AREDS2 SUPPLEMENTATION SLOWS MACULAR DEGENERATION IN NON-PROLIFERATIVE IDIOPATHIC TYPE 2 MACULAR TELANGIECTASIA

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DISCLOSURES

- RAS –AGTC (C, A), Gyroscope (C), Leica (C)
- DMM – Genentech (C, A), Novartis (C, A), Regeneron (C, A), Vortex (O)
- CDR – Alcon (C, S), Alimera (C, S), Allergan (S), Bausch and Lomb (S, C), CSTLII (S), Haag-Streit (C, S), Gyroscope (C), HumanOptics AG (C), iVeena (O, C), Janssen (C), Kaleidoscope (C), Lineage/Biotime (C), MedOne (C), NotalVision LLC (C), Novartis (S), Orbit Biomedical (C), Regeneron (S), Reliance (C, S), Salutaris (C, S), TrueVision (C, S), Vortex (S)
- TAB, MWM, JMO, LBL, REF, MRP – None

SUMMARY

- The natural history of macular telangiectasia type 2 is bilateral slowly progressive visual acuity loss and macular photoreceptor degeneration
- In this retrospective study, patients with IMT2 who used off-label AREDS2 formula maintained visual acuity and photoreceptor integrity at 2 years following initiation of treatment compared to untreated patients who deteriorated
- A prospective, randomized, controlled trial is warranted

INTRODUCTION

- Idiopathic Macular Telangiectasia Type 2 (IMT2) is a neurodegenerative disease characterized by a defect in serine metabolism resulting in loss of macular luteal pigments, cystic macular atrophy, and retinal telangiectasia
- The Macular Telangiectasia Project provided natural history outcomes including visual acuity loss and photoreceptor deterioration by OCT[1]
- Oral carotenoid supplementation increased macular pigment optical density in IMT2 but only in areas where macular pigment was present prior to treatment initiation[2,3]
- Visual acuity outcomes have been variable in previous studies with oral carotenoid supplementation for IMT2[2-4]

[1]Charbel Issa P et al. Prog Retin Eye Res. 2013;34:49–77
[2]Zeimer MB et al. Retina. 2010;30:586–595
[3]Choi RY et al. *Retina*. 2017:2238-2247
[4]Tan ACS et al. *Ophthalmic Surg Lasers Imaging Retina*. 2016;47(6):528-535.

STUDY DESIGN

- Purpose: Evaluate if a commonly available formulation of carotenoid and antioxidant supplementation in Age Related Eye Disease Study 2 (AREDS2) may prevent anatomic or visual deterioration in IMT2
- Methods: Retrospective, comparative, consecutive series of all cases of IMT2 at Cincinnati Eye Institute between January 1, 2013 and January 1, 2018
- Three providers routinely prescribed AREDS2 for IMT2 based upon preliminary evidence of preservation of macular pigment optical density (RAS, JMO, LBL), while other partners did not; patients not receiving AREDS2 served as a natural history control but were not matched to the AREDS2 patients
- Exclusion criteria: CNVM, GA, DME, ERM, other ocular abnormalities that would confound or decrease vision

OUTCOME MEASURES

Primary Outcome:

Snellen Visual Acuity at 24 months

Secondary Outcomes:

Changes on SD-OCT:

1) Central macular thickness (CMT)
2) Greatest cyst diameter (GCD)
3) Length of ellipsoid zone (EZ) loss on horizontal foveal raster scan

RESULTS: DEMOGRAPHICS

- 320 charts identified by ICD9 and ICD10 codes for IMT2
- 113 patients met the inclusion criteria
- Female preponderance
- Mean age ~65
- Baseline VA similar (~20/37)
- Baseline OCT characteristics similar

Table 1. Demographics and Baseline Characteristics

	AREDS2	Untreated	*p* value*
Eyes, no.	82	122	
Patients, no.	43	70	
Gender, no.			
Male	15	17	
Female	28	53	
Laterality, no			
Right eye	40	58	
Left eye	42	64	
Age, years mean ± SD	64.3 ± 10.8	66.8 ± 9.0	0.18
BCVA, logMAR mean ± SD	0.28 ± 0.18	0.26 ± 0.22	0.34
SD-OCT data, µm mean ± SD			
CMT	246.8 ± 27.4	250.0 ± 35.0	0.62
EZL	500.5 ± 529.8	475.6 ± 476.1	0.69
GCD	232.5 ± 220.8	251.1 ± 230.1	0.62

