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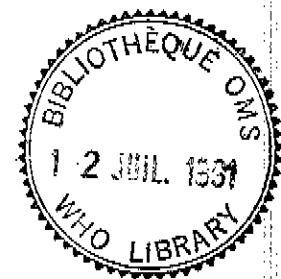
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GLAUCOMA IN MALTA

Report of a workshop

Malta, 19-21 October 1989



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CONTENTS

	<u>Page</u>
INTRODUCTION	1
1. DEFINITION OF BLINDNESS AND VISUAL IMPAIRMENT	2
2. DEFINITION AND TYPES OF GLAUCOMA	2
3. CLINICAL DIAGNOSIS	3
4. EPIDEMIOLOGY AND RISK FACTORS	4
5. TREATMENT: MEDICAL AND SURGICAL	6
6. SCREENING AND FOLLOW-UP OF PATIENTS	7
7. PATIENT INFORMATION; COMPLIANCE	9
8. DRUG INTERACTION IN RELATION TO GLAUCOMA TREATMENT	9
9. RECORDING AND REPORTING	10
10. POSSIBLE STRATEGIES FOR THE CONTROL OF GLAUCOMA IN MALTA	11
10.1 What is the significance of primary open-angle glaucoma (POAG) in Malta?	11
10.2 Is there a need for population-based intervention, i.e. screening?	11
10.3 What alternative strategies are there?	11
10.4 What are the implications of a glaucoma control programme?	12
10.5 Managerial requirements at various levels	12
ANNEX I : OPENING ADDRESS BY H.E. DR V. TABONE, THE PRESIDENT OF MALTA	13
ANNEX II : OPENING SPEECH BY HON. DR G. HYZLER, PARLIAMENTARY SECRETARY OF HEALTH	15
ANNEX III: CATEGORIES OF VISUAL IMPAIRMENT (ICD-9)	17

INTRODUCTION

A workshop on glaucoma was held in Malta from 19 to 21 October 1989, hosted by the Ministry of Health and organized in collaboration with the Programme for the Prevention of Blindness of the World Health Organization (WHO).

The workshop was opened by H.E. Dr V. Tabone, President of Malta, who gave an historic overview of glaucoma (see Annex I). The Parliamentary Secretary for Health, Dr G. Hyzler, also addressed the meeting, underlining the importance of glaucoma as a cause of avoidable blindness (see Annex II).

A faculty had been set up for this workshop, consisting of :

- Professor M. Blagojevic, Ophthalmic Consultant visiting Malta
- Dr J. Cachia, Public Health Physician, Department of Health, Malta
- Mr R. Hitchings, FRCS, Ophthalmic Consultant, Moorfields Eye Hospital, London, UK, and WHO Temporary Adviser
- Dr R. Soler, Ophthalmic Consultant, St Luke's Hospital, Malta
- Dr B. Thylefors, Manager, WHO Programme for the Prevention of Blindness

The objectives of this workshop were :

- to promote knowledge about the diagnosis and treatment of glaucoma amongst the medical and auxiliary personnel of Malta;
- to provide a forum for discussion of future possible strategies for the control of visual loss from glaucoma in the Maltese population.

This workshop constituted the second phase of the planning for glaucoma control in the Maltese Islands, the first phase being the collection of population-based data on the disease through a sample survey conducted in 1989. The third phase envisaged is the implementation of preventive measures on a large scale against visual loss from glaucoma.

1. DEFINITION OF BLINDNESS AND VISUAL IMPAIRMENT

In 1972, WHO convened a Study Group on the Prevention of Blindness to review existing data on visual loss in the world and to propose a uniform definition of various levels of visual impairment, including "blindness". The Group arrived at a global estimate of some 10-15 million blind, based on available data from Member countries. It was recognized, however, that in the absence of reliable information from many countries, this estimate was rather conservative. More recent estimates have given figures of 28 million (1978) and 27-35 million (1986) blind in the world.

