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Optic nerve head and macular neurovasculature in psychosis

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Case report

Studying the neurovasculature of the retina can provide invaluable information regarding Central Nervous System. This is mainly because the retina shares a common embryological origin with the brain [1]. The neurosensory retina can be regarded as an extension of the brain itself. Regarding vasculature and blood supply, the inner retina perfusion is provided by the central retinal artery, a branch of the ophthalmic artery that originates from the internal carotid artery. This linkage between the vascular networks of the retina and the brain makes it possible for clinicians to draw clues about CNS conditions by examining the retina [2].

In recent literature, particular interest has been shown in studying the retinal changes in psychotic patients. It has been suggested that schizophrenia, one of the most common causes of psychosis worldwide, is a multi-faceted disorder that results from the interaction of different genetic, vascular, and inflammatory etiologies [3,4]. From this aspect alone, information derived from studying the retinal neurovasculature may provide valuable insights regarding CNS modifications in schizophrenia patients. Examining the retina is considerably convenient due to its transparency and the availability of numerous imaging techniques, such as Optical Coherence Tomography Angiography (OCT-A). OCT-A is a non-invasive imaging modality that does not require any die administration and takes less than a minute to complete. These features have made OCT-A a very plausible option for studying retinal changes in psychosis [5].

Numerous data on different vascular and anatomical measurements of psychotic patients' retinas have been gathered by different research teams worldwide. As expected, the cases and the healthy controls have been matched in the aforementioned studies regarding other related comorbidities and social history. According to most of these data, in schizophrenia patients, nervous tissue and vascular density in some areas of the retina showed some levels of decrease when compared to the healthy subjects. For instance, in 2018, a study by Joe et al. showed decreased inner retinal thickness in schizophrenia patients compared to the control [6]. In another study by Budakoglu et al., the authors observed a significant decrease in peripapillary nerve fiber layer thickness and vessel density at the temporal quadrant in affected patients compared to healthy individuals [7]. We summarized the results of some previously published studies regarding the neurovascular changes of the retina in patients with schizophrenia in Table 1.

Table 1: The main findings of some previously published studies regarding the retinal neurovasculature in patients with schizophrenia.

Authors	Year	Main findings
Joe et al. [6]	2018	Inner retinal thickness is significantly lower in patients with psychosis thanin healthy subjects.
Budakoglu et al. [7]	2021	Peripapillary nerve fiber layer thickness and vessel density at the temporal quadrant were significantly lower in schizophrenia compared to healthy people.
Naghib et al. [8]	2022	Foveal and parafoveal thickness were significantly lower in patients with schizophrenia compared to healthy subjects.
Li et al. [9]	2022	No significant difference was observed in choroidal thickness in psychotic patients with healthy controls.
Bannai et al. [10]	2022	Microvascular alterations were observed in the schizophrenic group.
Topcu et al. [11]	2018	While macular thickness was significantly lower in patients with schizophrenia than in healthy controls, retinal nerve fiber layer, and choroidal thickness didn't show any significant difference.
Silverstein et al. [12]	2021	Macular and peripapillary nerve fiber layer thickness and retinal microvascular density were significantly lower in patients with schizophrenia.

This significant number of recent studies on this subject shows the growing interest in evaluating pathophysiologic mechanisms of neuropsychiatric disorders via retinal imaging modalities. However, some limitations hinder reaching any definite conclusions regarding retinal neurovascular changes in schizophrenic patients. In most of these studies, the sample size is relatively small, and the disease severity in studied participants is more heterogeneous than can be desired. Besides, the confounding effects of newer generations of antipsychotics and cigarette smoking on the retinal neurovasculature have not been appropriately addressed. Considering all these facts, it can be assumed that more studies are needed to shed light on this topic.

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