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Indirect imaging of branch retinal vein occlusion using a scanning laser ophthalmoscope
(走査レーザー検眼鏡を用いた網膜静脈分枝閉塞症の間接的画像化)

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Indirect Imaging of Branch Retinal Vein Occlusion using a Scanning Laser Ophthalmoscope

Running head: RETINAL FINDINGS IN BRVO USING SLO

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Conflict of interest: F. VAN DE VELDE: Nidek, Inc. (Consultant)

Cystoid macular edema (CME) is a common cause of visual loss in several macular diseases including branch retinal vein occlusion (BRVO) [1]. Evaluation of the macular pathology is important to determine the severity of the visual impairment.

Infrared (790 nm) indirect imaging using a SLO digital ophthalmoscope F-10 (Nidek, Gamagori, Japan) with a new aperture, we refer to this as the retro-mode. This apparatus can visualize retinal features undetectable by other methods. Herein we report the retinal findings evaluated by the retro-mode in patient with BRVO.

Case Report

A 60-year-old man who had had blurred vision OD for 2 months was diagnosed with BRVO at an eye clinic and referred to our hospital for detailed examination. The VA OD was 0.09. Retinal hemorrhage and macular edema were observed (Figure 1a). SLO examination showed cystic changes with a narrow confocal aperture and niveau-like findings, with the wide confocal aperture they revealed an impression of the fluid-fluid level with a meniscus (Figure 1b, c). Some niveau-like findings were seen at the inferior part of the image of the cyst. In retro-mode, the presence and progression of both large and small cystic changes at the macular area, and fine retinal wrinkles were clearly seen on topographic images (Figure 1d). OCT showed retinal cystic changes at the macular area (Figure 1e); however, no fine retinal wrinkles were seen and the niveau-like findings were barely visible on the OCT

images.

Comments

In the SLO, when light travels to the fundus, a great deal of both direct and indirect scattered light returns to the detector. With the confocal aperture, only the light returning from the focal plane can pass through the aperture [2]. The aperture for the retro-mode allows the light to return only from one direction to the confocal aperture. If the detector receives the returning light from a limited angle, it casts a shadow on the retinal pathology. Therefore, the borders of the cystic changes were highlighted by the retro-mode. Fine retinal wrinkles that were barely visible during the fundus examination were also observed. Even with an OCT, the resolution of the surface image is less distinct and the viewing angle is limited [3]. SLO infrared imaging facilitates observation of precise retinal changes and the full extent of the retinal findings. Therefore, the SLO is useful for gaining an understanding of the disease findings on fundus. Intraretinal hemorrhages can be observed through the retinal layers. The niveau-like findings were observed more distinctly on SLO infrared images and went beyond the findings on fundus photography. Niveau-like findings in the cystic changes can be observed when the fluid has high-density components; we speculate that this might be related to the severity of the leakage from the vessels. Cystic changes and intraretinal and subretinal hemorrhages were seen by OCT [4,5];

however, no mention niveau-like findings.

The SLO infrared examination visualizes the localization and the expanse of the findings in a 40-degree angle of view that is easy to compare to a fundus photograph and an angiographic image. Therefore, it would be useful to have a global overview of the fundus abnormalities before the OCT examination, because it would help to know where to focus the OCT examination. Some findings can be obtained only using SLO. Therefore, SLO can provide essential information relating to morphologic changes. Furthermore, because the method can be performed quickly and noninvasively and can, therefore, be done repeatedly, it would be clinically useful for evaluating the pathological changes and follow up patients with BRVO.

Keywords: branch retinal vein occlusion; cystoid macular edema; scanning laser ophthalmoscope

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Legend

Fig.1 **a** A color fundus image shows some hemorrhage and soft exudates. **b** A SLO image with the narrow confocal aperture shows cystic changes and retinal hemorrhages. **c** A SLO confocal image witha wide confocal aperture shows some niveau-like changes and hemorrhage. **d** SLO retro-mode shows cystic changes and the highlighted fine retinal wrinkles. **e** An OCT cross-sectional image shows cystic changes, but no niveau-like changes are seen.

Fig.1