The 1972 Study Group developed a scheme of 5 categories for defining levels of visual loss, as shown in Annex III. Category 1 is often referred to as "visual impairment" and category 2 as "severe visual impairment", the two categories together refer to "low vision". Categories 3-5, ranging from vision less than 3/60 (0.05) to absence of light perception, are normally referred to as "blindness". This proposal was made to overcome the difficulty of more than 60 different definitions of "blindness" in use in countries around the world in the early 1970s. Today, the above-mentioned categories of vision have become commonly used and referred to in national and international biostatistics, which offers great advantages in the comparison and reporting of data. The scheme has been included in the International Classification of Diseases, as from 1975 (ICD-9) and will remain in the forthcoming 10th revision of that classification.

The origin and consequences of visual impairment can vary widely. In general, the following terminology and concepts are applied :

The dysfunction of the eye, or part of it, leads to deterioration of vision, i.e., visual impairment. This may cause a visual disability, i.e., the individual is no longer able to accomplish a certain sight-demanding task, such as reading ordinary print. This may, or may not, constitute a handicap for the individual, depending on daily activities and lifestyle.

With regard to a global estimate of glaucoma as a cause of blindness, it seems from data from several countries that, in general, glaucoma is responsible for 5%-15% of total blindness encountered. Considering the total number of blind in the world of approximately 30 million, it can thus be assumed that some 3 million people are blind from glaucoma. Most of this would be due to primary open-angle glaucoma, but angle closure glaucoma is of great importance in some Asian populations.

2. DEFINITION AND TYPES OF GLAUCOMA

Glaucoma is the name given to a group of diseases sharing in common a characteristic lesion of the optic nerve - glaucomatous cupping, together with visual field defects and, usually, elevated intraocular pressure. The glaucoma may be primary or secondary.

The primary glaucoma may be open or closed angle. The former type suffers from a degenerative process with trabecular meshwork increasing resistance to aqueous leaving the eye and forcing up intraocular pressure. Primary closed angle glaucoma has iris trabecular opposition reducing outflow and producing the same effects, while the trabecular degeneration in the open-angle variety has no known cause. Angle closure develops through an anatomic variant whereby the anterior chamber angle is narrow.

The third primary glaucoma is congenital glaucoma or buphthalmos. In this condition the trabecular meshwork does not develop in utero. With increased intraocular pressure the coats of the neonatal eye stretch, allowing (often gross) enlargement of the eye.

Secondary glaucomas arise from a known ocular disease. These too may be either open or closed angle varieties. Examples of the former include steroid glaucoma, pigment dispersion glaucoma and pseudoexfoliation. In each of these conditions the meshwork is blocked with debris. Secondary angle closure is seen in post-thrombotic glaucoma wherein neovascularization occludes the angle, or in cases of swollen cataractous lenses.

3. CLINICAL DIAGNOSIS

The clinical diagnosis of glaucoma relies, in principle, on the three key signs:

- intraocular pressure
- visual field defects
- optic disc cupping

Whereas, individually, these signs may not always provide a reliable diagnosis, the constellation of the three parameters in each suspect case provides the best basis for diagnosis and treatment decisions.

The intraocular pressure is classically elevated in glaucoma, but there are some cases of typical visual field defects and optic disc cupping developing also in the presence of "normal" pressure; this is usually referred to as "low-tension glaucoma". The major problem with the intraocular pressure criterion for glaucoma is that there is no fixed upper limit for "normal" pressure. Most ophthalmologists would agree that an intraocular pressure (IOP) of ≤ 22 mm Hg is probably normal, in the absence of other signs of glaucoma, but many people live happily with higher levels of IOP without ever developing any visual loss. On the other hand, at an IOP level of 25-30 mm Hg, there is a progressively increasing risk of glaucomatous visual loss, but the physiological individual variations of pressure make the diagnosis and prognosis very difficult to confirm.

The visual field defects constitute the most reliable manifestation of glaucoma, but significant defect once established implies an irreversible loss of vision and a stage of fairly advanced disease. The assessment of visual field defects is difficult, due to the need for relatively sophisticated equipment and trained personnel, plus frequent variations as to the extent of defects.

The optic disc cupping is, again, a late manifestation of relatively advanced disease. The borderline between the common physiological cupping of the disc, as opposed to glaucomatous excavation, is not fixed. A horizontal cupping of 0.5 can be normal, or the early pathological stage, and there is a gradually increasing probability of pathological cupping with higher values. A disc-cupping ratio of 0.7 is today seen by most ophthalmologists as strongly indicative of a glaucoma. The assessment of optic disc cupping by ophthalmoscopy is, however, subjective, and implies a problem of observer variation; this can be reduced by training and standardization of the examination procedure, and the use of photographs in long-term follow-up schemes.

