“Best Management of Cataract Surgery In Complicated Eyes With Shallow ACD and Narrow Angle”

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Matteo Piovella MD

Sunday, April 27, 2014
8.00 AM – 9.30 AM
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“Lens Surgery in Patients at Risk for Narrow-Angle Glaucoma: Three Years Follow Up”
Matteo Piovella MD; Barbara Kusa MD
Discussion

Given the insidiousness of glaucoma and the increased life expectancy of the population, prevention of glaucomatous damage is of the foremost importance. The AC OCT provides previously unseen images of the anterior segment, with immediate visualization of its structures and almost instantaneous diagnostic opportunities. Presently, the indications for cataract surgery in eyes with very shallow ACD and narrow angle are well considered on the basis of the new images provided by AC OCT as well as on the increasingly limited invasiveness of cataract and lens surgery. Our studies indicates it is possible to determine these three parameters.

The Three “A”
Age: over 68 y.o. - ACD: ≤ 2.4 mm - Angle Width: ≤ 16°

OCT Technology Widened Indications for Clear Lens Extraction

In patients at risk for glaucoma, removal of crystalline lens implies:

- Reduced need for tricotomy.
- Reduced need for topical glaucoma therapy.
- Reduced social cost of glaucoma.
- Reduced number of challenging cataract cases.
Thank you for your attention!
“Multifocal IOLs: Directions to Improve Patient Satisfaction”
Matteo Piovella MD; Barbara Kusa MD
% Distribution of Light Rays

With Ascorbic Acid IOLs there is no loss of light, so quality of vision is not compromised.

<table>
<thead>
<tr>
<th></th>
<th>Pupil</th>
<th>Synchrony</th>
<th>ReSTOR®</th>
<th>Tecnis® MF</th>
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<tbody>
<tr>
<td>Near</td>
<td>2 mm</td>
<td>100%</td>
<td>40%</td>
<td>41%</td>
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<tr>
<td>5 mm</td>
<td>100%</td>
<td>84%</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Distance</td>
<td>2 mm</td>
<td>100%</td>
<td>0%</td>
<td>41%</td>
</tr>
<tr>
<td>5 mm</td>
<td>100%</td>
<td>10%</td>
<td>0%</td>
<td>41%</td>
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<tr>
<td>Intermediate</td>
<td>2 mm</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>5 mm</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>LIGHT LOSS</td>
<td>2 mm</td>
<td>0%</td>
<td>20%</td>
<td>19%</td>
</tr>
<tr>
<td>5 mm</td>
<td>0%</td>
<td>6%</td>
<td>19%</td>
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62 Eyes of 62 patients (32 female, 30 male)
Mean age 69.33 ± 11.35 years

EYEVISPOD - 6 Years P.O. Results
Mix and Match Uncorrected Intermediate Vision Visual Acuity

EYEVISPOD - 6 Years P.O. Results
Mix and Match Uncorrected Near Vision Visual Acuity

Tecnis® and RaZoom® Implantation
Scriverere o leggere la posta
elettronica, sistemare l’archivio, partecipare alle riunioni.

Dentro la giornata, gli occhi sono sempre al lavoro e costantemente esposti agli effetti abbaglianti del monitor.

Per chi non ha occhiali a tempo di lavoro, può essere problematico, o per chi non vuole perdere la testimonianza di propri occhi.

**Tecnis® MIOL**

**Sphere Equivalent and BCVA Visual Acuity**

![Graph showing sphere equivalent and BCVA visual acuity](image)

**Tecnis® MIOL**

Monocular Uncorrected Near Vision Visual Acuity

<table>
<thead>
<tr>
<th>Jaeger</th>
<th>1 year po</th>
<th>2 years po</th>
<th>3 years po</th>
<th>4 years po</th>
<th>5 years po</th>
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</thead>
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<tr>
<td>3.14</td>
<td>2.76</td>
<td>2.17</td>
<td>2.02</td>
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Binocular VA Jaeger 5 years po 1.15 ± 0.10

**Monocular defocus curve Multifocal IOL Tecnis® AMO ABBOTT**

![Graph showing monocular defocus curve](image)

**Residual Refractive Error as Function of Pupil Size and Defocus**

**Diffractive Technology**

Snellen Visual Acuity as Function of Pupil Size and Defocus

- Toric vs. spherical it is **two times difference**: the effect of 1 D cylinder error on VA is about 0.5 D spherical refractive error.
- In Multifocal lenses, VA sensitivity to refractive error depends on a multifocal design.
- Refractive Multifocal Technology was close to monofocal for the width of the Distance Peak in Defocus Curve measurements.
- Diffractive Multifocal Technology width of the Distance Peak was about half the monofocal width.
- The effect of refractive error was about twice more sensitive than in case of a monofocal optic.
Weak Points of Diffractive Multifocal IOLs

