

Project

Title: Age-related macular degeneration (AMD) deceleration: aging accelerating factors and photobiomodulation (PBM) treatment.

Aim: To analyze the potential effect of aging prevention and of photobiomodulation treatment in a consecutive cohort of intermediate age-related macular degeneration (AMD) patients.

Background:

AMD generally affects 12% of the population over the age of 70 years old. The dry form, occurred in 80% of cases, does not have a specific therapy while the neovascular form treatment is expensive and demanding both for patients and for medical facilities with medium- and long-term limited results. Due to the lack of a specific cause of AMD progression, the aim of the project is to study a cohort of patients affected by AMD in intermediate stage analyzing aging factors that could influence the course of the disease and moreover, to study ophthalmological response to PBM. Recently PBM, a physical treatment based on tissue regeneration, is emerging in numerous medicine fields demonstrating a potential deceleration in AMD progression.

Having said this premise, the project, which is then described in detail, applies a rationalized, synthetic and personalized preventive strategy based on the most recent publications in scientific literature on PBM and retinal diseases.

The project will include a systemic study based on the screening of the inflammatory and ischemic condition, in particular the active search of chronic infections and an in-depth study of the ocular microcirculation both via ophthalmological examination and with specific ultrasound doppler.

Finally, once the systemic investigations have made, retinal PBM will be performed. All data will be entered into a specific created database.

The authors included in the study will be: Dr Alfredo Pece (Ophthalmologist), Professor Claudio Azzolini (ophthalmologist), Dr. Federica Fossataro (Ophthalmologist), Dr. Claude Boscher (Ophthalmologist), Professor Massimo Venturini (Sonographer) and Dr. Nicola Vallani (dentist), Dr Mariano Cozzi (M.Sc-Master of Science) . Chief and director of the study will be Dr Claude Boscher.

Potential questions to answer.

- To observe the relationship between the presence of Aging accelerating factors and the stage of intermediate AMD : can they be part of the reason for the phenotype diversity of the disease (i.e. aside to hereditary and non hereditary genetic factors)
- To observe the potential effect of the correction of Aging accelerating factors alone on the progression of AMD
- To observe the effects of PBM in a consecutive cohort of intermediate AMD cases compared to the published (Lightsite) studies (i.e. selected patients)
- To observe the effects of the correction of Aging accelerating factors prior to PBM treatment
- To compare patients with intermediate AMD with systemic diseases and abnormal blood chemistry tests with those with no systemic diseases and normal blood tests.
- To compare patients with both eyes in intermediate stage treated with photobiomodulation with patients with one eye in intermediate stage treated with photobiomodulation and the other eye in stage 4.

Patients COHORTS to compare

- Intermediate AMD stage with and without overlooked Aging accelerating factors (control of their importance in clinical practice)
- Intermediate AMD natural evolution versus PBM treatment (control PBM studies)
- Intermediate AMD without significant Aging accelerating factors at baseline treated with PBM (control PBM studies)
- Intermediate AMD with significant Aging accelerating factors at baseline treated with PBM with and without prior correction of aging accelerating factors (control “boosting” PBM)

Material and Methods.

Patients

The Inclusion Criteria are patients over 50 years-old with dry AMD (stage intermediate). The advanced stage characterized by geographic atrophy is excluded. In the case that a patient has geographic atrophy or neovascular AMD (stage 4 of Beckman classification), the contralateral eye can be enrolled if it is in stage 3. Visual acuity should be between 20/100 and 20/32.

Eyes affected by AMD stage 1,2 and 4 or characterized by other macular retinal diseases, different than AMD, such as diabetes, vascular occlusion and inflammatory diseases were excluded.

Enrollment

Each patient is enrolled during an ophthalmological routine visit. In presence of inclusion criteria, the ophthalmologist will propose the study participation to the patient and in case of acceptance, carry out the required test directly (1st step) with informed consent. A complete ophthalmological visit will be performed in each patient including best-corrected visual acuity (BCVA) measurements using the ETDRS grid, fundus oculi, followed by basic spectral domain-optical coherence tomography (SD-OCT) of macular region, OCT angiography with particular analysis of retinal plexus, autofluorescence scan of the posterior pole, contrast sensitivity test, dark adaptation test and cine video indocyanine green angiography (ICGA). Except for ICGA, all the ophthalmological examination will be performed at baseline and repeated at three, six, nine and 12 months in both study groups. Moreover, a life quality test will be performed at each visit.

After having carried out the ophthalmological tests, each patient will be sent to a laboratory center for blood chemistry tests and to sonographer for the ultrasound of the ophthalmic artery (2nd and 3rd steps). A periodontitis visit will be carried out in each participant at baseline (4th step).

The anti-aging doctor will visit each patient in the ophthalmological office and in this occasion the phobiostimulation treatment will be carried out in the same center. Dr Claude Boscher will visit each patient in the ophthalmological studio for review of testing 3-5 and thorough screening of Aging accelerating factors

- a. In absence of significant factors, PBM treatment First session will be carried out in the same session.
- b. In presence of significant factors, the patient will be directed for potential complementary investigations and correction
 - b.i. The patient will be visited again after potential correction in a 2-3 months timeline by Dr Boscher, and PBM First session will be performed in the same session
 - b.i.1. Cohort a : Aging aggravating factors corrected
 - b.i.2. Cohort b : not corrected (control PBM)

In case of any systemic pathologies, the anti-aging doctor will help and direct the patient for a possible resolution (5th step).

PBM treatment Sessions according to the LightSite III protocol : 3 sessions of 9 treatments in 3-4 weeks.

Follow-up: Pre-Month 4, Pre month 8, Month 12: complete oph examination except CVA-ICG, plus Life-Quality Test.

The project described below will start At Retina 3000 Foundation Milano in 1st September 2023.