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Diabetic retinopathy screening using a deep-learning system

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The article titled "Real-time diabetic retinopathy screening by deep-learning in a multisite national screening program: a prospective interventional cohort study" introduces a notable breakthrough in the field of medical technology. Deep-learning is a subfield of machine learning that uses algorithms inspired by the structure and function of the brain's neural networks to learn from large amounts of data[1].

The study is centered on diabetic retinopathy, a primary source of avoidable vision loss. The prospective interventional cohort study evaluated the performance and feasibility of a deep-learning system for screening for diabetic retinopathy and diabetic macular edema in Thailand. The authors claim that their study is the first of its kind to apply a deep-learning system to an existing large-scale screening program in a low-to-middle-income nation.

The study included 7,651 patients with diabetes who were registered in the national diabetes registry. The patient data were examined using the deep-learning system at nine primary care sites that are under Thailand's national diabetic retinopathy screening program. The following were the exclusion criteria: patients with a prior diagnosis of diabetic macular edema, severe nonproliferative diabetic retinopathy, or proliferative diabetic retinopathy; patients with a previous history of laser treatment of the retina or retinal surgery; patients with other nondiabetic retinopathies necessitating a referral to an ophthalmologist; and inability to obtain an image of the fundus of both eyes for any reason. The deep-learning system offered real-time interpretations of the patients' fundus images and referral suggestions.

The deep-learning system results were compared with those of fellowship-trained retina specialists who over-read each image as a safety mechanism. The deep-learning mechanism demonstrated an accuracy of 94.7%, sensitivity of 91.4%, and specificity of 95.4% for detecting vision-threatening diabetic retinopathy. However, the retina specialist demonstrated an accuracy of 93.5%, a sensitivity of 84.8%, and specificity of 95.5%.

The study concludes by highlighting the potential benefits of using a deep-learning system as an instantaneous screening tool with expert-level accuracy in resource-constrained settings. Furthermore, it suggests directions for future studies. This could facilitate earlier detection and intervention, potentially preventing blindness induced by this condition.

REFERENCE

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