The clinical diagnosis of glaucoma is most difficult in cases of slowly developing primary, open-angle glaucoma, commonly and misleadingly referred to as "simple glaucoma".

This is the most prevalent glaucoma in Caucasian populations, whereas in some Asian populations the acute angle-closure glaucoma is relatively common. In those cases, the clinical diagnosis is usually easy, because of very high IOP levels, severe pain, and shallow anterior chamber with a fixed dilated pupil.

The diagnosis of a congenital glaucoma is, again, different, in that the enlargement of the eye is usually the factor which brings the child for an ophthalmological examination. Gonioscopy is an essential diagnostic tool in those cases, as well as in many instances of glaucomas in adults.

In secondary glaucomas, the diagnosis is usually based on a known underlying ocular disease; there may also be particular signs indicative of a glaucoma, such as heavy pigment dispersion in the anterior chamber angle, and pseudoexfoliation of the lens.

4. EPIDEMIOLOGY AND RISK FACTORS

The findings of the recently conducted population-based survey on glaucoma were summarized to illustrate the main epidemiological features and known risk factors for glaucoma.

In the period from 10 April to 17 June 1989, a survey was organized by the Department of Health of the Government of Malta, with the cooperation of the World Health Organization.

The objectives of the survey were :

- (a) to establish the prevalence of glaucoma in a population of 40 years of age and over, selected on a random sample basis;
- (b) to analyse the relation between primary open-angle glaucoma and possible major risk factors;
- (c) to evaluate the reliability and practicability of a non-contact pulsair tonometer in mass screening for glaucoma.

The participants for the survey were selected from the already existing electoral list for Malta and Gozo on a random basis : 3212 participants were from Malta and 282 from Gozo - a total of 3494 participants - representing approximately 3% of the population aged 40 years and over.

The survey methodology included (i) the recording of data on personal and family medical history with regard to main risk factors related to glaucoma, namely diabetes mellitus, myopia and arterial hypertension; (ii) checking of visual acuity; (iii) checking of intraocular pressure (IOP) with non-contact pulsair tonometer.

All cases having IOP above 25 mm Hg were investigated further for glaucoma; funduscopy was used to record the cupping of the optic disc - the cupping over 0.5 was taken as pathological.

Of the 3494 selected persons a total of 2245 (64%) responded to the survey.

Visual acuity was normal or almost normal in 97.4%, but in the remaining 2.6% it was reduced to 3/60 or below.

Overall, 3.3% of glaucoma cases, as defined in this study, were found. The following ocular conditions, other than glaucoma, were detected : lens opacities preventing fundal view (3.3%), myopic maculopathy (2.9%), diabetic retinopathy (1.5%),

senile macular degeneration (0.4%), corneal opacities (0.4%), vitreous opacities (0.2%), optic atrophy (0.1%) and phthisis (0.1%).

The distribution of IOP showed that the majority (86.6%) of the eyes had IOP ranging from 12 mm Hg to 22 mm Hg, with the highest peak at 16 mm Hg.

In 7.6% of eyes IOP was from 23 mm Hg to 25 mm Hg. These eyes cannot be considered as completely normotensive and need to be followed up.

In the participants affected with glaucoma (74 persons), two major risk factors are represented :

- positive family history for glaucoma (15.5%, versus 2.1% in the general population) and
- positive personal history for diabetes (24.4%, versus 14% in the general population).

Aging is found to be a risk factor for all three conditions. In this sample there was no evidence that myopia represents a major risk factor for glaucoma.

The main objective of this survey was to establish the prevalence of glaucoma. Glaucoma cases included only those participants whose IOP was over 25 mm Hg, measured both with pulsair and applanation tonometer. The diagnosis of low-tension glaucoma was confirmed by the appearance of optic disc (cupping) and visual field defects.

Among the 2245 participants in Malta and Gozo, 36 (1.6%) persons who were already being treated for glaucoma (known cases) could be recorded, while a further 38 (1.7%) new glaucoma cases were diagnosed and treatment given. This means that for every case already known and treated for glaucoma, there is another case of glaucoma in the population which is unknown.

