



AXIAL LENGTH AND SUBFOVEAL CHOROIDAL THICKNESS IN INDIVIDUALS WITH AGE-RELATED MACULAR DEGENERATION; BEFORE AND AFTER INTRAVITREAL BEVACIZUMAB INJECTION

Clinical Anatomy

Sebastian J Pengiparambil*	Little Flower Institute of Medical Science and Research, Kerala University of Health Sciences, Kerala, India. *Corresponding Author
Dr. A. Gnanavel	Meenakshi Medical College Hospital & Research Institute, Enathur, Kanchipuram, Tamandu.
Dr. S. Saravana Kumar	Meenakshi Medical College Hospital & Research Institute, Enathur, Kanchipuram, Tamandu.
Prof. D Kesavi	Department of Anatomy, Sri Ramachandra medical college, hospital and; Research. Porur, Chennai, Tamandu.
Dr. D Dinesh Roy	GENETIKA, Centre for Advanced Genetic StudiesPettah, Trivandrum.

ABSTRACT

The study investigates the effects of bevacizumab injections on AL and SFCT in patients with wet ARMD. In a sample of 70 patients aged 50-80, including 39 males and 31 females, the analysis showed a mean elevation in AL from 20.52mm pre-injection to 23.35mm post-injection. SFCT decreased from 341.7µm to 272.6µm. The study found a AL was inversely correlated with SFCT. with SFCT thinning as AL increases. No significant gender differences in ARMD were observed, but age was a factor, with older patients at higher risk. The findings suggest that SFCT may be a practical measure for observing treatment effects. needs in exudative AMD.

KEYWORDS

“Axial Length(AL), Sub choroidal Thickness, Age-related Macular degeneration, bevacizumab, subfoveal choroidal thickness (SFCT)”.

INTRODUCTION:

Age-related macular degeneration (ARMD), also known as senile macular degeneration, affects both eyes and typically develops in individuals over 50 years old. **AMD can progressively impair central vision** and is classified into non-exudative and exudative forms [1]. Sub-foveal choroidal thickness (SFCT) is defined as a vertical distance from the hyperreflective line of RPE to the hyperreflective line corresponding Involving the sclera choroidal interface junction[1,2]. The axial length (AL) is the distance Situated between the anterior portion of the cornea and the fovea and is usually measured by A-scan ultrasonography[3].

The measurement of SFCT remains the most sensible and easily accessible means to assess choroidal function. “In humans, VEGF levels seem To demonstrate a link with the severity of the activation of neovascularization and vascular permeability. VEGF therefore appears to be the most prominent molecule inducing neovascularisation, and consequently, treatments inhibiting VEGF bioactivity have been widely used as the new paradigm to treat neovascular AMD[4]. Bevacizumab, a full-length anti-VEGF Antibody approved for systemic use in some solid tumours, is the prime molecule used to treat CNV by intravitreal injection in this study, we are comparing Axial length and SFCT parameters in patients affected by AMD. before and after injection [5]. we analysed Investigating how gender, axial length, and SFCT are related in wet ARMD.

The study aimed to investigate the changes in sub-foveal Choroidal dimension and axial length after intravitreal injection of bevacizumab, “this study aimed To examine AL and SFCT differences between patients with AMD and controls without any lesions.

MATERIALS AND METHOD

Methodology:

Seventy patients, all of whom met the inclusion and exclusion criteria, were enrolled from the retina department of the ophthalmology OPD, Little Flower Hospital and Research Center, Angamaly after obtaining informed consent. The Study received a Permit from the scientific and ethics committee of the Hospital.

Before performing the test, the patient was instructed about the whole procedure and also about the purpose of the study. “First, we can categorise the patients with wet ARMD. The respondent's age at the last birthday and gender were documented in a predesigned proforma. The patient's distance visual acuity was recorded unaided using an illuminated 6-meter Snellen chart in a well-light room, one eye at a

time. we are including the subject Having visual acuity worse than 6/18 and has an age group of 50-80 are included.” AL of the affected eye was determined with optical biometry (IOL Master Zeiss, Jena, Germany)”. Participants were placed in a comfortable seated position with their heads held steady chin on the chin rest and their forehead rested firmly on the headband of the IOL Master. They were instructed to constantly fixate on the internal fixation target within the machine. Five axial length (AL) measurements were taken per eye, and the average value was used for analysis. Subfoveal choroidal thickness (SFCT) was manually measured by two independent observers using 1-line raster scan OCT images (Stratus OCT, Carl Zeiss Meditec, Inc., Dublin, CA, USA) taken horizontally through the foveal center. The subfoveal choroid was defined as the choroidal region located beneath the central concave retinal depression, within a 1500 µm diameter area. A single choroidal thickness measurement was obtained from the horizontal raster scan, extending from the outer border of the retinal pigment epithelium (RPE) to the inner scleral border.

Similarly, AL and SFCT were measured during the first post-operative visit, followed by the administration of a 0.05 ml dose of intravitreal bevacizumab. The associations between age, axial length, and SFCT in patients with wet age-related macular degeneration (ARMD) were analyzed.

RESULT&DISCUSSION:

Out of 70 Patients 31(44.2%) were females and 39 (55.7%) were males. the age group was between 50 to 80 years. The mean value of AL in pre injection is 20.52mm and in post injection is 23.35mm.

