires
- Examination (with and without slit lamp)

**Specific dry eye disease tests**
- Fluorescein tear break-up time
- Ocular surface staining

**Specific clinical tests**
- Lid morphology/margin
- Meibomian gland expression
- Schirmer test

10 min break

- Inflammation
- Tear film instability
- Apoptosis/damage
- Lipid deficiency/alteration
- Aqueous deficiency
Tear Film Dysfunction Symptoms

• **Irritation symptoms:**
  1. Burning, stinging
  2. Gritty sensation
  3. Sandy sensation
  4. Soreness
  5. Dryness
  6. Sensitivity to air drafts
  7. Itching more by end of day

• **Tearing/discharge symptoms:**
  1. Mucus
  2. Tearing, more in morning

• **Vision Symptoms**
  1. Fluctuation
  2. Blurring improves with tears
  3. Light sensitivity
Dry Eye Affects Quality of Life

- Percent of patients reporting interference with daily life:
  - Night time driving 32.3%
  - Reading 27.5%
  - Computer work 25.7%
  - Watching TV 17.9%
DED interaction with phaco-refractive surgeries

- Distortions induced by disruption at ocular surface is magnified by some premium IOLs [MF, Aspheric].
- This can severely degrade both visual acuity and visual quality in most demanding cases.

“I was better before doctor!!!”
Diagnosing Tear Film Abnormalities

- Lipid
- Aqueous/Mucin
- Corneal Staining
- Tear Film Break Up Time
Clinical Signs of Lipid Deficiency

• Poor lipid production and/or composition:
  – Obstruction of meibomian glands
  – Change in gland secretion

• Repeated styes, chalazion

• Tear film instability and rapid BUT
Aqueous/Mucin Deficiency - Corneal and Conjunctival Staining

Lissamine Green

Rose Bengal
Schirmer test
Marginal tear meniscus & LIPCOF
Other Tests
Dry Eye Treatment
Types of Lubricant Eye Drops

Cellulose Derivative Products

Glycerin Containing Products

Hyaluronic Acid Containing Products

Polyethylene & Propylene Glycol Products

Oil-Containing Emulsion Products
Other LINES Of Treatment

- Cyclosporins
- Serum
- Steroids
- Tetracyclins
- Omega 3
Meibomian gland probing & expression
Punctal plugs
Conclusions

- DED is common & often under-recognized.
- Multifactorial in origin & categorized to aqueous or lipid deficiency.
- Dry eye is a major problem in phaco & refractive patients.
- Tell patient before better than after surgery.
Conclusion

- Preoperative assessment & ocular surface preparation is mandatory.

- The level of severity of DED definitely influence operative details.

- Maintaining healthy ocular surface is essential for achieving best visual outcome.

- Many tear substitutes available. Also consider other ttt lines.
Thank you

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