

Research and report

Discussion on visualization techniques for diabetic retinopathy screening

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Background

In theory, fundus examination with traditional ophthalmoscopy should be able to detect fundus microvascular arteriosclerosis, fundus hemorrhage, fundus vascular infarction, neuropathy, papilledema[1,7,8]. In fact, the technical proficiency of fundus examiners affects whether they can see the retina clearly. When the subject's pupil, ophthalmoscope, and examiner's pupil are in line, the examiner should be able to see a certain area of the retina, and maintaining line only for a moment. Even if the examiner sees the area of the retina that he wants to see, the maintenance of this instantaneous memory and the ability of fundus image analysis based on the instantaneous memory are limited.

Objective

To explore the accurate method of microvascular visual detection, and to provide clinical reference for the early detection of diabetes complicated with vascular disease.

Method

VPT-I (Bio-Thesiometer) was used to non-invasively detect the sensory sensitivity of the nervous system to vibration in subjects with normal fasting blood glucose and above the upper limit of the normal range, and early detection of sensory dysfunction [1,4].

In addition, the Finnish Optomed Smartscope camera Without dilating the pupils camera was used to noninvasively record binocular fundus images, analyze the images of fundus blood vessels, and understand whether the subjects with hyperglycemia had vascular lesions.

Result

A small amount of retinal microangiopathy was found in the examined patients, which provided

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an objective visual reference for the further diagnosis of diabetic microangiopathy.

We were able to capture images of key areas of the retina and analyze them further to reveal the nature of the abnormality, making the diagnosis more accurate[2].

Discussion

We retain the fasting blood glucose value, glycosylated hemoglobin value and glucose tolerance test results of the date of capturing the fundus image, so the fundus image analysis is more valuable. The use of the Finnish Optomed Smartscope camera allows the retinal examination process to avoid pupil dilation, which saves time and eliminates the use of mydilation drugs.

Using paired analysis of retinal microvascular imaging and blood glucose values, we identified severe diabetes in potential patients and provided an important medical avenue to avoid diabetic retinopathy blindness[3].

The use of non-invasive fundus photography for patients with glaucoma and other conditions that are not suitable for pupil dilation makes it possible to perform fundus retinal examination.

As one of the Windows of human microcirculation examination, fundus examination can help us early detect human microcirculation obstacles[2,3,4,5], such as microvascular infarction,

microvascular bleeding, microthrombus and other problems[2,9,10], which is of great significance. The status of fundus blood vessels and the indication of microcirculation can also help us to understand the potential risk of stroke[6].

Furthermore, the retinal camera did not dilate the pupil to display information on the boundary of the optic disc [7] , and in some stroke patients, blurring of the boundary of the optic disc may result from intracranial hypertension [1,6,9] . Conclusions hand-held fundus camera can replace ophthalmoscope for diabetic retinopathy microangiopathy and can detect diabetic retinopathy in time, it has important clinical reference value for the prevention of diabetes-induced cerebrovascular disease. Retinal examination without pupillary dilatation is fast and the image is clear and reliable [10] . Retinal microvascular screening improves the accuracy of diagnosis.

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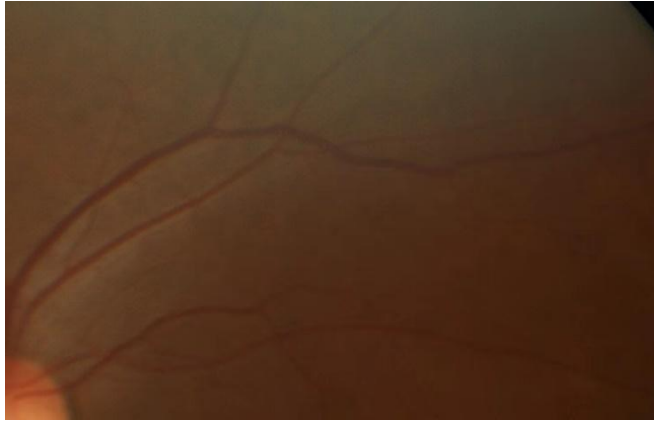


Fig1. As shown in Figure 1, a retinal camera without dilating the pupil can be used to obtain a clear image of the microvessels in different quadrants of the fundus retina.



Fig2. As shown in Figure 2, clear images of the fundus and optic disc can be obtained using a retinal camera without pupil dilation.