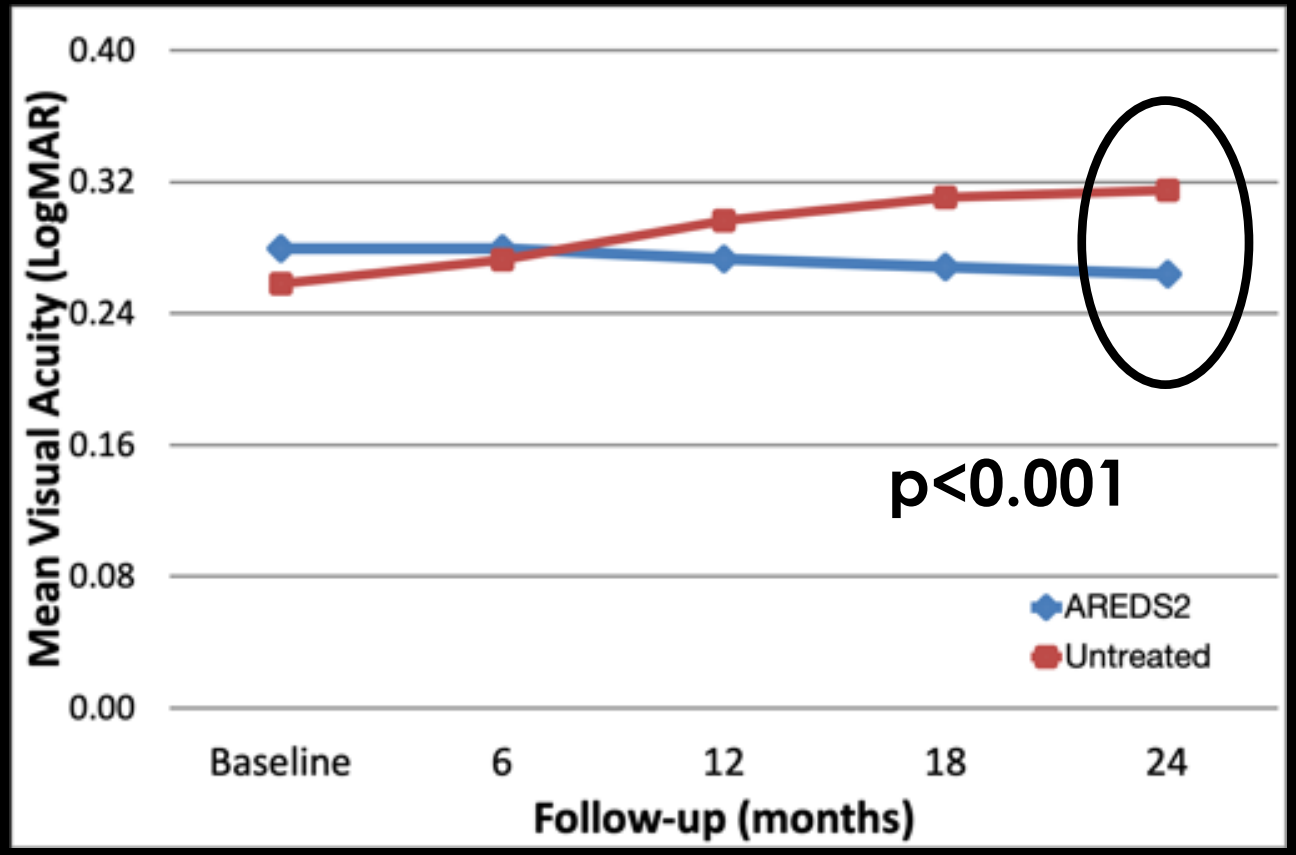
SD = stardard deviation; BCVA = best corrected visual acuity; SD-OCT = spectral domain optical coherence tomography; CMT = central macular thickness; EZL = ellipsoid zone loss length; GCD = cavity diameter.

**p* value reflects statistical comparison between AREDS2 and untreated eyes; $p < 0.05$ denotes statistical significance

