Screening for Glaucoma
Why is the Disease Underdetected?

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Summary

A review of 15 population-based glaucoma prevalence surveys in Western Europe, the US, the West Indies and Japan shows that the proportion of patients with the condition who had previously gone undetected was generally at least 50%.

Possible reasons for underdetection of glaucoma have been considered in relation to England and Wales, where most patients with glaucoma are initially detected during the course of sight tests in connection with providing spectacle lenses. It was found that: (i) a high proportion of the population over 40 years of age attends fairly regularly for a sight test; (ii) the standard of primary testing for glaucoma is very uneven — those examiners who test comprehensively detect about 50% more cases than average; and (iii) referral criteria, which reflect the need not to overload hospital eye clinics, inevitably exclude many patients who are in apparently low risk categories.

Both the population survey data and the subsequent analysis suggest that underdetection is most pronounced in patients with glaucoma of the normal pressure type.

Glaucoma is a disease that particularly affects older people, its prevalence progressively rising to about 5% in those aged 70 years and over.\(^{[1-17]}\) It is the main cause of 8 to 15% of new registrations for blindness in Western developed countries.\(^{[17-20]}\)

The principal form of glaucoma, accounting for 51 to 93% of all affected patients,\(^{[1,5,8,11]}\) is primary open-angle glaucoma (POAG). It causes a progressive loss of peripheral vision, which is sometimes unilateral, but usually involves both eyes, although to a different extent. It is insidious and much sight can be irretrievably lost before the individual becomes aware of the problem. Other forms of glaucoma typically have acute symptoms or are secondary to other diseases that also give rise to symptoms. Thus, the main problem of underdetection relates to POAG.

Two variables are involved in the aetiology of POAG; one is the level of the intraocular pressure (IOP), and the other is the combination of innate factors affecting the optic nerve, such as inadequate nerve tissues or blood supply.\(^{[21]}\) Diagnostic criteria also vary. Emphasis is currently laid on the evidence of optic nerve damage, as revealed by the presence of visual field loss of a glaucomatous nature, and associated optic disc and retinal nerve fibre defects, although these can often be difficult to assess. Raised IOP has also been used as a criterion, but IOP now tends to be regarded only as an important risk factor.\(^{[22-24]}\) Nevertheless, for some purposes, it remains useful to distinguish between chronic simple glaucoma (CSG), in which IOP is above the normal statistical range, and normal pressure glaucoma (NPG).\(^{[1]}\)
Besides the patients who are diagnosed with POAG, there are also many patients whose condition is borderline. Most have ocular hypertension (abnormally high IOP, but without apparent visual field defects); others are sometimes categorised as ‘glaucoma suspects’ for different reasons. Various surveys indicate that patients with borderline disease may be similar in number to those with POAG, depending partly on the diagnostic definitions that are used.

Medical treatment for POAG (mainly eye drops), which is principally directed towards reducing IOP, can usually either arrest glaucomatous optic nerve damage or retard it, so that satisfactory vision is retained for the patient’s lifetime. Often, however, especially where there is progressive deterioration in the condition, laser treatment or the surgical procedure of trabeculectomy are necessary. Medical treatment is also given to many patients with ocular hypertension, especially in view of evidence that a considerable proportion of nerve fibres are lost before the fields of vision are detectably impaired.

The benefits of ocular pressure-lowering treatment are, as would be expected, more certain in those patients with abnormally high IOP than in other patients with glaucoma (NPG), although even the latter can benefit from further reduction of pressure.

When the disease is detected only at a late, symptomatic stage the patient will already have lost much useful vision and the condition will be more difficult to treat effectively.

### 1. Underdetection and Late Detection

#### 1.1 The Extent of Underdetection

Table I summarises data from studies concerned with glaucoma prevalence in mainly White Caucasian populations in the US and Europe. The data distinguish between patients with POAG who were already known at the time of the survey, and those who were newly detected (i.e. previously undetected).

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