Late Intraocular Lens Subluxation in Patients with Uveitis

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Introduction

• Late in-the-bag IOL subluxation is an unusual complication of phacoemulsification cataract surgery

• Incidence of IOL subluxation 0.2-2.8% described
Classification IOL Subluxation

- **TIME:** Early vs late (3mo)
Classification IOL Subluxation

• **TIME:** Early vs late (3mo)

• **IN- OR OUT-OF THE BAG**

  **Out of the Bag**
  - Insufficient support in capsular bag or sulcus
  - Zonular rupture, complicated surgery

  **In the Bag**
  - Typically late
  - Lens/bag complex instability
  - Typically posteriorly, rarely anteriorly
Risk factors for in-the-bag IOL subluxation

- PXF
- Myopia
- Trauma
- Vitreo-retinal surgery
- Retinitis pigmentosa
- Complicated cataract surgery
- Advanced cataract
- Uveitis
<table>
<thead>
<tr>
<th>Author</th>
<th>Journal</th>
<th>Year</th>
<th>No. eyes</th>
<th>Mean years to subluxation</th>
<th>Leading causes (%)</th>
<th>Uveitis cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones JJ et al</td>
<td>AJO</td>
<td>2014</td>
<td>14</td>
<td>7.5</td>
<td>PXF (71)</td>
<td>0</td>
</tr>
<tr>
<td>Fernandez et al Eye</td>
<td>Eye</td>
<td>2013</td>
<td>61</td>
<td>7.5</td>
<td>Myopia (20)</td>
<td>1.6% (1 eye)</td>
</tr>
<tr>
<td>Jakobsson et al JCRS</td>
<td>JCRS</td>
<td>2013</td>
<td>88</td>
<td>7.8</td>
<td>PXF (53)</td>
<td>3% (3 eyes)</td>
</tr>
<tr>
<td>Krepste et al Medicina</td>
<td>Medicina</td>
<td>2013</td>
<td>58</td>
<td>5.5</td>
<td>PXF (57)</td>
<td>6% (3 eyes)</td>
</tr>
<tr>
<td>Matsumoto et al</td>
<td>EJO</td>
<td>2012</td>
<td>21</td>
<td>7.9</td>
<td>VR (40)</td>
<td>9% (2 eyes)</td>
</tr>
<tr>
<td>Davis et al Ophthalmol</td>
<td>Ophthalmol</td>
<td>2009</td>
<td>86</td>
<td>8.5</td>
<td>PXF (50) VR (19)</td>
<td>2% (2 eyes)</td>
</tr>
<tr>
<td>Hayashi et al Ophth</td>
<td>Ophth</td>
<td>2007</td>
<td>38</td>
<td>8.3</td>
<td>PXF (45)</td>
<td>2.6% (1 eye)</td>
</tr>
<tr>
<td>Gimbel et al JCRS</td>
<td>JCRS</td>
<td>2005</td>
<td>73</td>
<td>6.1</td>
<td>PXF (52)</td>
<td>6% (5 eyes)</td>
</tr>
<tr>
<td>Gross et al AJO</td>
<td>AJO</td>
<td>2004</td>
<td>25</td>
<td>6.9</td>
<td>PXF (44)</td>
<td>16% (4 eyes)</td>
</tr>
</tbody>
</table>
Mechanism - Zonule Failure

- Zonule weakness
- Capsule contraction syndrome or fibrosis causing zonular stress

Davis D. Late In-the-Bag Spontaneous Intraocular Lens Dislocation. *Evaluation of 86 Consecutive Cases*. Ophthalmology 2009
Methods

• **A review of five cases** of late in-the-bag IOL subluxation in patients in the Manchester Uveitis Clinic

• All had previously undergone **uneventful phacoemulsification** + IOL surgery

• **Uveitis** identified as the **ONLY risk factor** in all 5 cases
5 Patients

- **Age range**: 35-82 yrs (mean 59.4)
- **Sex**: 4F, 1M
- **IOL**: Acrylic 1 or 3-piece
- **Yag Caps**: 1/5
- **Uveitis**: FHU, Birdshot, Chronic intermediate, chronic posterior, chronic panuveitis
**Timing**
Mean time to subluxation 11 years (Range 5-13)

Cataract surgery: 48 yrs (22-70)
IOL subluxation: 59 yrs (35-82)
IOL Subluxation

All inferiorly displaced
1 bag/IOL complex into AC
SYMPTOMATIC?

