EFFECT OF EARLY AGE RELATED MACULAR DEGENERATION ON THE DISK HALO SIZE PRODUCED BY A GLARE SOURCE

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PURPOSE

Age-related Macular Degeneration (AMD) is one of the leading causes of irreversible vision loss and blindness among elderly persons.[1] Persons in the early phases of AMD are more likely to experience difficulty in night driving and glare disability compared with those in good retinal health.[2] The presence of subretinal drusen is associated with a scotopic dysfunction, a slower dark adaptation[3] and a reduced visual acuity in eyes with early and intermediate AMD.[4]

Measuring the size of a glare source-induced disk halo has been proposed as an objective method of quantifying quality of mesopic vision.[5] As strategy for preventing AMD and arresting its early progression, the aim of this study was to examine the disk halo size in response to a glare source in eyes with early to intermediate Age-related Macular Degeneration.

METHODS

This observational, transversal, and comparative study examined 56 eyes of 56 subjects without systemic diseases, and having cataract surgery with bilateral implantation of a monofocal intraocular lens (AcrySof SN60WF, Alcon) 6 to 9 months previously to avoid the light scatter effects of aging lens on halo size:

- 24 no AMD Control subjects.
- 15 Early AMD subjects.
- 17 Intermediate AMD subjects .

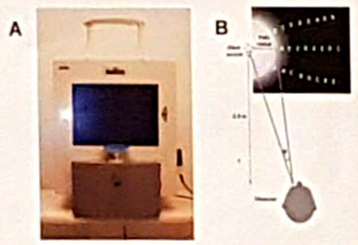

Figure 1. *Measuring halo size. **A)** Vision Monitor. **B)** Diagram showing how the visual angle produced by the radius of the halo is determined (φ).*

The inclusion criteria were: Corrected distance visual acuity (CDVA) ≥ 0,8 decimal, photopic pupil size ≥ 3,00mm, and a spherical equivalent ≤ ± 2.25 D.

Setting place was the Ophthalmologic Clinic Rementeria. With the best-optical correction in the selected eye:

- LogMAR VA was assessed using high-contrast (HC-96%) ETDRS acuity charts, at a distance of 4 m, under photopic luminance conditions (85 cd/m²).
- After 5 minutes to mesopic adaptation (0.1 to 0.2 cd/m²), disk halo radius was measured using the Vision Monitor (MonCv3, Metrovision, France). Optotypes (0.33 decimal VA) of low luminance (5 cd/m²) were presented at a distance of 2.5 m. The visual angle subtended by the radius of the halo was calculated in Log. minutes of arc (log arc min) (Figure 1). [6]

RESULTS

The table 1 presents the demographic and baseline characteristics of Control, early AMD and intermediate AMD groups (Mean ± SD). All the groups were well-matched in terms of age, spherical equivalent (SE), photopic pupil size and photopic VA according to the established inclusion criteria.

Table 1. *Demographic and Baseline Characteristics of Control, early AMD and intermediate AMD groups. (Mean ± SD).*

	TOTAL	Control	Early AMD	Intermediate AMD
N (eyes)	**56**	**24**	**15**	**17**
Sex (Female/Male)	28 / 28	11/13	7/8	10/7
Age p-value: 0,4862	75,38 ± 5,88 (60,00 - 84,00)	74,46 ± 6,51 (60,00 - 84,00)	76,85 ± 5,05 (69,00 - 84,00)	75,47 ± 5,63 (64,00 - 84,00)
SE p-value: 0,9687	-0,07 ± 0,67 (-1,75 - 2,25)	-0,01 ± 0,80 (-1,50 - 2,25)	-0,11 ± 0,27 (-0,75 - 0,375)	-0,12 ± 0,72 (-1,75 - 1,5)
Photopic pupil Ø p-valor:0,0039	3,42 ± 0,57 (2,50; 5,00)	3,42 ± 0,49 (3,00; 4,50)	3,76 ± 0,67 (3,00; 5,00)	3,11 ± 0,37 (2,50; 4,00)
Photopic VA p-value: 0,6801	0,02 ± 0,06 (-0,20 - 0,12)	0,01 ± 0,07 (-0,20 - 0,10)	0,03 ± 0,06 (-0,10 - 0,12)	0,03 ± 0,05 (-0,10 - 0,10)

The figure 2 shows box plots of halo radius (log arc min) in the Control, early AMD and intermediate AMD groups. The mean halo radii (±SD) were 2,30 ± 0,15 log arc min, 2,36 ±0,12 log arc min and 2,38 ± 0,13 log arc min in the Control, early AMD and intermediate AMD groups, respectively.

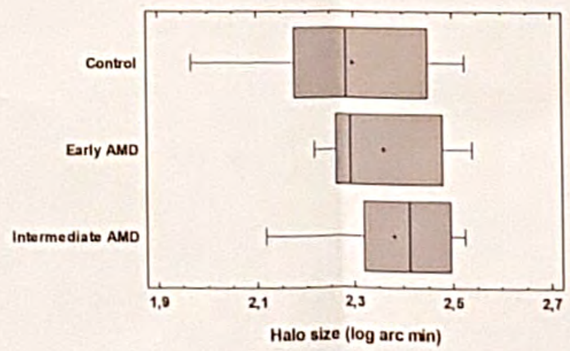

Figure 2. *Box plots of halo radius (log arc min) in the Control, early AMD and intermediate AMD groups.*

Between the groups, no significant differences were found in the mean halo radii (P-value = >0,05).

However, there were 46%, 47% and 76% of eyes with disk halo radius above the cutoff value (2.30 log arc min) reported to diagnose cataract in the Control, early and intermediate AMD groups respectively (figure 3). The x^2 analysis was no significant.

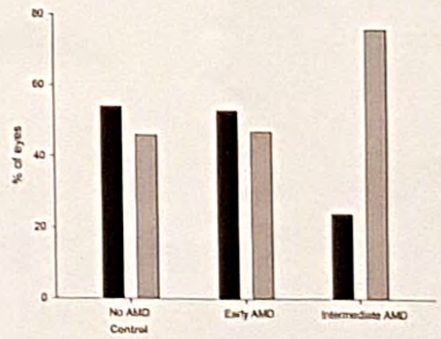

Figure 3. *Percentage of eyes with disk halo radius below (black bars) and above (grey bars) the cutoff value (2.30 log arc min) reported to diagnose cataract.*

CONCLUSIONS

Early to intermediate AMD did not affect the disk halo size induced by a given glare source. Across all pseudophakic eyes, an increased size of the disk halo would be indicative of altered scattering, transmission and reflection properties of various parts of the aging eye.

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