

Global Guideline

for Type 2 Diabetes

Chapter 13: Eye screening

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These guidelines are concerned with preventative *diabetes* care. No advice is given on the further investigation of retinopathy by an ophthalmic specialist, or the subsequent use of laser or other retinal therapy, of vitrectomy, or other tertiary care. It is noted that a substantial evidence-base does exist for these techniques in the prevention of visual loss.

Recommendations

■ Standard care

- ES1 Ensure that examination of the eyes of people with Type 2 diabetes is performed around the time of diagnosis and then annually as part of a formal recall process:
- measure and document visual acuity, corrected with glasses or pinhole
 - assess retinopathy:
 - using retinal photography through dilated pupils, performed by an appropriately trained health-care professional, or
 - by examination by an ophthalmic specialist.
- ES2 Discuss the reasons for eye examination with the person with diabetes.
- ES3 Use tropicamide to dilate pupils, unless contra-indicated, after discussing the implications and obtaining agreement of the person with diabetes.
- ES4 Classify the findings of eye examination as requiring: routine annual review, earlier review, or referral to an ophthalmologist (if not making the examination).
- The following frequency of screening is suggested:
- 12 months if no or minimal unchanged retinopathy
 - 3 to 6 months if worsening since last examination
 - more often during pregnancy.
- ES5 The following situations require specialist referral:
- the same day:
 - sudden loss of vision
 - evidence of retinal detachment
 - within 1 week:
 - evidence of pre-retinal and/or vitreous haemorrhage
 - new vessel formation or rubeosis iridis

- within 1-2 months:
 - advanced retinal lesions
 - unexplained deterioration of visual acuity
 - macular oedema
 - unexplained retinal findings
 - cataract
 - inability to visualize fundus.

ES6 Advise that good control of blood glucose, blood pressure, and blood lipids (see relevant sections of this guideline) can help to reduce the risk of eye damage developing or worsening.

ES7 Advise that diabetic retinopathy is not a contra-indication for use of aspirin if this is indicated for prevention of cardiovascular disease.

ES8 Advise that tests of intra-ocular pressure should be made periodically.

■ Comprehensive care

ES_C1 Retinal screening will be as for *Standard care* in most respects, but could use seven-field stereoscopic colour fundus photography interpreted by a trained reader (where a retinal ophthalmological specialist is not anyway performing the eye check).

■ Minimal care

ES_M1 Use direct fundoscopy through dilated pupils, performed by a member of the health-care team who is properly trained and has appropriate experience to assess retinopathy.

ES_M2 Check visual acuity.

ES_M3 Repeat review, referral, and preventative therapy are as for *Standard care*.

Rationale

Diabetic retinopathy is the most common complication of diabetes and a major cause of visual loss. Damage (maculopathy) to the area of the retina used for fine and central vision (the macular area around the fovea) is the largest problem in people with Type 2 diabetes, though classical retinopathy with new vessels and consequent problems is also important. Measures to control blood glucose and blood pressure (discussed elsewhere) can help to prevent onset and delay worsening of retinopathy, but most people with retinopathy will be asymptomatic until the damage is far advanced. Early detection by regular surveillance is thus essential if people with sight-threatening retinopathy are to be identified in time to offer them the laser treatment which can prevent visual loss.

Evidence-base

General diabetes guidelines which address the subject of eye screening [1-4] draw on an evidence-base going back to the 1970s, including the findings of the American studies WESDR, DRS and ETDRS which provide the framework for retinal screening and laser treatment [5-7]. The 'gold standard' screening test of seven-standard field stereoscopic colour fundus photography and associated grading scheme were established by these studies. In recent years technological developments in digital photography have offered expanding opportunities for recording and transmitting images, with potential for automated grading, reviewed in the NICE Type 1 diabetes guideline [8].

The importance of screening people with Type 2 diabetes at diagnosis relates to the finding that between 21 and 39 % of them already have some retinopathy (which may already be sight-threatening) by this time [3]. In the WESDR 1.6 % of people with Type 2 diabetes were legally blind [5]. For people who have no retinopathy at diagnosis of Type 2 diabetes, the chance of developing sight-threatening retinopathy within 2 years is less than 1 % [1]. Although there is some argument as to whether such people need to receive screening as often as annually, and the Canadian guideline recommends every 1 to 2 years [3], the other three favoured annual systematic review [1,2,4] pending further information identifying sub-groups which might safely have longer review periods [2]. Cataract is another important cause of visual loss in people with diabetes, being twice as common as in people without diabetes [1].

Support for optimized glucose control and tighter blood pressure control (see elsewhere) derives from the reduction in risk of microvascular complications found in the UKPDS [9,10]. The effects of aspirin were investigated in the ETDRS (reported in reference 3). High levels of LDL cholesterol were associated with hard exudates in the ETDRS [11].

Recent review of screening methods found that digital photography best met the needs of appropriate sensitivity/selectivity, feasibility and opportunities for quality assurance [8]. SIGN found that direct ophthalmoscopy only rarely achieved 80 % sensitivity even when carried out by properly trained operators [1]. Where cost issues were considered [2], attention was drawn to the dependence of cost-effectiveness on features such as sensitivity and specificity of screening tests, attendance and prevalence.

Consideration

The core issue is how to provide regular structured review using either ophthalmological expertise or camera technologies. With regard to the latter, use of digital cameras with eyes dilated to reduce the incidence of screen failures is found to be desirable and cost-effective. However, camera technologies cannot detect macular oedema, so visual acuity testing must accompany photography. Where neither camera technologies nor ophthalmologists can be made available, ophthalmoscopy by a trained observer can detect many problems (though with significantly poorer sensitivity) and is thus recommended in these circumstances.

The availability of laser therapy is currently limited in many parts of the world due to cost and lack of trained expertise. It is noted that raising awareness of eye problems by examination and recording of detected problems can both

help individual preventative care (blood glucose and blood pressure control) and provide the necessary evidence for establishment of a laser service.

Implementation

Staff requirements are sufficient numbers of experienced ophthalmologists, optometrists and other health-care professionals to perform the screening, and sufficient ophthalmologists to perform laser therapy, and training of such staff. Equipment for screening and treatment will be required, as will a structured recall system and record. All screening modalities require quality assurance checks; for retinal photography it has been suggested this should happen for around 1 % of photographs [1].

A national or regional advisory group, including representation of ophthalmologists, optometrists, internists and people with diabetes, can work with health funders to define such issues as: criteria for screening and treatment; training and education programmes; provision of accessible facilities; awareness programmes; strategies for programme implementation and guideline dissemination; information systems (for monitoring diabetic eye disease, follow-up and recall, collection of baseline and annual data); annual reports based on defined indicators.

Evaluation

The percentage of records containing the results of eye examination within a 12-month period is easily evaluated. Where such records are of sight-threatening retinopathy or decrease of visual acuity, evidence of review by (or referral to) an ophthalmological specialist should be present. Eye screening services can be checked for appropriately trained personnel, and facilities sufficient to ensure diabetes population coverage. Evidence of quality checks should be assessed. Evidence of control of rates of visual loss is more difficult to gather unless the records of ophthalmological services can be linked to those of diabetes services.

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