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, Vanda, Finland), assess IOP by accelerating a probe at the cornea and measuring speed of deceleration after impact. It is validated with Goldmann applanation tonometry[5] (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

	Control Group	Therapy Change	Total
Number of Eyes *(n)*	n=18	n=25	n=43
Age *(mean, SD)*	67.7 (5.0)	65.1 (10.5)	65.9 (9.0)
Gender *(female, %)*	8 (88.9%)	8 (44.4%)	16 (59.3%)
Corneal Pachymetry *(mean, SD)*			
Right Eye	537.0 (36.7)	549.8 (33.1)	545.6 (34.2)
Left Eye	541.0 (32.8)	548.1 (36.7)	545.7 (34.9)
Glaucoma Type *(n, %)*			
POAG	6 (66.7%)	11 (61.1%)	17 (63%)
PDG	1 (11.1%)	2 (11.1%)	3 (11.1%)
Ocular Hypertension	1 (11.1%)	4 (22.2%)	5 (18.5%)
Normal Tension Glaucoma	1 (11.1%)	1 (5.6%)	2 (7.4%)
Treatment Group *(n, %)*			
1) Stable Management	9 (100%)	0 (0%)	9 (33.3%)
2) Undergoing SLT	0 (0%)	8 (44.4%)	8 (29.6%)
3) Treatment-naïve, Initiating Therapy	0 (0%)	4 (22.2%)	4 (14.8%)
4) Adding Second Medication to Monotherapy	0 (0%)	6 (33.3%)	6 (22.2%)
Previous Treatment *(n, %)*	9 (100%)	11 (61.1%)	20 (74.1%)
Previous SLT	0 (0%)	1 (5.6%)	1 (3.7%)
Previous Medical Treatment	9 (100%)	10 (55.6%)	19 (70.4%)

- Group 1 (control): No significant difference in IOP was detected by iCare HOME between week 1 and week 2 ($p \geq 0.0042$ 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."

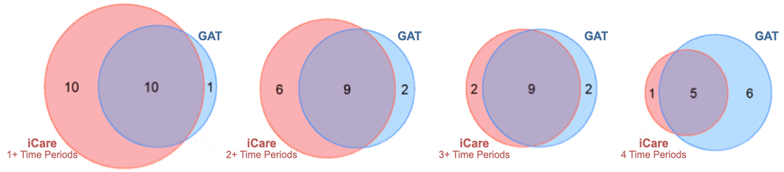
RESULTS (cont'd)

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

	5-10am	10am-3pm	3-8pm	8pm-1am
Control Group *(mean, 95% CI)*				
Week 1	16.0 (13.3, 18.6)	15.6 (12.9, 18.2)	15.0 (12.3, 17.7)	13.8 (11.1, 16.4)
Week 2	16.3 (13.6, 19.0)	15.5 (12.8, 18.1)	14.0 (11.3, 16.6)	13.4 (10.7, 16.1)
Change	0.4 (-1.5, 2.2)	-0.1 (-1.8, 1.6)	-1.0 (-2.8, 0.8)	-0.4 (-2.2, 1.4)
GAT-detected Therapy Response *(mean, 95% CI)*				
Week 1	21.6 (19.4, 23.8)	22.9 (20.7, 25.1)	21.5 (19.3, 23.7)	17.2 (15.0, 19.3)
Week 2	17.0 (14.8, 19.2)	15.8 (13.6, 18.0)	15.9 (13.7, 18.0)	13.7 (11.5, 15.9)
Change	-4.6*** (-6.7, -2.5)	-7.1*** (-9.1, -5.1)	-5.6*** (-7.6, -3.6)	-3.4*** (-5.4, -1.5)
No GAT-detected Therapy Response *(mean, 95% CI)*				
Week 1	17.1 (15.0, 19.1)	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)	13.9 (11.9, 15.9)	13.8 (11.8, 15.8)	12.2 (10.1, 14.2)
Change	-2.1* (-3.8, -0.4)	-3.3*** (-5.0, -1.6)	-2.8*** (-4.4, -1.2)	-2.4** (-4.1, -0.8)

*p<0.5; **p<0.01; ***p<0.001

FIGURE 1: Eyes Responding to Therapy Change



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.
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