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Advancements in Optical Coherence Tomography Angiography for Early Detection of Diabetic Retinopathy

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Diabetic retinopathy (DR) remains a leading cause of blindness globally, especially among working-age adults. Early detection of retinal microvascular changes is essential to prevent irreversible vision loss. Optical coherence tomography angiography (OCTA) is a novel, non-invasive imaging modality providing detailed visualization of retinal and choroidal vasculature without dye injection. This study evaluated OCTA's diagnostic accuracy in detecting early microvascular alterations in 150 diabetic patients without clinical retinopathy and 50 healthy controls.

Quantitative OCTA metrics, including vessel density and foveal avascular zone (FAZ) area, were measured. Diabetic patients exhibited significant reduction in capillary density and enlargement of the FAZ compared to controls ($p < 0.001$). OCTA parameters correlated strongly with glycemic control markers such as HbA1c, suggesting microvascular impairment may precede clinical retinopathy. OCTA's sensitivity in early detection may enable timely intervention and improve patient outcomes.

Routine OCTA screening could revolutionize diabetic eye care by allowing ophthalmologists to detect subtle vascular changes, tailor follow-up intervals, and initiate early treatments, potentially reducing DR-related blindness.

Biography

Dr. Anika Patel is an Associate Professor of Ophthalmology at Moorfields Eye Hospital, London. She specializes in retinal imaging and diabetic eye disease, with a focus on advancing diagnostic techniques. Dr. Patel leads several international research collaborations in Optical Coherence Tomography Angiography (OCTA) and is recognized for her contributions to improving early detection and treatment of retinal conditions.