NO or tolerable/inoperable

Watch

YES

FIXATION OF EXISTING IOL

Optic fixation
Haptic fixation

REMOVE IOL

Urgent vs elective

Aphakic

Secondary IOL
Management
Management

- Observation (n=2)

6/19, chronic hypotony & only eye
Management

- Observation (n=2)
- Re-positioning of existing IOL (n=1)
  - Scleral fixation
  - Iris fixation
Management

- Observation (n=2)
- Re-positioning of existing IOL (n=1)
  - Scleral fixation
  - Iris fixation
- Explantation of IOL
  - Aphakia (n=1)
  - Secondary IOL options
    - Anterior chamber IOL
    - Iris fixated claw IOL (anterior or retro-pupillary)
    - Scleral fixated (sutured or sutureless) (n=1)
Uveitic patients - considerations

- Nature, severity and control of inflammation
- Previous uveitic complications eg CMO/IOP
- Existing iris changes eg FHU/herpetic
- Corneal disease
- Visual potential of affected eye
- State of fellow eye
Outcomes of surgical intervention (3/5 cases)

<table>
<thead>
<tr>
<th>Complication</th>
<th>Number (interval)</th>
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<tbody>
<tr>
<td>IOP&gt;30mmHg</td>
<td>-</td>
</tr>
<tr>
<td>CMO</td>
<td>-</td>
</tr>
<tr>
<td>Worsening of uveitis</td>
<td>-</td>
</tr>
<tr>
<td>Vitreous haemorrhage</td>
<td>-</td>
</tr>
<tr>
<td>Retinal Detachment</td>
<td>-</td>
</tr>
<tr>
<td>IOL re-dislocation</td>
<td>-</td>
</tr>
<tr>
<td>IOL suture breakage or haptic exposure</td>
<td>-</td>
</tr>
<tr>
<td>Macular hole</td>
<td>1 (18mo)</td>
</tr>
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</table>
Scleral Fixated IOL
Conclusions

• IOL dislocation is a rare, late complication in uveitic patients

• Conservative management may be appropriate

• Fixation of the existing IOL or removal and implantation of a secondary IOL may be necessary

• Good outcomes have been achieved in our service using scleral fixation techniques and is currently the preferred option

• Long-term outcomes of SF-IOL in uveitic patients remain uncertain
Contributors

- Mr S Charles & Mr M Lavin, Consultant MREH
- Mr B Williams, Medical Illustration
- Ophthalmic photographers
### Comparison of the Advantages and Disadvantages of Different Methods of IOL Fixation

<table>
<thead>
<tr>
<th>Implantation Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>ACIOL</td>
<td>• Technically less demanding</td>
<td>• Requires mostly intact iris diaphragm</td>
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<tr>
<td></td>
<td>• Reduced operative time</td>
<td>• Unresolved concern regarding long-term effects on corneal endothelium and blood aqueous barrier</td>
</tr>
<tr>
<td>Iris claw lens</td>
<td>• Technically less demanding</td>
<td>• Potential for increased damage to angle, PAS, and glaucoma</td>
</tr>
<tr>
<td></td>
<td>• Reduced operative time</td>
<td>• Requires intact iris diaphragm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unresolved concern regarding long-term effects on corneal endothelium and blood aqueous barrier</td>
</tr>
<tr>
<td>Iris suture-fixated PCIOL</td>
<td>• Physiological position near nodal point of eye</td>
<td>• Require intact iris diaphragm</td>
</tr>
<tr>
<td></td>
<td>• Physical separation from corneal endothelium</td>
<td></td>
</tr>
<tr>
<td>Transscleral fixated PCIOL</td>
<td>• Physiological position near nodal point of eye</td>
<td>• Increased operative time</td>
</tr>
<tr>
<td></td>
<td>• Physical separation from corneal endothelium</td>
<td>• Increased risk of intraocular hemorrhage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Possibly increased risk of retinal detachment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Late suture erosion and exposure (unless knot rotated into eye)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Risk of suture related endophthalmitis</td>
</tr>
</tbody>
</table>
In-The Bag IOL Dislocations - Mechanism

- Zonular insufficiency is the final common cause leading to in-the-bag dislocations

• MECHANISMS:
  - ZONULAR WEAKNESS
    • (age and unrecognised/subclinical during cataract surgery)
  - CAPSULAR CONTRACTION/FIBROSIS

Capsular fibrosis promoting capsulorrhexis phimosis is another mechanism leading to zonular weakness. The phi-mosis exerts a tractional force on the capsular bag that is transmitted to the zonules.19 Capsular contraction syndrome may lead to zonulysis by itself; however, any capsular fibrosis may transmit increased force into the zonular apparatus. This force is not likely to be absorbed symmetrically by the zonules. Fibrosis therefore is an underlying cryptic force contributing to zonular insufficiency and late IOL dislocation, and indeed it was found to be a significant finding in this study, with cases of capsulorrhexis phimosis in all IOL groups.