During this survey 3.3% of glaucoma cases were recorded; 22 persons or 1.0% were classified as suspects.

It can therefore be estimated that the total number of glaucomatous persons in the population of 40 years of age and above in Malta should be about 4000.

In the subsequent discussion it was pointed out that the relatively low attendance rate of 64% represented a field test of a methodology of having one recall only to all non-responders. Furthermore, the analysis of demographic characteristics of responders and non-responders does not give any evidence for a bias in the composition of responders; thus the sample seems to be highly representative of the total population. Presumably, a number of the non-responders have access to a private ophthalmologist, and would thus not be interested in the screening offer, but this group does not seem to represent a particular social or economic status in Malta.

The importance of diabetes as a risk factor for glaucoma was questioned. This relationship has been demonstrated in both the Framingham and Bedford studies, and cases of low-tension glaucoma often also have diabetes and hypertension.

When discussing the non-contact pulsair tonometer, it was concluded that it had functioned well during the survey; however, it gives a wider dispersal of readings in some cases and it had become necessary to instruct about re-examination if there was more than a 6 mm Hg difference between readings for the same eye. It seems, as a general trend, that the pulsair tonometer gives slightly higher readings of IOP in the range of

<22 mm Hg, but there is a tendency for lower readings (as compared to Goldmann applanation tonometry) for the IOP range of >22 mm Hg.

5. TREATMENT: MEDICAL AND SURGICAL

These two types of antiglaucoma treatment will be discussed separately, even though in the management of the patient the two types may be used consecutively or concurrently.

Medical treatment : Topical antiglaucoma treatment is the first-line therapy in glaucoma and is likely to remain so, whatever advances are made in laser or surgical treatment.

Beta-blockers are the treatment of choice, because of a twice-a-day regime, few side-effects and maintained effectiveness. Noncardio-selective beta-blockers can be expected to produce a 25% lowering of the IOP in the long term and are frequently sufficient to control ocular hypertension and some glaucomas. Many chronic glaucomas require an additional drug for good control.

Sympathomimetic agents, such as adrenalin or propine, are equipotent with beta-blockers but not additive in effect. They are used if beta-blockers are contraindicated. However congestion and allergy prevent their long-term use in many instances.

Miotics are additives with the first two groups. They may be preferred as first-line treatment if a twice-daily regime suffices and/or the patient has adequate vision through a constricted pupil.

Carbonic anhydrase inhibitors given orally are additives with the first three, but their many side-effects preclude long-term use in 50% of patients.

Combinations of these drugs can be expected to control IOP <22 mm Hg in 75%-80% of primary open-angle glaucoma patients.

Surgical treatment : Laser treatment by means of low energy argon laser to the trabecular meshwork reduces outflow resistance and produces on average a 7mm Hg lowering of the IOP. Thus lowering of pressure may suffice to control IOP if the initial (off treatment) pressure was <30 mm Hg. The treatment is most effective in the middle-aged or elderly case of primary open-angle glaucoma, or pigment dispersion or pseudoexfoliation patients with a pigmented trabecular meshwork. However, of those eyes achieving IOP control at one year, only 50% maintain control at 5 years.

Laser trabeculoplasty as described above may be useful additive treatment for some glaucoma patients and primary treatment for the occasional case.

In the subsequent discussion, the role of visual fields in the monitoring of treatment of glaucoma was debated. This is a complex issue as there may be wide fluctuations in visual field defects from day to day. As long as there are normal visual fields regular assessment is useful, but once defects appear it is usually difficult to measure progression in relation to therapy, because of the fluctuations of the defects.

Another important issue is that of contraindications to surgery in glaucoma. This may be the case when there is an extensive visual field loss, which may deteriorate further following surgery. However, this risk is usually relatively small, and has to be considered in relation to the pressure level and if other therapeutic means are failing.

It was pointed out that in primary angle closure glaucoma, surgery is accepted practice also in the fellow eye, following an attack in the first eye. Such treatment should normally be performed soon, as a rule within 6 months of the attack, to prevent the possibility of damage in the second eye. This may be performed as a peripheral iridectomy by surgical intervention, or as an iridotomy using a YAG-laser.

