Exploration of Medicine

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Open Access Letter to the Editor

Ultra-widefield imaging technologies in the peripheral retinal pathologies

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Academic Editor: Margaret M. DeAngelis, University at Buffalo, USA

Received: July 28, 2022 Accepted: December 13, 2022 Published: February 16, 2023

Cite this article: Balyen L. Ultra-widefield imaging technologies in the peripheral retinal pathologies. Explor Med. 2023;4:1–2. https://doi.org/10.37349/emed.2023.00119

Keywords

Conventional imaging systems, peripheral retinal pathology, ultra-widefield retinal imaging

The technical progress of ophthalmic imaging systems has revolutionized the diagnosis and monitoring of many retinal diseases in recent years and has fundamentally changed ophthalmologists' understanding of numerous retinal and choroidal diseases. Diagnostic fundus imaging techniques play an increasingly important role in the diagnosis, grading, management, and follow-up of retinal and choroidal diseases. However, visualization of the posterior segment through conventional imaging systems is inadequate for the evaluation of retinal diseases. Because these cover a 20° to 50° field of view between the optic nerve and the macula. Besides, peripheral retinal pathologies such as ischemia and neovascularization, as well as a significant portion of the fundus, are excluded from this field of view. Ultra-widefield (UWF) retinal imaging applications allow the capture of both central and peripheral retina up to 200° eccentricity in a single image, hence enabling documentation and qualitative and quantitative evaluation of peripheral retinal lesions [1, 2].

UWF imaging systems allow several alternatives for fundus documentation and evaluation, including color and red-free fundus images, fluorescein and indocyanine green angiography images, fundus autofluorescence images, optical coherence tomography, and optical coherence tomography angiography [1–3]. There is a close relationship between central pathologies and changes in the peripheral retina. The peripheral retina is the site of many vision-threatening pathologies, including diabetic retinopathy, age-related macular degeneration, retinal vein occlusion, uveitis, retinal vasculitis, retinopathy of prematurity, retinal tears, holes, detachments, retinal and choroidal masses [1, 2]. It is logically certain that macular lesions can be detected simultaneously when imaging peripheral retinal lesions with UWF techniques. It has been proven in UWF-based clinical trials that total retinal surface area, non-perfusion area, neovascularization area, and peripheral lesions are more accurately detected with UWF images compared to non-UWF images [1, 4].

In conclusion, with the contribution of UWF imaging applications in the pathogenesis, classification, prognosis, and risk factors of retinal diseases, it will play a key role in the early diagnosis, effective

treatment, and monitoring of vision-threatening retinal diseases. Visualizing the peripheral retina up to 200° eccentricity with UWF imaging systems will fundamentally change the understanding of ophthalmologists about many retinal and choroidal diseases and thus expand clinicians' horizons in the revaluation of the peripheral retina. Principally, with the UWF imaging systems, clinicians' ability to diagnose and monitor peripheral retina pathologies will be fully developed. Therefore, very soon, UWF imaging technologies will be an indispensable medical examination device for routine daily modern retinal practices in ophthalmic health care settings. In this perspective, retina specialists will optimize the management of retinal diseases with UWF imaging systems.

Abbreviations

UWF: ultra-widefield

Declarations

Author contributions

The author contributed solely to the work.

Conflicts of interest

The author declares that he has no conflicts of interest.

Ethical approval

Not applicable.

Consent to participate

Not applicable.

Consent to publication

Not applicable.

Availability of data and materials

Not applicable.

Funding

Not applicable.

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