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Comparison of nonmydriatic digital retinal imaging versus dilated ophthalmic examination for nondiabetic eye disease in persons with diabetes.

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OBJECTIVE: To evaluate the ability of stereoscopic nonmydriatic digital retinal imaging to detect ocular pathologic features other than diabetic retinopathy (DR) in patients with diabetes mellitus (DM) compared with dilated retinal examination by retinal specialist ophthalmologists. **DESIGN:** Clinic-based comparative instrument study and retrospective chart review. **PARTICIPANTS:** Two hundred eighty Joslin Diabetes Center outpatients (560 eyes) with type 1 or type 2 DM. **METHODS:** Nonsimultaneous stereoscopic nonmydriatic digital retinal images (640 x 480 pixels) of three 45 degrees retinal fields were acquired and graded for clinical level of DR and other ocular pathologic features by certified readers according to Joslin Vision Network (JVN) protocol. Retrospective chart review compared findings from JVN digital images with findings from dilated retinal examination by retinal specialists performed within an average of 39.6 days of digital imaging. An independent senior retinal specialist adjudicated disagreements by review of 7 standard field 35-mm Early Treatment Diabetic Retinopathy Study protocol fundus photographs and JVN images. **MAIN OUTCOME MEASURES:** Detection of non-DR ocular pathologic features by digital imaging as compared with clinical examination. **RESULTS:** Nonmydriatic digital evaluation identified at least 1 non-DR ocular finding in 40.7% of patients (114/280). Non-diabetes mellitus ocular pathologic features identified by digital images, clinical examination, or both included cataract (n = 100); age-related maculopathy (n = 52); suspicion of glaucoma (n = 18); choroidal lesions (n = 18); evidence of systemic disorder (e.g., hypertension or renal disease; n = 15); epiretinal membrane (n = 11); chorioretinal atrophy, scar, or both (n = 6); retinal emboli (n = 3); retinitis pigmentosa (n = 1); and asteroid hyalosis (n = 1). Agreement of nonmydriatic imaging with clinical examination for presence and absence of these findings was 95.4%, 91.3%, 98.2%, 98.6%, 98.2%, 99.6%, 100%, 100%, 100%, and 100%, respectively. Kappa values for all non-DR lesions demonstrated near perfect agreement ($\kappa > \text{or} = 0.80$) except for age-related maculopathy ($\kappa = 0.71$) and choroidal lesions ($\kappa = 0.73$), where agreement was substantial. Overall, only 55 eyes (9.8%) were ungradable for level of DR and 85 eyes (15.2%) were ungradable for macular edema. **CONCLUSIONS:** Joslin Vision Network nonmydriatic digital imaging demonstrated excellent agreement with dilated ophthalmic examination by retinal specialists in the detection of ocular disease other than DR, suggesting a potential role for this technology in evaluating non-DR disorders and highlighting the extent of findings other than retinopathy in patients with diabetes.

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