The risk of using topical treatment with cortico-steroids over long periods of time was highlighted. In certain individuals this may lead to raised intraocular pressure, ultimately causing severe visual loss. The use of beta-blockers has become widespread in the treatment of glaucoma, but these drugs are still fairly expensive from a public health point of view. It was mentioned that bulk purchase of such ophthalmic preparations may substantially reduce the price, if used in a large-scale treatment scheme. There are no particular new antiglaucoma drugs in the pipeline at present, and even if there were, their cost is likely to be high. Consideration of costs in glaucoma treatment should, however, also include the alternative of laser treatment, which may be quite cost-effective.

In the choice of medical or surgical treatment of glaucoma, recent results indicate that surgery may be the preferable alternative. It may give a more stable and permanent reduction of IOP, with an overall 95% success rate over a 5-year period. With regard to changes or deterioration in visual acuity, there seems to be no real difference. It is still not clear, however, whether vision is better protected in the long-term perspective in those cases undergoing surgery, as compared to medical or laser treatment.

6. SCREENING AND FOLLOW-UP OF PATIENTS

The population-based survey recently carried out on glaucoma in Malta can give a projection of the likely success of undertaking whole population screening. The overall response was 66% with 50% coming at a first call and 16% responding to a recall. This was accompanied by an intense radio and TV campaign together with articles in all the local press. 33% of the selected population remained unknown with respect to their disease characteristics. Distribution by age and sex among respondents reflected the stratification by age and sex of both the sample and the population up to age 74 years. Persons aged 75 years and over did not attend the survey although invited. Geographical distribution of response rates reflected the same patterns of response for other preventive services, for example immunization, and seemed to confirm the implication of social factors in responding to screening programmes. An effective description of non-responder is useful in attempting to address the population whose disease pattern is unknown and towards which further health education endeavours must be directed.

What are the implications of the outcome of the survey on population screening? 5.7% had IOP of 25 mm Hg and a further 7.6% had IOP between 22 and 25 mm Hg. The persons with IOP above 25 mm Hg were further classified: 3.3% were glaucoma cases (half of these were new cases), 1.0% were suspect cases, and 1.3% were normal. Glaucoma patients need treatment and regular follow-up.

But:

- How often do you screen the normotensive person?
- How often do you screen persons with IOP above 22 mm Hg?
- How often do you screen suspect cases?

These technical decisions have a decisive role in defining further service development. The implications for the ophthalmic services in terms of personnel and equipment depend on the agreed content of follow-up. Extrapolating the experience of call and recall from a survey to the routine screening of populations, one will have to

deal with issues of non-response, incomplete coverage and partially effective control of glaucoma. Screening only persons at risk might be a suitable alternative. Education for health is however a strategy with long-term results, when a population becomes sensitized to ask for an eye pressure check from the eye specialist as a matter of routine. The eye specialist who includes IOP measurement in his routine examination will help to achieve this target more quickly.

By the time visual field loss has occurred in glaucoma, i.e., by the time it can be detected, 30% neuronal loss has occurred. As the disease is asymptomatic in its early stages, significantly more damage may have occurred by the time the patient presents. Screening programmes are designed to identify patients at an asymptomatic stage and institute early treatment, minimizing visual loss.

"Whole population" screening reveals that 1%-3% of the adult population suffers from primary chronic glaucoma. Unless the screening for glaucoma is part of a wider public health programme, screening whole populations is uneconomic. High-risk sections of the population may well be targeted.

High risk in glaucoma is seen in a number of groups : close family members, the very old, ocular hypertension >30 mm Hg, cup disc ratio >0.8; in addition myopia, arterial hypertension, diabetes and steroid responsiveness are subsidiary risk factors.

Although these risk factors are difficult to quantify either singly or in combination, screening programmes targeting these groups have been started.

As a result of screening "high-risk groups", large numbers of glaucoma patients and even larger numbers of suspects have been identified. Consideration needs to be given to the management of the former and follow-up of the latter.

