



Title	The Value of Digital Imaging in Diabetic Retinopathy
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Aim

To assess the performance of digital imaging compared with other modalities in screening for and monitoring the development of diabetic retinopathy.

Conclusions and results

Manual grading of 35-mm color slides produced the highest sensitivity and specificity figures, with optometrist examination recording most false negatives. Manual and automated analysis of digital images had intermediate sensitivity. Both manual grading of 35-mm color slides and digital images yielded sensitivities above 90% with few false positives. Digital imaging produced 50% fewer ungradable images than color slides did. This part of the study was limited as patients with the more severe levels of retinopathy opted for treatment. There was an increase in the number of microaneurysms in those patients who developed from mild to moderate. There was no difference between the turnover rate of either new or regressed microaneurysms for patients with mild or with sight-threatening retinopathy. It was not possible in this study to ascertain whether digital imaging systems determine when treatment is warranted.

Recommendations

In the context of a national screening program for referable retinopathy, digital imaging is an effective method. In addition, technical failure rates are lower with digital imaging than with conventional photography. Digital imaging is also a more sensitive technique than slit-lamp examination by optometrists. Automated grading can improve efficiency by correctly identifying just under half the population as having no retinopathy

Methods

Imaging was acquired at a hospital assessment clinic. Subsequently, study optometrists examined the patients in their own premises. A subset of patients also had fluorescein angiography performed every 6 months. A repeat assessment was carried out of all patients 1 year after their initial assessment. Patients who had more severe

forms of retinopathy were monitored more frequently for evidence of progression.

Further research/reviews required

Recommendations for future research include investigating:

- Whether the nasal field is required for grading
- If automated grading can safely perform as a first-level grader (a large screening program is required)
- If color improves the performance of grading digital images
- Methods to ensure effective uptake in a diabetic retinopathy screening program.