Sayoko (Sy) E. Moroi, MD, PhD
Chair and Director of the Department of Ophthalmology and Visual Sciences
The Ohio State University Wexner Medical Center

Future of Vision Treatment and Research
Financial Disclosures 2019 – 2020

• Aerie Pharmaceuticals, Inc.: Grant Support (completed 2019 UM)
• Allergan: Grant Support (UM)
• Icare USA: Grant Support (completed 2019 UM)
• Ocuphire: Grant Support (completed 2019, UM)
• Wolters Kluwer Health: Royalty for Shields’ Textbook of Glaucoma
• Federal: NSF AWD010114 (MPI Argento & Moroi), R01 EY022124 (PI Moroi), R21 EY030363 (MPI Musch & Moroi), R01 EY025752 (PI Komaromy)
• Grateful patients
1. Telehealth options for glaucoma
   Communities
   Preparing for COVID-19
   - Healthcare professionals
     • Develops guidance for healthcare professionals
     • Conducts clinical outreach and education
   - Healthcare systems
     • Develops preparedness checklists for health systems
     • Provides guidance for PPE supply planning, healthcare system screening, and infection control
     • Leverages existing telehealth tools to redirect persons to the right level of care

2. Vision parameters as markers for cognitive function in late mid-aged women

1. Telehealth options (Telemedicine for Ophthalmology Info Statement, AAO 2018)

1. Live audio-video (synchronous) telemedicine

2. Store-and-forward (asynchronous) telemedicine

3. Remote physiological monitoring (RPM)

4. Mobile health (mHealth)
Hybrid telehealth appointments for glaucoma care:

Drive through IOP check

Testing appointment (vision, IOP, visual field and imaging) + live audio-video appointment
72 yo active general surgeon, progression OS. CCT 551 OD; 545 OS. IOPs 10-16 mmHg (fixed combo dorz+tim OU, travoprost OU).
Telehealth in glaucoma management

Benefits:
- Decrease exposure times of patient and staff
- Acquire data (e.g., vision, IOP, imaging, visual field)
- Decrease wait times compared to in person office visits
- New technologies to acquire data

Limitations:
- Requires specific technology equipment
- Requires minimum broadband access
- Expense of equipment
- Impact on doctor-patient relationship (?)
- Learning curve for patients, staff, health systems, insurance coverage
2. Vision parameters as markers for cognitive function in late mid-aged women

Image from:
From: Public Attitudes About Eye and Vision Health

Conditions With the Greatest Effect on Day-to-Day Life (Zogby Analytics conducted survey. Funding: Research to Prevent Blindness, Alliance for Eye and Vision Research
Evidence of vision impairment and cognitive decline


Key Points

**Question** Is visual impairment associated with women’s risk for developing dementia?

**Findings** In this cohort study of 1061 older women, baseline objectively measured visual impairment was associated with a 2- to 5-fold increased risk of dementia over a median 3.8 years of follow-up; 3.1% of participants without objective visual impairment developed dementia vs 8.2% of those with visual acuity of 20/40 or worse. More severe visual impairment was associated with increasingly elevated risk of incident dementia.

**Meaning** These results suggest that visual impairment may be a risk factor for dementia; findings are limited by sample size, and more research is needed in a larger population.
Interactions Between Dementia and Self-reported Vision Impairment in Anticipating Activity Limitations

Functional ability scores correspond to the marginal predicted proportions from multivariable Poisson regression models. The marginal predicted proportions were divided by the number of survey items making up each of the 3 outcomes to make the scale equivalent across outcomes.
Question: Is hypertensive retinopathy associated with cognitive function?
What is SWAN?

- Multi-site, longitudinal study to examine women’s health during the middle years
- Age at recruitment 42 – 52 years
- Parameters: physical, biological, psychological and social changes
- University of Michigan studied vision as an ancillary parameter
SWAN Study Timeline

Cognitive tests Age 64.9 ± 2.7
Eye exams Age 66.0 ± 2.7
Methods

Cognitive tests on Visit 15

- East Boston Memory Test = assessment of verbal episodic memory immediately and after 10-minute delay
- Digit span backwards = assessment of working memory
- Symbol digits modalities test = assessment of memory by attention, perceptual speed, motor speed, and visual scanning (limitation as depends on vision)

Ophthalmologic exam (Visit 16) to assess:

- Refractive error
- Dry eye
- Cataract
- Glaucoma
- Diabetic retinopathy
- Hypertensive retinopathy
- Macular degeneration
- Other
Results: Forest plot of cognitive z-score

Interpretation: Hypertensive (HTN) retinopathy was associated with lower cognitive scores while adjusting for demographics, education, systemic HTN, use of blood pressure meds, and study visit.
FIGURE 1 | Possible mechanisms that can explain the association between hypertension and cognitive impairment/dementia.
Conclusions from topic #1 & #2

potential patient-centered glaucoma assessment

is here to stay

research to discover vision and eye biomarkers for memory decline and dementia
Funding

Topic 1: RPB, P30 EY007003 (UM), R01 EY022124 (SM)

Topic 2: R21EY030363 (DCM, SEM).

SWAN is supported by grants from the National Institute on Aging (NIA), the National Institute of Nursing Research (NINR) and the NIH Office of Research on Women’s Health (ORWH) with U01NR004061; U01AG012505, U01AG012535, U01AG012531, U01AG012539, U01AG012546, U01AG012553, U01AG012554, U01AG012495. This study was additionally supported by NIA R01AG017104 (Michigan SWAN Strength & Functioning Study)

University of Michigan MCubed support (SEM, CK-G)

K23EY027848 (JRE)

Acknowledgements

Topic 1: Telehealth with Carin Rojas, Jesse Gilbert, David Reed

Topic 2: SWAN project with Sarah Wood, Michelle Hood, Joshua Ehrlich, Carrie Karvonen-Gutierrez, Brenda Gillespie, David Musch
Thank you
Submit Your Questions Through Q&A