Use of Home Tonometry for Detection of Therapy-Related Intraocular Pressure Changes

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INTRODUCTION

• Glaucoma is a leading cause of vision loss in the world.1 Intraocular pressure (IOP) is the main modifiable risk factor for prevention of glaucomatous optic neuropathy.2

• Patients experience peak IOP at different times between and within days,3 and possibly outside of business hours,4 leading to missed peak IOP measurements at regular office visits.

• Rebound tonometers, such as the iCare HOME (iCare Oy, Vanta, Finland), assess IOP by accelerating a probe at the cornea and measuring speed of deceleration after impact. It is validated with Goldmann application tonometry5 (GAT), the gold standard for IOP measurement.

• The iCare HOME is designed for self-­tonometry performed at home in order to obtain a more complete assessment of a patients’ peak and range of IOP.

PURPOSE

To determine whether iCare HOME tonometry can detect therapy-related IOP changes for patients diagnosed with glaucoma or ocular hypertension.

METHODS

• Prospective controlled trial of patients seen at the Sue Anschutz-Rodgers Eye Center diagnosed with glaucoma or ocular hypertension.

• Participants met only one of the following criteria:
  - Group 1: Stable medical management of IOP with no planned change
  - Group 2: Plan for selective laser trabeculoplasty (SLT)
  - Group 3: Treatment-naïve, initiating first IOP-lowering topical therapy
  - Group 4: Adding second medication to baseline monotherapy

• Subjects recorded four daily IOP measurements (after awakening, before lunch, before dinner, before bed) using iCare HOME for 7 days.

• Group 1 (control) completed a second week of measurement after 6 weeks with no change in therapy. Groups 2-­4 initiated therapy change, recording a second week of measurements after 4-­6 weeks.

• Response to therapy was defined as ≥20% IOP reduction.

• Participants completed a feasibility survey upon study completion.

RESULTS

TABLE 1: Characteristics of Study Population

<table>
<thead>
<tr>
<th>Treatment Group (%)</th>
<th>Control Group</th>
<th>Therapy Change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (0%)</td>
<td>6 (33.3%)</td>
<td>9 (50%)</td>
<td>15 (83.3%)</td>
</tr>
<tr>
<td>Underlying SLT (0%)</td>
<td>5 (27.8%)</td>
<td>3 (16.7%)</td>
<td>8 (44.4%)</td>
</tr>
<tr>
<td>Treatment-naïve, Initiating Therapy (0%)</td>
<td>3 (16.7%)</td>
<td>1 (5.6%)</td>
<td>4 (22.2%)</td>
</tr>
<tr>
<td>Adding Second Medication to Monotherapy (0%)</td>
<td>4 (22.2%)</td>
<td>6 (33.3%)</td>
<td>10 (55.6%)</td>
</tr>
<tr>
<td>Previous Treatment (%)</td>
<td>10 (55.6%)</td>
<td>6 (33.3%)</td>
<td>16 (88.9%)</td>
</tr>
<tr>
<td>Previous SLT (0%)</td>
<td>12 (66.7%)</td>
<td>4 (22.2%)</td>
<td>16 (88.9%)</td>
</tr>
<tr>
<td>Previous Medical Treatment (9%)</td>
<td>10 (55.6%)</td>
<td>5 (27.8%)</td>
<td>15 (83.3%)</td>
</tr>
</tbody>
</table>

• Group 1 (control): No significant difference in IOP was detected by iCare HOME between week 1 and week 2 (p ≥ 0.0042 for all comparisons).

• Groups 2-­4: GAT detected therapy response for 11/25 (44%) eyes. Of these, a response was also measured by iCare HOME for 10/11 (90.9%) eyes at 1+ time periods and 5/11 (45.5%) at all 4 time periods (Figure 1).

• Groups 2-­4: GAT did not detect a treatment response in 14/25 (56%) eyes, however iCare HOME did measure a response in 10 (71.4%) of these eyes at 1+ time periods and 1 (7.1%) eye at all 4 time periods.

• 92% reported using iCare HOME as “very easy” or only “mildly difficult.”

CONCLUSIONS

• iCare HOME reliably detects therapy-related IOP reduction for patients with glaucoma & ocular hypertension and may detect treatment responses missed by GAT.

DISCLOSURES

• No relevant disclosures exist for any author.
• Financial Support: This work was supported in part from an unrestricted research award from Research to Prevent Blindness.

REFERENCES


FIGURE 1: Eyes Responding to Therapy Change

TABLE 2: iCare HOME IOP Estimates by Time Period & GAT-detection

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Control Group</th>
<th>Therapy Change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10am</td>
<td>16.0 (12.3, 18.6)</td>
<td>15.6 (12.0, 18.2)</td>
<td>15.0 (12.3, 17.7)</td>
</tr>
<tr>
<td>10am-3pm</td>
<td>16.9 (13.6, 19.0)</td>
<td>17.2 (12.8, 18.1)</td>
<td>14.0 (11.3, 16.6)</td>
</tr>
<tr>
<td>3pm-8pm</td>
<td>0.4 (-1.5, 2.2)</td>
<td>-0.1 (-1.4, 1.6)</td>
<td>-1.0 (-2.8, 0.8)</td>
</tr>
<tr>
<td>8pm-1am</td>
<td>-0.4 (-2.2, 1.4)</td>
<td>-0.2 (-3.0, 1.6)</td>
<td>-0.2 (-2.0, 1.4)</td>
</tr>
</tbody>
</table>

GAT-detected Therapy Response (mean, 95% CI):

Week 1: 21.6 (19.4, 23.8) 22.0 (20.7, 23.1) 21.5 (19.3, 23.7) 17.2 (15.0, 19.3)
Week 2: 17.0 (14.8, 19.2) 15.8 (13.8, 18.0) 15.0 (13.7, 18.3) 13.7 (11.5, 15.9)

Change: 4.0 (3.0, 5.0) 7.1 (4.9, -5.1) 6.6 (4.5, 8.8) 3.4 (1.5, 5.3)

No GAT-detected Therapy Response (mean, 95% CI):

Week 1: 17.1 (15.0, 19.2) 17.2 (15.2, 19.3) 16.6 (14.5, 18.6) 14.6 (12.6, 16.6)
Week 2: 15.0 (12.9, 17.0) 13.0 (11.3, 15.0) 13.8 (11.8, 15.8) 12.2 (10.1, 14.2)

Change: -2.1 (-3.3, -0.9) -3.3 (-5.0, -1.6) -2.8 (-4.4, -1.2) -2.4 (-4.1, -0.8)