- Reduction of contrast sensitivity (up to 50%)
- Diffractive Groove (Blaze height) creates different Diffraction Efficiency and Light Loss
- Toric Multifocal when 0.75 D of corneal Astigmatism
- Heats, Glare and Ghost images are difficult to manage in suspicious patients
- Poor intermediate Distance Vision
- 0.60 Dioptr SE generates loss of one line of Visual Acuity
- Perfect Target: Piano postop Refractive results

MTF (50 lp/mm) sensitivity to IOL rotation error up to 2.0 D cylinder correction - Pupil size 5 mm

- E" (20/40) sensitivity to IOL rotation errors of 0, 6, 10, 16, 29 degrees for 2.0 D cylinder correction

OptiVis MIOIL (Aaron Solitoff, Inc.)

- Posterior multifocal surface consists of 3 zones:
  - Zone 1 of Progressive refractive powers for Far and Intermediate within central 1.5 mm diameter
  - Apodized Diffractive Zone 2 for Far with 2.6 D effective Add for Near within 1.5 to 2.8 mm diameter
  - Peripheral Refractive Zone 3 is shaped for bi-sign apochromatization

OptiVis multifocal surface shape deviation from equivalent power sphere

Central Progressive power zone

- Zone 1 Power profile starts with Intermediate power at the center of the lens
- Power profile shape is to extend focus range from Far to Intermediate distances
- Negative surface slope of Zone 1 and part of Base Surface of the Diffractive Zone 3 is to expand Depth of Focus at Far to Intermediate
- A Reformation zone has advantage of utilizing 100% of light for retinal image thus reducing the overall light loss as compare with any other diffractive optic

OptiVis multifocal surface shape deviation from equivalent power sphere

Apodization Zone 2

- Initial Diffractive groove is to direct light to Near focus
- Zone 2 groove heights reduce towards periphery in order to direct more light to Far
- Light Loss is smaller with more normal Far to Near light split
- OptiVis apodization allocates the smallest surface area for equal Far to Near light split where light loss is the largest
**OptiVis™ MIOL (Aaron Scientific, Inc)**

Materials and Methods

OptiVis™ Implanted in 82 eyes of 42 patients (40 Bilateral Implantation)
Mean age: 70.37 ± 8.25 years.
Follow-up: 3 years

- Uncorrected Distance (UCDVA), Intermediate (UCIVA) and Near (UCNVA) Visual Acuity
- Best Corrected Distance (BCDVA), Intermediate (BCIVA) and Near (BCNVA) Visual Acuity

**Manifest Refraction: Spherical Equivalent 82 Eyes**

Outcome for targeted refraction

**Monocular Far Visual Acuity: 82 Eyes**

Far Vision Outcome

**Two years Binocular Near Vision Visual Acuity**

Two Patients – 80 Eyes

<table>
<thead>
<tr>
<th>MEAN ETDRS 20M</th>
<th>MEAN JAGGER</th>
<th>BEST VISION MEAN DISTANCE</th>
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<tbody>
<tr>
<td>UCDVA PHOTOTOPIC</td>
<td>51.30</td>
<td>3</td>
</tr>
<tr>
<td>UCNVA PHOTOTOPIC</td>
<td>51.20</td>
<td>3</td>
</tr>
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**Two years Binocular Intermediate Vision at 70 cm**

40 Patients – 80 Eyes

<table>
<thead>
<tr>
<th>MEAN ETDRS 20M</th>
<th>MEAN JAGGER</th>
<th>DISTANCE</th>
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</thead>
<tbody>
<tr>
<td>UNCORRECTED INTERMEDIATE VISION</td>
<td>41.37</td>
<td>4</td>
</tr>
<tr>
<td>DISTANCE CORRECTED INTERMEDIATE VISION</td>
<td>41.37</td>
<td>4</td>
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*Used same ETDRS Logarithmic Visual Acuity Chart 2*

**AT LISA® trif MIOL – Trifocal Optic**

The optical zone of the AT LISA® trif 350MP provides:

- A near addition of +0.35 D for a comfortable reading distance
- An intermediate addition of +1.68 D

It improves intermediate vision without compromising near or far vision.

AT LISA® trif has fewer rings on the IOL optic surface for reduced potential visual disturbances and improved night vision.