The identification of additional glaucoma patients will result in an increased need for funding for staff, clinical space and drugs. Consideration needs to be given to the allocation of these financial resources based on projected numbers of new patients. Fortunately glaucoma management lends itself to the mobilization of paramedical personnel - opticians, nurses and technicians who can be trained in tonometry, funduscopy and perimetry. Efficient use of such personnel is best achieved by collecting patients and staff together in "glaucoma clinics".

From the results of the Malta glaucoma survey, it would appear that the number of glaucoma patients on the islands might be double the known 2000 patients. However the structure of the survey was designed to identify glaucoma patients with an IOP >22 mm Hg on the day of screening. Follow-up of persons with IOP >22mm Hg in the coming two years will detect the extent to which progression to glaucoma happens in the borderline and suspect group. From the data of Hollows and Graham (Ferndale survey 1966) this may mean that 40% of the glaucoma patients have been overlooked - for this is the percentage in the Ferndale survey whose IOP was normal on the day of the test. If these figures are to be translated to the island of Malta then the total glaucoma population in the over-40s could reach 6000-7000 patients or up to 5% of the adult population. This represents a significant proportion of the adults on the island which in an aging population is likely to increase.

7. PATIENT INFORMATION; COMPLIANCE

It is particularly important to provide adequate and appropriate information to the glaucoma patient with regard to the disease and the treatment prescribed.

If the diagnosis of primary open-angle glaucoma has been confirmed, such as if typical visual field defects develop, the patient must be made aware of the need for life-long treatment and follow-up. The same may obviously apply if the intraocular pressure is quite high, but there are no other signs of the disease as yet. If, on the other hand, the patient is kept under regular surveillance, being considered as a borderline case because of intraocular pressure level or for other reasons, it is important to explain clearly the need for regular follow-up over a period of several years, even if there is no change in vision or disease manifestation.

Compliance, in terms of the patient presenting for check-ups at regular intervals, is usually reasonably good for well-informed glaucoma patients. This part of compliance can also be assessed except if the patient moves away or changes his/her doctor for the examination. The more difficult aspect of compliance is how the patient actually uses the medicine(s) prescribed with regard to doses and regular intake. The elderly patient can easily get confused if too many eye drops, tablets or ointment are prescribed in a complex fashion. Thus, it is desirable to try to arrive at a treatment scheme, as simple as possible, for the sake of compliance. In this context, it should be noted that a medication scheme involving morning and/or evening doses is considerably easier to cope with in long-term treatment, as compared to more frequent dosage schemes.

8. DRUG INTERACTION IN RELATION TO GLAUCOMA TREATMENT

The prolonged administration of drugs may cause unwanted side effects. These effects may be due to the drug acting on other tissues within the eye or (after system absorption) altering a distinct site within the body. Drugs used in glaucoma may have these effects.

(1) Beta-blockers can cause changes:

- (a) Within the eye
 - rarely an allergy
 - less understood, constriction of retina and choroidal blood vessels
- (b) Outside the eye
 - bradycardia, which may result in lowered cardiac output, and compromise the sick patient
 - reversible airway diseases - latent and manifest asthma may be made worse.

(2) Carbonic anhydrase inhibitors: given orally or parenterally

- Gastrointestinal upsets, e.g., anorexia, diarrhoea
- CNS upsets, e.g., depression and lethargy
- Idiosyncratic, e.g., blood dyscrasias
- Renal stones

(3) Sympathomimetics - e.g., propine and adrenalin

- (a) Within the eye
 - cystoid macular oedema
 - mydriasis and angle closure
 - congestion

- (b) Outside the eye - tachycardia

(4) Miotics - e.g., pilocarpine

- (a) Within the eye
 - ciliary spasms and pain, myopia
 - miosis - visual loss
 - allergy - rare

- (b) Outside the eye
 - in particular, eserine, given intensively, can cause symptoms of parasympathomimetic overdose, e.g., salivation, muscle contraction
 - long-term anticholinesterase therapy means that caution needs to be taken when anaesthetizing the patient.

This brief review of some of the problems encountered with long-term medical treatment of glaucoma patients shows how manifestations may occur.

The usefulness of ocuserts for slow release of pilocarpine was questioned. This is theoretically a good approach to glaucoma treatment, and clinical results have in general been good; the ocuserts are, however, very expensive and have therefore so far been of limited usefulness. Recently another topical drug for glaucoma treatment has become available in the West Indies, Canazole^R, based on cannabis. This drug has a good effect in lowering IOP, but the available preparation does not at present meet the pharmacological standards laid down in most European countries.

