Early detection of chronic simple glaucoma in general practice

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SUMMARY. Chronic simple glaucoma, also known as open-angle glaucoma, is the cause of blindness in about 13 per cent of people on the Blind Register, and 40 per cent of these have had no treatment before registration. Patients over the age of 60 are most liable to the disease and it is rare under the age of 40; there is often a family predisposition. I carried out a routine test for the disease in 300 patients over 60 years of age in my general practice with the object of detecting chronic simple glaucoma at an early stage. Anyone with an intraocular pressure of over 23 mm of mercury in either eye was referred to a consultant ophthalmic surgeon for further investigation. Seven patients (2·3 per cent of those examined) were confirmed as suffering from chronic simple glaucoma.

Introduction

WHILE acting as clinical assistant in an ophthalmic hospital for four years, I noted the late referral by general practitioners of patients suffering from chronic simple glaucoma. I soon realized that this occurred because patients suffering from this disease did not complain of eye symptoms until a comparatively late stage, by which time irreparable damage had often been done to their sight, "indicating that they were unaware of the seriousness of their eye trouble until they became blind" (Perkins, 1965).

Prevalence

In Sweden 3·5 per cent of 8,000 people over the age of 40 were found to have chronic simple glaucoma (Eggink, 1962). Similarly, Gensler (1967) found two per cent of people over 40 with the disease.

Cause of blindness

Sorsby (1956) found that 13 per cent of patients on the Blind Register had glaucoma and 40 per cent of them had had no treatment before registration (Standing Medical Advisory Council, 1963).

Similarly, in Germany, Leydhecker (1966) estimated that between 12 and 20 per cent of the blind lost their sight because of chronic simple glaucoma.

The International Glaucoma Association was formed last year to encourage earlier diagnosis of chronic simple glaucoma, as well as other forms of glaucoma. The only way to prevent this tragic visual loss is to diagnose the conditions before symptoms are present. The diagnosis is based on:

1. Increased intraocular pressure.
2. Pathological cupping of the optic disc.
3. Characteristic loss of visual fields.
4. Facility of aqueous outflow.

Of the objective signs of chronic glaucoma enumerated above, the pathological cupping of the optic discs and recognition of characteristic defects in the visual fields would generally have reached an advanced stage before they could be recognized by a general practitioner, and the rate of aqueous outflow can only be measured in an ophthalmic unit of a hospital. However, increased intraocular pressure can be detected by tonometry and, if it persists over a period of years, it is considered to result in pathological cupping of the discs and associated field defects, with resulting deterioration of vision (Perkins, 1968).

Advantages of tonometry

Perkins considered that "In spite of its defects, tonometry does have very great advantages as a screening method and remains the best single test which does not require an experienced ophthalmologist to perform it."

"Tonometry is the most important test in establishing the diagnosis of glaucoma . . . A single high reading (20 to 25 mm Schiøtz) should suggest the possibility of glaucoma" (Vaughan *et al.*, 1965).

"A survey of intraocular pressure in a random sample

of the population of Oxford stresses the importance of a routine measurement of intraocular pressure, using a Schiøtz tonometer, in individuals over the age of 45 years . . . this simple test could be carried out by the general practitioner" (Luntz *et al.*, 1963).

In Israel Blumenthal and Kornblueth (1965) stated: ' Of all tests used to detect glaucoma . . . tonometry seems to be the simplest, most expeditious, and most effective."

Method

Selection of patients

In the Bedford Glaucoma Survey (1968) it was found that "nearly 80 per cent of the patients with glaucoma were over 60 years old, suggesting that detection programmes should concentrate on the older age groups." A screening of 1,724 patients in a medical centre found that, of 1,140 aged from 40 to 60 years, about one per cent required treatment, whereas of 586 patients over the age of 60 about 2·1 per cent needed treatment (Ross, 1968). Hollows and Graham (1965) state: "We feel reasonably certain that if you are going to do glaucoma screening you may as well start at 60".

Accordingly, 300 patients over the age of 60 in my general practice, chosen at random, were asked verbally to agree to a test of eye pressure. The term glaucoma was never mentioned. No known case of glaucoma was included in these tests. No patient whom I asked to have an examination refused, or was reluctant to be tested: on the contrary, they were pleased to be asked, and grateful for the interest shown. In all, 188 women and 112 men were examined, selected as they attended surgery for treatment of general complaints.

Practical procedures

A family history was always sought, but this was not found to be helpful because the patients were usually very vague in describing any previous eye disease in the family. The visual acuity was then noted, the cornea examined for any noticeable defect or inflammation, a confrontation test was carried out to detect any obvious loss of field, and the eyes were palpated through the upper lids in an attempt to recognize any marked increase in tension difference between the eyes, though "digital examination for increased tension requires considerable experience before being reliable" (Wybar, 1966). Except in very late and severe cases, it is unlikely to be detected with certainty by a general practitioner.

The instrument used for the test was a Schiøtz tonometer, an inexpensive instrument readily available. It works on the indentation principle, and although not as accurate as the applanation method used by ophthalmologists, it should be remembered that applanation has become available only in recent years, and no satisfactory portable applanation instrument within the means of the general practitioner has yet been devised.

The Schiøtz tonometer is easy to use after a little practice. Many nurses are trained to use it in the eye departments of hospitals, and in America it is used routinely in factories, clinics, military examination centres, and even in state fairs. The Schiøtz tonometer gives a slightly higher reading than that given by applanation when the scleral rigidity is above normal—as it may often be in the elderly—hence some false positives are inevitable.

Table 1. Results obtained from patients referred to hospital.

