In-vivo mitochondrial imaging as a biomarker in Retinitis Pigmentosa and Stargardt Disease.

Abstract Number: 1460 - A0033

Amanda Victoria Martinez[*1], Tamara Juvier Riesgo[2], Carlos Mendoza-Santiesteban[2], Byron L. Lam[2]*
[1]The Ohio State University College of Medicine, Columbus, Ohio, United States; [2]University of Miami Health System Bascom Palmer Eye Institute, Miami, Florida, United States

Disclosures: Amanda Victoria Martinez: Code N (No Commercial Relationship) | Tamara Juvier Riesgo: Code N (No Commercial Relationship) | Carlos Mendoza-Santiesteban: Code N (No Commercial Relationship) | Byron L. Lam: Code N (No Commercial Relationship)

Purpose

Flavoprotein Fluorescence (FPF) is a direct marker of oxidative stress and mitochondrial dysfunction within the retina, making it a promising biomarker for retinal diseases. The study aimed to evaluate mitochondrial metabolic integrity in patients with retinitis pigmentosa (RP) and Stargardt Disease (SD) to assess if mitochondrial imaging may be used for early detection of retinal diseases.

Methods

This cross-sectional clinical study included patients over age 18 years with an established diagnosis of RP (n = 19) or SD (n = 8) recruited during their routine visits. Participants underwent standard ophthalmic workup and FPF imaging using the OcuMet Beacon (OcuSciences, Inc., USA) was performed to assess intensity and variability in the macular and nasal retinal regions in both eyes. Best-corrected visual acuity (BCVA), mitochondrial FPF signal intensity and variability (heterogeneity) were compared between groups using SPSS (version 29.0.2.0), and statistically significant was set at <0.05.

Results

The RP cohort (mean age 50.68±17.8 years, 58% female) and the SD cohort (49.6±20.2 years, 50% female) had BCVA of 0.4±0.3 and 0.3±0.4 Snellen decimal, respectively. The mitochondrial FPF signal intensity was significantly higher in the macula of patients with SD (35.94±9.23) than in those with RP (19.36±5.99, p<0.001). For the nasal area, the intensity was also higher in SD (37.07±5.68) compared to RP (21.05±10.87, p<0.001). Additionally, the FPF variability was increased in SD patients in comparison with RP patients in both macular (7.51±1.54 vs 5.01±1.23, p<0.001) and nasal regions (9.52±3.98 vs 5.04±1.51, p<0.001).

Conclusions

The intensity and heterogeneity of FPF were significantly increased in SD patients compared to RP

patients. Measuring flavoprotein fluorescense may serve as a promising biomarker to differentiate inherited retinal diseases.