**AT LISA® trif FOCAL Implantation**
ATLISA® tri No correction Intermediate Vision

ATLISA® tri No correction Near Vision

ATLISA® Tri IOL contrast sensitivity
Daytime, Nighttime and Nighttime with glare

AcrLISA Toric® Study
Materials and Methods

AcrLISA® MOL implanted in 36 eyes of 22 patients
Mean age: 61.80 ± 14.04 years.
Follow-up: 3 years
- Best corrected distance VA (BCVA) Distance
- Post-op Mean Refractive Astigmatism
- Post-op Sphere Equivalent
- Binocular Near VA

AcrLISA® Toric
3 Years Post-op Result

Pre-op Mean Corneal Astigmatism 1.68 D
Pre-op Mean Refractive Astigmatism 1.26 D
Mean IOL Astigmatism 1.68 D

Post-op Mean Refractive Astigmatism (36 Eyes)
(Pre-op Mean Corneal Astigmatism 1.68 D)

Near Vision (EDTRS)
**Acr.LISA® Toric Implantation**

**EARLY YAG LASER TREATMENTS**
(within one year postop)

7 Eyes: YAG laser treatments (21.2%)  

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**Acr.LISA® Toric MIOL**

**Rotational stability and centration**

Mandatory for a good long-term postoperative outcome after the implantation of a toric multifocal IOL is the rotational stability and centration of the lens.

Because of the special 4-haptic design, ZEISS MIC IOLs have proven excellent rotational stability and stable centration in more than 250,000 implantations.

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**Acr.LISA® MIOL Implanted in 16 eyes of 8 patients**

Mean age: 68.7 ± 12.08 years.
Follow-up: 3 years

- Best corrected distance VA (BCVA) Distance
- Post-op Mean Refractive Astigmatism
- Post-op Sphere Equivalent
- Binocular Near VA

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**Acr.LISA®**

**BCVA (15 Eyes) 3 Years Post-op Result**

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**Acr.LISA®**

**3 Years Post-op Result**

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**Near Vision (EDTRS)**
Monocular defocus curve ActiLISA®

Conclusions

- Diffuse IOLa technology is difficult to manage to avoid quality of vision penalization on a significant number of patients.
- 3 mm pupil size condition works at the best to minimize patient complaints. Larger pupils have to be detected pre-op and the mandatory.
- Perfect Target™ is plano postop results.
- Diffuse multifocal technology has no significant % of light for intermediate distance and an important amount of light loss. The trifocal technology overcome this weak point providing specific % of light for intermediate distance and reduces the light loss improving diffusive efficiency and quality of vision.
- Halos, Glare and Ghost images are difficult to manage in demanding patients. Trifocal technology is an effective tool to improve contrast sensitivity and reduce night driving problems. It is really important a proper patient selection related to pupil dynamics.

High Quality Distance And Near Vision With Dual Optic Accommodating IOL

Synchrony Dual-Optic AIOL

What is the Synchrony AIOL?

- Single-piece, dual-optic silicone IOL
- Three dimensional lens designed to fill the capsular bag
- 6.6 mm high plus anterior optic (±32D)
- 6.0 mm variable negative posterior optic
- Optics connected by spring haptic
- Size: 6.5 mm x 9.5 mm

Barbara Kusa MD
CMA, Centro di Microchirurgia Ambulatoriale
Monza – (Milan)
Italy

Synchrony Dual Optics AIOL – 18 Months Clinical Results

- 53 eyes of 18 patients
- Mean Age: 71.62 ± 7.62
- Mean Preoperative BCVA: 0.67 ± 1.61
- Mean Time Follow Up Days: 660.96 ± 44.63
- Mean Preoperative Sphere Equivalent: 0.48 ± 1.42
- Incision Size: 5.75 mm using calibrate metal knife

Synchrony Implantation Technique

- Insert injector tip to CCC edge
- Release 1st optic
- Open capsular bag by pushing leading optic against the posterior capsule
- Deliver 2nd optic into capsular bag
The new generation Synchro™ VU Accommodating IOL is designed to provide enhanced near vision without compromising quality of vision. Central blended aspheric zone designed to extend depth of focus. Latest innovation advancing the Synchro™ platform. The lens is CE Mark approved.

Monocular defocus curve Synchro™ Dual Optics AIOL

- No Contrast Sensitivity Penatization
- Halos or Glare similar to Monofocal IOLs
- Future AMD: No Future Visual Penatization due to IOLs Technology
- Best Choice for Suspiotuos Patient, with Possible High Sensitivity to Glare and Halos, but Highly Demanding for New Technology IOLs
- Provide Intermediate Vision

Functional Image Analyzer OPTEC 6600P

- Daytime (86 cd/m²), Nighttime (3 cd/m²) and Nighttime with Glare (3 cd/m²)
- Monocular testing
- Paper demonstrated strong age dependence of CS with age
Multifocal IOLs Contrast Sensitivity

Synchrony contrast sensitivity
Daytime, Nighttime and Nighttime with glare

Multifocal IOLs Contrast Sensitivity

Multifocal IOLs Contrast Sensitivity

Cataract Surgery Main Complications - National Register
Where are we?

Cataract Surgery Main Complications
Where are we?

27% Posterior Capsule Opening
33% Endophthalmitis
26% Corneal Decompensation

Only 81% of eyes see 20/20 after cataract surgery
Biometry 91% within ± 1 D
### ADDRESSES

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