OPTICAL COHERENS TOMOGRAPHY ANGIOGRAPHY FINDINGS IN ADULT PATIENTS WITH SICKLE CELL ANEMIA

Leyla Hazar[1], Esra Vural[2]
[1] *Dicle Universiy Medical Faculty, Ophthalmology Department, Diyarbakır, Turkey*
[2] *Kayseri City Hospital, Ophthalmology Department, Kayseri, Turkey*

Introduction: Sickle hemoglobin (HbS) is characterized by a mutation in the beta globin gene, which contains a single nucleotide (GA G à GTG) that replaces glutamine with valine at amino acid position six. These hemoglobins are insoluble at low oxygen concentrations and tend to crystallize. Interactions between sickle red blood cells and vascular endothelium often lead to vaso-occlusion and tissue ischemia. Detecting sickle cell retinopathy in its early stages is important to identify proliferative changes and prevent its long-term consequences, including vitreous hemorrhage, retinal detachment, and vision loss. Optical coherence tomography angiography OCTA is an easy-to-apply imaging method that does not require the use of dyes that accurately show retinal microvascularization.

Purpose: It was aimed to measure macular vascular density (VD) and foveal avascular zone (FAZ) in patients with sickle cell anemia by OCTA and to compare with healthy controls.

Methods: Eighteen right eyes (group 1) of 18 adult patients with sickle cell anemia followed in the hematology clinic of Dicle University, and 25 right eyes of 25 age- and sex-matched healthy individuals (group 2) were included in the study. Those with systemic diseases other than sickle cell disease, eye diseases such as retinal vascular disease, maculopathy, glaucoma, and those with high refractive errors were excluded from the study. Macular superficial capillary plexus (SCP) and deep capillary plexus (DCP) vascular density (VD) and FAZ measurements were made with OCTA (RTVue-XR Avanti; Optovue Inc., Fremont, CA, USA).

Patients with normal fundus examination and no other systemic disease were included in the study. Vascular density measurements were made in the macula with a 3x3 mm scanning mode. Vascular density in superficial and deep capillary plexus was compared in 8 sectors; as the whole image, parafovea, superior hemi, inferior hemi, temporal, superior, nasal and inferior. Image quality below 8/10 were excluded from the study.

Results: The mean age of group 1 was 24.73±6.60, group 2 was 23.70±3.19 ($p=0.572$). The female/male ratio was 10/8 in group 1 and 12/13 in group 2 ($p=0.500$). In patients with sickle cell anemia, there was a significant lower VD in DCP in all sectors compared to the control group ($p<0.001$) (Figure 1). There was a significant lower VD in the superficial capillary plexus only in the temporal region in group 1 compared to group 2 ($p=0.015$). Superficial FAZ was found to be statistically significantly larger in group 1 than group 2 ($p=0.001$). Deep FAZ width was found to be similar in both groups ($p=0.145$)

Conclusion: Sickle cell anemia causes a significant decrease in vascular density in the deep capillary plexus. Knowing exactly the status of retinal vascular density and FAZ in sickle cell anemia will guide the pathophysiology of retinopathy and will help prevent retinopathy at an early stage.