Vision Loss and Recovery after Trabeculectomy: Risk and Associated Risk Factors


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Introduction

• Recommending glaucoma filtration surgery in patients with severely compromised visual fields for fear of loss of central vision or “snuff-out” phenomenon has been debated.

• The study objective is to determine the risk of long-term vision loss after trabeculectomy with mitomycin C and to determine the course of long-term visual loss versus transient loss and recovery.
Methods

• Records of 301 eyes of 262 patients who underwent trabeculectomy from 1999-2003 were retrospectively reviewed.

• Vision loss was divided into two groups:
  – mild/moderate (defined as decrease of 3-5 lines of Snellen visual acuity).
  – severe (>5 line decrease of visual acuity).

• Vision loss was considered “permanent” if visual acuity did not have a return of 3 lines within 6 months of follow-up.

• Statistical analysis was performed with SAS, version 9.2, for Windows (SAS Institute Inc, Cary, North Carolina).

• Descriptive statistics were used to compare baseline demographics of two postoperative groups:
  – permanent vision loss
  – other (comprising transient or no vision loss).
Results

• Permanent vision loss occurred in 24 of 301 eyes (8%):
  – 13 (4.3%) mild/moderate loss.
  – 11 (3.7%) severe loss.
• Ten (3.3%) cases of permanent mild/moderate loss and 6 (2.0%) cases of permanent severe loss had no identifiable cause.
• Significant risk factors for permanent unexplained severe vision loss were preoperative split fixation on visual field, number of quadrants of split fixation, and choroidal effusions (even after resolution).
• Transient vision loss occurred in 170 (56%) patients: 79 (26.2%) mild/moderate with mean recovery of 88.3 days (range 6 to 720) and 91 (29.8%) severe with mean recovery of 78 days (range 6 to 720).
Results

Risk factors and incidence of unexplained vision loss following trabeculectomy

Note: Numbers for visual field parameters are for evaluable patient data only, with some unable to perform VF.

<table>
<thead>
<tr>
<th>UNEXPLAINED Permanent Vision Loss</th>
<th>OTHER</th>
<th>Odds Ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILD/MOD.</td>
<td>SEVERE</td>
<td>TOTAL (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Split Fixation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Split Fixation Quadrant numbers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Study Design

- Retrospective with 3 month follow up
- Prospective with 2 month follow up

<table>
<thead>
<tr>
<th>Study</th>
<th>No. of Eyes (No. of Patients)</th>
<th>Study Design</th>
<th>Procedure Studied</th>
<th>VF Defect Requirement (Goldmann test)</th>
<th>Other Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Definition of Severe Vision Loss</th>
<th>No. (%) with Unexplained Vision Loss</th>
<th>Idiosyncrasies of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law et al. 2007</td>
<td>117 (117)</td>
<td>Retrospective [with 6 month follow up]</td>
<td>Trabeculectomy with mitomycin C</td>
<td>&gt;85% test points ≤5dB or &gt;75% test points ≤5dB and ≥¾ of central test points ≤5dB</td>
<td>Consistent optic nerve cupping, one eye of each patient (if both eyes qualifies, eye with greatest VF damage selected)</td>
<td>Uveitic or neovascular glaucoma; nonglaucomatous optic neuropathy; corneal or retinal disease; aphakia; concurrent procedure</td>
<td>VA ≤20/200 in affected eye, ≤CF if pre-op VA &lt;20/200, or &gt;4-line reduction in Snellen VA</td>
<td>0% Only included patients with preoperative severe loss of central vision</td>
<td></td>
</tr>
<tr>
<td>Toupouzis et al. 2005</td>
<td>21 (12)</td>
<td>Prospective [with 3 month end point]</td>
<td>Trabeculectomy with mitomycin C (+2 concurrent cataract operations)</td>
<td>AGIS score &gt;16 (Humphrey)</td>
<td>&quot;End-stage glaucoma,&quot; defined on basis of VF as being &quot;high risk for wipe-out&quot; phenomenon (including uveitic glaucoma)</td>
<td>None mentioned</td>
<td>Not stated; In considering 4 cardinal points - Number of points with sensitivity &lt;5dB included as main outcome measure (5dB selected arbitrarily) - Mean sensitivity of 4 central points used to evaluate status of fixation</td>
<td>0 Small sample size; 9 of 12 patients with both eyes included</td>
<td></td>
</tr>
<tr>
<td>Costa et al. 1993</td>
<td>508 (440) (4 cases of VA wipe-out compared with 85 controls)</td>
<td>Retrospective [with 3 month follow up]</td>
<td>Trabeculectomy (24 eyes with fluorouracil), trabeculectomy with anterior vitrectomy (2), trabeculectomy with Molteno implantation (6)</td>
<td>No requirement</td>
<td>None mentioned</td>
<td>Central vision considered &quot;lost&quot; when BCVA ≤20/200 or when visual field examination confirmed central scotoma</td>
<td>4 (0.95%) Small sample size; included eyes without loss of VA as &quot;treated group,&quot; eyes for which VA was lost to follow up</td>
<td></td>
<td></td>
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</tbody>
</table>

Conclusion: “Sudden unexplained postoperative loss of vision in patients with end-stage glaucoma is, at most, a rare complication.”
Discussion

Study Limitations

- Retrospective design
- Lack of regular postoperative Humphrey visual fields
- Study Strengths
- Large population
- Longer term follow up, allowing for measurement of visual recovery
- Measurement of mild-moderate versus severe as well as permanent versus transient visual decrease
Conclusion

- Our findings suggest that “snuff-out” or severe, long-term, unexplained vision loss, although rare, does occur after trabeculectomy with mitomycin C.

- Transient vision loss after trabeculectomy with mitomycin C is common and may take up to 2 years to recover.

- Careful preoperative evaluation of patients’ clinical risk factors is warranted during consideration of trabeculectomy with Mitomycin C in order to minimize the risk of “snuff out.”

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