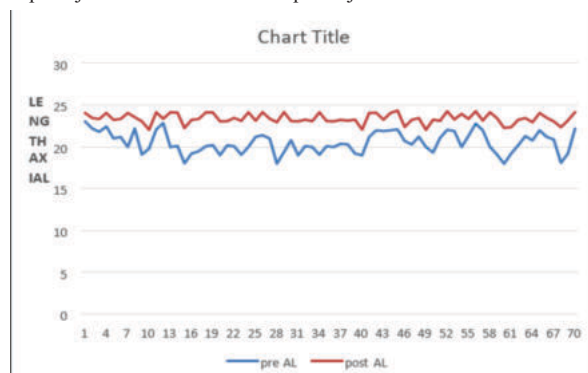


Figure-2 shows the comparison of axial length in pre and post-injection.

The mean difference between pre and post-AL measurements is 2.83mm.

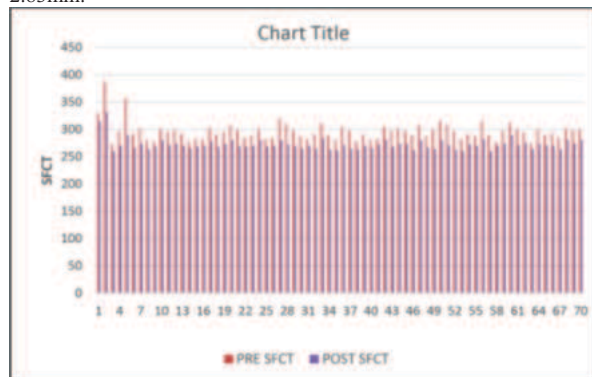


Figure-3 Shows The Comparison Of SFCT In Pre And Post Injection.

The mean value of SFCT in pre injection is 341.7 μ m and in post injection is 272.628 μ m. The mean difference of pre and post SFCT measurement is -69.072 μ m

DISCUSSION:

This study observed significant variations in AL and SFCT before and after the bevacizumab injection. "The association Across age, AL, and SFCT were discussed". The mean value of AL in pre injection is 20.52mm and in post injection is 23.35mm. The mean difference of pre and post AL measurement is 2.83mm. The mean value of SFCT in pre injection is 341.7 μ m and in post injection is 272.628 μ m. The mean difference of pre and post SFCT measurement is -69.072 μ m. However, there is considerable variation across these studies. The mean SFCT in healthy controls has been reported to range from 261.93 $\pm$ 88.42 μ m to 354 $\pm$ 111 μ m in different studies. These variations in choroidal thickness across studies could be attributed to several factors, including differences in OCT models, light source wavelengths, measurement software and processing techniques, sample sizes, age, sex, race, patient classification, refractive errors (REs), and axial lengths (ALs). Additionally, the visibility of the choroidal-scleral interface (CSI) using time-domain OCT plays a significant role in these measurements. Time-domain OCT, with its slower scanning speed and lower resolution, makes interpreting the CSI more challenging.

Our findings indicate that AL was the key determinant of choroidal thickness. Results from single-variable linear regression showed that as AL increased, SFCT decreased. This inverse correlation between AL and SFCT was evident both before and after the injection. Intravitreal bevacizumab injection affects a rapid decrease in SFCT to normal or near-normal levels. Our statistical evaluation demonstrates that in wet ARMD, the AL will be less and SFCT will be more. After the pars plana injection of 1.25mg Avastin (0.05ml bevacizumab at a concentration of 25 mg/ml), the SFCT decreases gradually and axial length increases."

The study of Melamud A, and Stinnett S found that intravitreal bevacizumab therapy produced an improvement in foveal thickness over time in eyes suffering from neovascular AMD. SFCT changes after Bevacizumab therapy for neovascular AMD. by Unlu c, Erdogan supports our findings.

There is no significant variation between gender ratios. In this study out of 70 subjects, 31 (44.2%) were females and 39(48.57%) were males. our study shows man has a little chance for wet ARMD. The age group was about 50 to 80 years. A clear relationship between age and ARMD has been observed. when age increases Evidence suggests a chance for wet ARMD[1,2].

CONCLUSION:

This study indicates that increased axial length (AL) is considered a significant factor contributing to reduced choroidal thickness. Subfoveal choroidal thickness (SFCT) in patients with exudative age-related macular degeneration (AMD) could serve as a valuable prognostic indicator for assessing treatment burden. Patients with a thicker subfoveal choroid may require more frequent intravitreal injections. Additionally, a negative correlation exists between axial length and subfoveal choroidal thickness. The SFCT will be more and AL will be less can be seen in before injection. The SFCT decreases

and AL will increases following the intravitreal bevacizumab injection. There is no significant variation for more chance to occur either males or females. Despite this, our study finds that little chance for males.

REFERENCES:

1. Ünü C, Erdogan G, Gunay BO, Kardes E, Akcay BIS, Ergin A. Modifications in subfoveal choroidal thickness following intravitreal bevacizumab injection in neovascular age-related macular degeneration patients and diabetic macular edema. *International Ophthalmology* [Internet]. 2017 Feb 1 [cited 2024 Jul 17];37(1):147– 58. Available from: <https://pubmed.ncbi.nlm.nih.gov/27154721/>
2. Lu L, Xu S, He F, Liu Y, Zhang Y, Wang J, et al. Assessment of Choroidal Microstructure and Subfoveal Thickness Change in Eyes Across all stages of age-related macular degeneration. *Medicine* [Internet]. 2016 Mar 1 [cited 2024 Jul 17];95(10):e2967. Available from: <https://pubmed.ncbi.nlm.nih.gov/26962799/>
3. Khurana AK,B. *Comprehensive ophthalmology*. New Delhi: Jaypee, The Health Sciences Publisher; 2015.
4. Lim JJ. *Age-related macular degeneration*. Boca Raton: CRC Press/Taylor & Francis Group; 2013.
5. Mogk LG, MarjaMogk. *Macular degeneration: the complete guide to saving and maximizing your sight*. New York: Ballantine; 2003.