Less Than Perfect Outcomes After Uneventful Cataract Surgery: What Are We Missing?

Parag A. Majmudar, MD
Associate Professor of Ophthalmology
Rush University Medical Center
Chicago Cornea Consultants, Ltd.
Chicago, IL USA

I am a consultant for Allergan, Alcon, B&L, and Tear Science
I have no financial interest in any product discussed herein

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Playing Detective

- Most of our cataract patients experience great outcomes following modern cataract surgery
- When they don’t, we need to solve the mystery
- One of the most common problems is fortunately easy to remedy, and with some planning - identify and treat pre-operatively

What's the most important refracting surface of the eye?

- Cornea?
- Lens?

The Tear Film!
Image Courtesy of Marguerite McDonald, MD

Minimal Disruption of the Ocular Surface can Severely Degrade Visual Acuity
Image Courtesy of Marguerite McDonald, MD
P.H.A.C.O.: Prospective Health Assessment of Cataract patients Ocular surface

Objective:
• To determine the prevalence of dry eye in patients undergoing cataract surgery

Methods:
• Prospective, multi-center study (10 sites)
  - Mark Packer, MD
  - Damien Goldberg, MD
  - Parag Majmudar, MD
  - Eric Donnenfeld, MD
  - Marguerite McDonald, MD
  - Karl Stonecipher, MD
  - Jon Vukich, MD
  - Chaz Reilly, MD
  - Gregg Berdy, MD
  - Ranjan Malhotra, MD
  - William Trattler, MD
• 200 patients scheduled for cataract surgery

Results:

Tear Break up Time
N = 102 patients (204 eyes)
- Average TBUT: 4.93 seconds
  - # of eyes with TBUT ≤ 5 seconds: 126 eyes (61.7%)
  - # of eyes with TBUT ≤ 7 seconds: 169 eyes (82.8%)

Corneal Staining
N = 102 patients (204 eyes scored)
- Positive Corneal Staining: 154 eyes (75.5%)
- Central Corneal Staining: 92 eyes (45.1%)

Summary of PHACO Study
(Patients scheduled for cataract surgery)
• Dry eye signs are very common in patients scheduled for cataract surgery
  - TBUT:
    • More than 60% with very abnormal TBUT (≤ 5 seconds)
  - 83% with TBUT ≤ 7 seconds
  - Corneal Staining
    • 45% with Central staining
    • Schirmer’s score
      • 18.6% with very low Schirmer’s (≤5mm)
Topography: Excellent Tool for Diagnosing a Poor Tear Film

William Trattler, MD

Recommendations for all cataract surgery patients:

Preop Topography

William Trattler, MD

Preop Topo after 1 day of Treatment

Same patient: 1 day after starting lubricating drops.

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Preop Topo after one week of Treatment

Same patient: one week after initiating topical steroids along with lubricating drops

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Preop Evaluation

60 year old male: Initial Consultation for Presbyopic IOL

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Dry Eye Identified:

One week after cyclosporine BID

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Summary

- Dry eye is very common in patients planning cataract surgery
  - More than 60% with very abnormal TBUT
  - 50% with Central staining
  - 21% with very low Schirmer’s (≤5mm)
- Preop testing can identify less than ideal candidates for Presbyopic IOLs
  - Topography
  - OCT of the macula
  - Fluorescein staining of the cornea:
    - Dry Eye
    - EBMD

The Normal Tear Film: A Delicate Balance

- Lipid, Aqueous and Mucin components
- Lipid layer (from Meibomian glands) retards aqueous evaporation
- Aqueous layer: mixture of proteins, mucins, electrolytes
  - Secreted by lacrimal glands
- Mucins provide viscosity and stability during blink cycle

Meibomian Gland Dysfunction: A Prevalent Condition with Consequences

"Meibomian gland dysfunction (MGD) may well be the leading cause of dry eye disease throughout the world."
—The International Workshop on Meibomian Gland Dysfunction: Executive Summary

MGD: Toothpaste

- Physical Measures:
  - Hot compresses/lid massage
- Nutritional Supplements:
  - Flaxseed oil, essential fatty acids
- Pharmaceutical Measures:
  - Lipid-altering substances (doxycycline)
  - Inhibition of MMPs
- Corticosteroids
- Antibiotics: azalides (Azasite)
- Cyclosporine A (topical, Restasis)
LipiFlow® Thermal Pulsation System

- Heat applied to the palpebral surfaces of the upper and lower eyelids directly over the meibomian glands
- Graded pulsatile pressure delivered to the outer eyelid

The Lid Warmer: Comprised of a precision heater, eye insulation & vaulted shape

The Eyecup: Comprised of an inflatable bladder & rigid eye cup

Mean Meibomian Gland Score

<table>
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<tr>
<th>Group</th>
<th>Baseline</th>
<th>Week 2</th>
<th>Week 4</th>
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<tbody>
<tr>
<td>N=130</td>
<td>6.3±3.5</td>
<td>5.6±3.9</td>
<td>6.1±5.6</td>
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<td>N=136</td>
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Statistically Significant Increase in Mean Meibomian Gland Score from Baseline after Crossing Over to LipiFlow®

P<0.0001*

Mean Tear Film Break up Time

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<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=130</td>
<td>5.5±2.9</td>
<td>6.9±5.0</td>
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<tr>
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<td>5.4±2.5</td>
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Statistically Significant Increase in Mean Tear Film Break Up Time from Baseline After Crossing Over to LipiFlow®

P<0.0001*

Mean SPEED Questionnaire Score

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<th>Baseline</th>
<th>Week 2</th>
<th>Week 4</th>
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</thead>
<tbody>
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<td>7.4±5.8</td>
<td>7.8±5.6</td>
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Statistically Significant Reduction in Mean SPEED Score from Baseline After Crossing Over to LipiFlow®

P<0.0001*
SUMMARY

- Ocular Surface Disease is more prevalent than we previously believed.
- It is a major factor in visual outcomes after cataract surgery.
- Greater awareness by patients and physicians will enable more prompt treatment and greater patient satisfaction.

Thank you for your attention!

Parag A. Majmudar, MD
e-mail: pamajmudar@chicagocornea.com