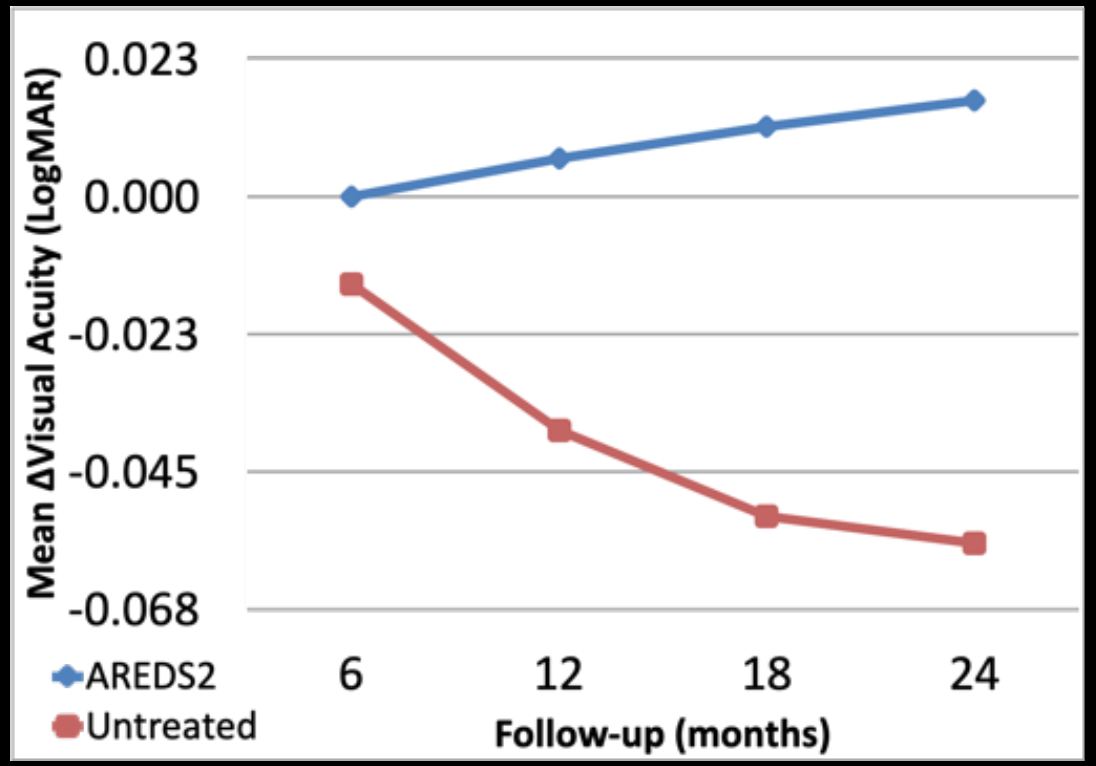
RESULTS: VISUAL ACUITY

- Untreated eyes showed a decline in BCVA at 2 years (20/42 vs 20/36)
(0.32 ± 0.24 vs. 0.26 ± 0.22 logMAR; **p < 0.001**)

- Mean BCVA was similar to baseline at 2 years for AREDS2 eyes (20/38 vs 20/36)
(0.28 ± 0.18 vs. 0.26 ± 0.19 logMAR, p = 0.35)



RESULTS: VISUAL ACUITY



Mean change in BCVA from baseline for AREDS2 and untreated controls

Month	AREDS2	Untreated	P-value
6	0.000 ± 0.106	-0.014 ± 0.085	0.29
12	0.006 ± 0.134	-0.038 ± 0.129	0.01
18	0.011 ± 0.128	-0.052 ± 0.133	0.002
24	0.016 ± 0.134	0.057 ± 0.150	<0.001

RESULTS: ANATOMIC CHANGES

- Mean change in EZ loss was significantly greater for untreated eyes compared to AREDS2 at 24 months

  (-84.3 ± 167.3 vs. -1.5 ± 199.9 µm, p =0.003)

- EZ loss was similar to baseline at 24 months for AREDS2 treated eyes

  (500.5 ± 529.8 vs. 502.1 ± 501.0 µm; p = 0.94)

- Mean change in GCD and CMT was similar between both cohorts at 24 months

Mean change in anatomical outcomes respective to baseline for AREDS2 and untreated eyes

		Mean ± SD	*p* value*
Δ CMT, µm			
	AREDS2	-1.0 ± 17.4	0.61
	Un-treated	-2.9 ± 20.4	
Δ GCD, µm			
	AREDS2	1.2 ± 95.4	0.23
	Un-treated	-17.5 ± 117.8	
Δ EZ Loss, µm			
	AREDS2	-1.5 ± 199.8	0.003
	Un-treated	-84.3 ± 167.3	

**p* value reflects comparison between AREDS2 and untreated eyes

DISCUSSION

- Strengths
  - Largest retrospective series evaluating effects of carotenoid supplementation in IMT2
  - Excellent compliance with treatment and follow-up
- Limitations
  - Retrospective, controls not matched, not randomized
  - EZ measurements taken from horizontal SD-OCT raster rather than *en face*
  - No microperimetry to correlate functional and anatomic outcomes
  - Both eyes were included in the analysis, although outcomes unchanged with single eye analysis (best or worse eye)
  - Could not analyze baseline macular pigment optical density

CONCLUSIONS

- IMT2 eyes treated with AREDS2 supplementation showed significantly reduced EZ loss and BCVA decline compared to a natural history cohort
- Our results suggest AREDS2 stabilizes visual acuity and slows anatomical deterioration in non-proliferative IMT2
- A confirmatory randomized controlled clinical trial is warranted