The Association between Glaucoma Medication Adherence and Intraocular Pressure Variability in the Collaborative Initial Glaucoma Treatment Study (CIGTS)

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PURPOSE

- Because variability of intraocular pressure (IOP) is an established risk factor for visual field loss, we investigated the association between IOP variability and medication adherence in participants randomized to the medication arm of the CIGTS

METHODS

- 607 newly-diagnosed, open-angle glaucoma patients participated in the CIGTS, of which 307 were randomized to treatment with medication
- Participants were followed every 6 months up to 10 years at clinic visits, where measures of IOP were taken, and in telephone interviews, where self-reported medication adherence information was obtained
- Cumulative measures of IOP variability (range, SD, maximum) were calculated over all available visits for years 1-8
- Medication adherence was assessed by responses (Yes or No) to “Did you happen to miss any dose of your medication yesterday?”
- Medication adherence was assessed by
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- Younger participants (p=0.0011), those with worse baseline MD (p=0.0159), and those of Black race (p=0.0119) were more likely to have worse adherence

RESULTS

- Participants (n=307) were 53% male, 54% White, on average 57.4 years old (SD=11.2), and followed for an average of 7.3 years (SD=2.3)
- 1 subject dropped out prior to follow-up
- 7% (n=21) reported missed at ≥2/3 of visits
- 10% (n=31) reported missed at 1/3-2/3 of visits
- Cumulative measures of IOP variability were highly correlated (r=0.82 to 0.97, p<0.0001)

- Over all available follow-up, missing a medication dose was reported as follows:
  - 46% (n=142) never reported missing a dose
  - 37% (n=112) reported missed at ≤1/3 of visits
  - 10% (n=31) reported missed at 1/3-2/3 of visits
  - 1 subject dropped out prior to follow-up

- Range of IOP increased from an average of 4.7 mmHg at year 1 to 10.6 mmHg by year 8
- SD of IOP increased from an average of 2.5 mmHg at year 1 to 2.9 mmHg by year 8
- Max IOP increased from an average of 21.4 mmHg at year 1 to 23.9 mmHg by year 8
- Measures of IOP variability were highly correlated (r=0.82 to 0.97, p<0.0001)

- Increase in IOP Variability per 10% increase in Nonadherence
  - Unadjusted: Range IOP 0.27 (0.05, 0.50) p=0.0166
  - Adjusted: Range IOP 0.20 (0.03, 0.37) p=0.0192
  - Unadjusted: SD IOP 0.10 (0.03, 0.17) p=0.0039
  - Adjusted: SD IOP 0.10 (0.03, 0.17) p=0.0039
  - Unadjusted: Max IOP 0.28 (0.05, 0.48) p=0.0033

- In unadjusted and adjusted models, worse adherence was associated with larger range IOP, larger SD IOP, and higher maximum IOP

- The average IOP range at 8 years for a participant who reported never missing a dose of medication over follow-up was 9.9 mmHg (95% confidence interval, CI=9.4-10.3), whereas a participant who reported missing a dose of medication at 1/3, 1/2, and 2/3 of follow-up visits had an average IOP range at 8 years of 10.5 mmHg (CI=10.1-11.1), 10.9 mmHg (CI=10.2-11.6), and 11.3 mmHg (CI=10.3-12.2); (p=0.0192)

CONCLUSIONS

- These results link medication non-adherence to increased IOP variability
- IOP variability has been shown to be a risk factor for visual field loss (Musch DC, Gillespie BW, Niziol LM, Lichter PR, Varma R; CIGTS Study Group. Intraocular pressure control and long-term visual field loss in the Collaborative Initial Glaucoma Treatment Study. Ophthalmology 2011;118(9):1766-73)
- Limitations include self-reported medication adherence, and being queried about missing medication only twice a year on the previous day
- Further study will explore pathways between medication adherence, IOP variability, and visual field progression to capture the inter-relationship between these factors

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