Number examined	Number referred to hospital	Diagnosed as chronic simple glaucoma	Borderline cases with slightly raised tension but no other signs of glaucoma
300	15 *(5)*	7 *(2.3)*	8 *(2.6)*

The Schiøtz tonometer, after cleansing in warm water, was tested for accuracy at zero on a metal disc supplied with the instrument. The footplate was sterilized by being passed briefly through a flame, and allowed to cool. Amethocaine one per cent was then instilled into each eye and the patient was asked to lie on a couch and look at a spot previously marked on the ceiling, vertically above his head. I tested from behind the patient.

The right eye was always tested first. The right lower lid was held down by the little finger of the right hand and the upper lid raised by the index finger of the left hand. The tonometer, held between the thumb and index finger of the right hand was then gently lowered until it rested on the centre of the cornea. The weight of the tonometer can be varied, and a total weight of 7·5 g, supplied with the instrument, was found to be the most consistent and reliable. As the tonometer is allowed to rest on the eyeball, a moving level points to a number on a dial, and this reading, compared with a calibration table provided, indicates the intraocular pressure. A similar procedure was carried out on the left eye, this time using the index and middle fingers of the left hand to hold the lids apart. Finally, as a prophylactic measure against any possible infection, a drop of chloromycetin one per cent was instilled into each eye.

The entire procedure is described in a film *Indentation Tonometry* which is available on loan from the British Medical Association Film Library.

No patient reported ill-effects: in a series of 40,000 patients examined by Schiøtz tonometer in America no case of trauma or infection was reported (Ryan *et al.*, 1966).

Results

I considered a reading of 23 mm the upper limit of normal. If the tension in either eye was above this the

Table 2. Details of cases of chronic simple glaucoma confirmed by ophthalmologist.

Case No.	Age	Visual acuity R	Visual acuity L	Highest tension recorded R	Highest tension recorded L	Optic discs R	Optic discs L	Field of vision R	Field of vision L	Further details
1	71	6/12	6/12	20	25	Normal	Cupped	Normal	Loss	
2	82	Counting fingers	6/12	40	30	Cupped	Cupped	Loss	Loss	Treated by cyclodiathermy
3	60	6/18	6/18	25.8	25.8	Cupped	Cupped	Loss	Loss	
4	64	6/6	6/6	23.8	23.8	Normal	Cupped	Normal	Loss	
5	82	6/36	6/60	25.8	25.8	Cupped	Cupped	Loss	Loss	Bilateral cataract
6	80	6/60	6/60	40	40	Cupped	Cupped	Loss	Loss	Developed central retinal vein thrombosis
7	60	3/36	6/9	34	34	Cupped	Normal	Loss	Normal	

patient was referred to an ophthalmologist for further investigation.

In the series of 300 examined, 15 were found to have raised tension and were referred to hospital (Table 1), and of these, seven patients, whose ages ranged from 60 to 82 (five women and three men) were confirmed as suffering from chronic simple glaucoma and were asked to attend hospital regularly for observation and appropriate treatment (Table 2). In these seven patients eyesight and field of vision were already partly impaired, although only one of them had complained of some "blurring" of vision before testing.

The remaining eight were thought to be false positives and asked to return at a later date for retesting. None of these complained of defects of vision.

Discussion

Of the people examined 2·3 per cent were found to be suffering from chronic simple glaucoma, which had not previously been suspected. All were given immediate and regular treatment by an ophthalmic surgeon at the local hospital.

In view of the remaining eight, whose pressures measured by applanation were found to be slightly raised but who had no other signs of glaucoma and were therefore considered to be borderline, it is relevant to note that a five-year follow-up of similar cases referred from the Bedford Glaucoma Survey was carried out in 1973 by Perkins. He found that 3·5 per cent of these had developed glaucoma. Thus, in addition to the 2·3 per cent of the over 60s examined by me who were already suffering from chronic simple glaucoma, 3·5 per cent of those whose eye tensions were above normal were likely to develop the disease within a few years.

The general practitioner alone has the opportunity to examine a high proportion of the over-60s in the country, and enjoys a personal relationship with his patients which will readily induce them to submit to an examination of their eyes when they have noticed no eye symptoms. I suggest that one of the doctors in a group practice or health centre, by carrying out regular examinations of his elderly patients by tonometry, paying special attention to those patients with a family history of chronic simple glaucoma, can make a worthwhile contribution to the problem of diagnosis and detection of the disease at a stage at which treatment may be effective in preventing further deterioration of vision. Using the method described, the test may easily be carried out single-handed in minimum time, even during surgery hours.

If the procedure is limited to the measurement of intraocular pressure only, the time taken varies from five to ten minutes. Some workers using the Schiøtz tonometer have tested 60 patients in an hour (Tillett, 1960; Williamson, 1962). "The actual screening, using tonometry alone, need take only a few minutes" (Perkins, 1965). Ross (1968) gave a screening rate of 50

per hour. Working alone, a practitioner should allow about ten minutes per patient.

"If one can diagnose chronic simple glaucoma in the first affected eye, it is probably true to say, if the appropriate treatment is commenced, that in the majority of cases, the patient will have adequate vision in his working life" (Morgan, 1958).

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Elongation of pause time in speech: a simple, objective measure of motor retardation in depression

A sample of 'automatic speech' (counting from one to ten) was tape recorded and the time taken up by phonation and pauses measured. In four healthy volunteers, both phonation times and pause times remained constant over a period of two months. In four moderately depressed patients, with no history of manic illness and with no obvious clinical signs of motor retardation, the pause times were significantly elongated while the patients were depressed compared to pause times measured after recovery. The phonation times were constant throughout the period of observation (four to six months). Other tests for motor retardation (tapping time; nurses' rating scale; Hamilton Retardation Scores) did not give consistent results. It is concluded that the simple test described here may reveal a degree of motor retardation in cases where other tests fail to do so.

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