# CORRELATION BETWEEN CHANGES IN CHOROIDAL THICKNESS AND VISUAL ACUITY IN NEOVASCULAR AGE-RELATED MACULAR DEGENERATION AFTER AFLIBERCEPT INTRAVITREAL INJECTION

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## Introduction

**Epidemiology:** Age-related macular degeneration is the most common cause of permanent visual loss around the world in people over the age of 65 years in developed countries, the disease forms about 9% of blindness cases. The number is expected to reach about 300 million by 2040.

**Risk factors for AMD:** Other than age, white race, female gender, arterial hypertension, hypercholesterolemia, cardiovascular disease, obesity, positive family history, smoking, high levels of C-reactive protein and other inflammatory markers, hyperopia, and light-colored iris are risk factors for developing AMD. Smoking is the most important modifiable risk factor.

**Types of AMD:**

1. **Dry AMD:** Drusen, pigmentary changes in the retina, RPE atrophy or geographic atrophy may be present.
2. **Wet AMD:** Signs of wet type include RPE detachment, subretinal fluid, subretinal hemorrhage and choroidal neovascularization.

•**Types of CNV:**

- Type 1 (occult or subRPE) - Type 2 (classic or subretinal)
- Type 3 (retinal angiomatous proliferation RAP)

•**Treatment:** Life style modification, photodynamic therapy and anti-VEGF agents are treatment modalities.

## Aim of the Work

To investigate the correlation between changes in sub foveal choroidal thickness in neovascular age-related macular degeneration and visual acuity after receiving three monthly doses of Aflibercept, depending on using Heidelberg optical coherence tomography (enhanced depth image) (Heidelberg Engineering, Inc., Heidelberg, Germany).

## Patients and Methods

**Patients:** A cohort of 31 eyes of 31 participants presenting to ophthalmology department of Alexandria University Main hospital were included in this prospective interventional study.

**Inclusion criteria:** Patients with neovascular AMD (subretinal CNV) who are treatment naive and planned for 3 monthly injections of aflibercept over a 3months period.

**Exclusion criteria:** previous treatment for neovascular AMD .

Patients under 50 years of age, diabetics, previous vascular occlusion, high myopes and recent cataract surgery. History of glaucoma or vitreoretinal surgery.

**Methods:**

**History and clinical examination**

**Optical coherence tomography:** using Heidelberg spectralis optical coherence tomography using enhanced depth image measuring choroidal thickness sub foveal and 1500 micron from the fovea by manual method. Central foveal thickness was also measured before and after injection.

**Fluorescein** angiography and OCTA were done whenever possible.

## Results

**Table 1:** Pre-post difference in study parameters (n = 31)

| Term | Avg (SD) | Median (IQR) | Range: Min-Max |
|---|---|---|---|
| BCVA change (LogMar) | -0.21 (0.35) | 0 (0.4) | -1 - 0.7 |
| CFT change (micron) | -35.32 (71.57) | -20 (45.5) | -267 - 85 |
| SCT change (micron) | -2.58 (16.67) | -4 (11) | -43 - 37 |
| CT1500 change (micron) | -3.29 (18.61) | -3 (14) | -72 - 30 |

BCVA: Best corrected visual acuity CFT: Central foveal thickness
SCT : Subfoveal choroidal thickness CT : Choroidal thickness

**Table 2:** Spearman's correlation matrix between study parameters (n = 31) (changes in retinal and choroidal thickness after intravitreal injection)

| Term | Age (years) | BCVA change (LogMar) | CFT change (micron) | SCT change (micron) | CT1500 change (micron) |
|---|---|---|---|---|---|
| **Age (years)** | - | - | - | - | - |
| **BCVA change (LogMar)** | -0.131 | - | - | - | - |
| **CFT change (micron)** | 0.09 | 0.188 | - | - | - |
| **SCT change (micron)** | 0.162 | -0.017 | 0.421* | - | - |
| **CT1500 change (micron)** | -0.317 | 0.17 | 0.06 | 0.188 | - |
| **Pre Injection BCVA (LogMar)** | 0.557* | -0.408* | -0.072 | 0.06 | -0.103 |
| **Pre Injection CFT (micron)** | 0.026 | -0.092 | -0.435* | -0.079 | 0.234 |
| **Pre Injection SCT (micron)** | -0.359* | -0.272 | -0.268 | -0.29 | -0.289 |
| **Pre Injection CT 1500 micron from fovea (micron)** | -0.247 | -0.013 | -0.069 | -0.144 | -0.256 |

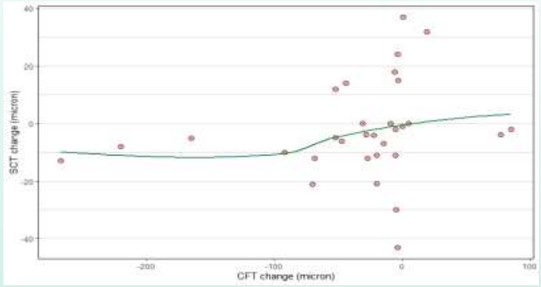


**Figure 1:** Correlation between CFT change and SCT change among our study participants (n:31).

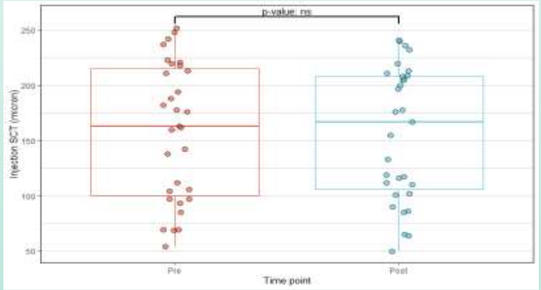


**Figure 2:** Comparing pre- and post-injection subfoveal choroidal thickness among our study participants (n:31).

## Conclusion

Our findings highlighted a statistically significant improvement in BCVA after three doses of monthly intravitreal aflibercept injections. We also observed a positive correlation between changes in CFT and SCT, reflecting the effectiveness of the therapy in addressing both retinal and choroidal abnormalities, with greater reductions in these parameters suggesting better overall therapeutic outcomes.

However, the lack of correlation between CFT and SCT with BCVA cannot guarantee the reliability of these radiological biomarkers as surrogate for visual acuity.