9. RECORDING AND REPORTING

The survey activities were used as a training opportunity for primary care nurses in the field of ophthalmology. Following intensive training in visual acuity and IOP measurements, these nurses could produce reliable and reproduceable readings. This was done with the intent that when further equipment in primary ophthalmic care was purchased, this could be easily operated by these nurses. A review of the survey sheets showed that all had been satisfactorily completed, which is a truly remarkable result in a population survey.

The basic tool for IOP measurement as a screening tool was the non-contact Pulsair (Keeler) tonometer. The correlation of results between non-contact tonometry and other conventional applanation methods was reviewed prior to the survey and found to be acceptable. However, there was a problem of large dispersal among the four readings that were necessary to construct the mean IOP reading. It was decided that any IOP measurement series containing readings that varied more than 6 mm Hg would be discarded and a fresh set of readings be made. It was felt that this was the major defect in the non-contact tonometer when used as a screening device.

It was pointed out that the recent population-based survey on glaucoma had yielded one extremely important "spin-off" result, namely the finding of significant lens opacification in 3.3% of the population. This represents the present "backlog" of unoperated cataracts in Malta, which is a matter that should be looked into. The

phenomenon of a certain number of unoperated cases of blinding cataract is known from other developed countries, most recently the UK. Usually several factors explain such a backlog, such as multiple disabilities in elderly persons, lack of awareness or fear of surgery, lack of transport, etc. Considering the setting of Malta with good communications and infrastructure, it should be possible to reach this underserved population group in need of cataract surgery relatively easily.

With regard to the recording and reporting of cases of suspect glaucoma, this needs to be considered as an integral part of the primary health care monitoring system, if the health centres are to be involved in a general or targeted screening effort. The evaluation of such a scheme could easily include the number of referrals made, and the "quality" of referrals, i.e., the correct examination and diagnostic procedure. Consideration would still need to be given to how the private sector could be involved in a monitoring and evaluation system.

10. POSSIBLE STRATEGIES FOR THE CONTROL OF GLAUCOMA IN MALTA

This item was addressed as a panel discussion with interaction from the audience, dealing with five specific issues, or questions, as follows:

10.1 What is the significance of primary open-angle glaucoma (POAG) in Malta?

The population-based survey had demonstrated the high proportion of glaucoma cases, 3.3%, as defined in the study. It was pointed out that the true prevalence may be even higher, considering false negatives and low-tension glaucomas; thus, total prevalence of POAG may well be close to 5%. This represents, indeed, a public health problem, particularly as only 50% of cases detected in the survey had previously been diagnosed. Still, in those cases discovered, the glaucoma did not seem to have as yet caused severe visual loss or blindness, which speaks in favour of the early detection of this disease through the survey.

10.2 Is there a need for population-based intervention, i.e. screening?

It seems that systematic population-based screening for glaucoma in the Maltese population could well be justified, in view of the very high prevalence of POAG in the population over 40 years of age. However, it was pointed out that only about a 50% response rate could be expected in such screening, and that, together with the need for recalls for examination, the screening interval, and all the operational implications, full-scale screening needs to be carefully considered. Any such "campaign" must also be launched together with intense public education, in order to obtain the highest possible attendance and response rates. The private sector would probably still not be too greatly involved, and thus a considerable number of people would probably not bother about a screening examination, if already in contact with a private ophthalmologist.

10.3 What alternative strategies are there?

Considering the complexity and potential cost of full-scale systematic screening for glaucoma, some possible alternative approaches were discussed, as follows :

- Public education about glaucoma, to encourage people over 40 years of age, in particular those with known glaucoma in the family or suffering from diabetes, to have their eyes checked regularly by an ophthalmologist.
- Standardized examination procedures in medical practice, to include measurement of IOP in all routine medical examinations of people 40 years of age and over. Examination for glaucomatous cupping of the optic disc could also be included in this scheme.

- Establishment of standards and criteria for the diagnosis and treatment of glaucoma in Malta, to facilitate future follow-up of patients and evaluation of results. This matter could probably be best addressed in a continuing education setting, inviting all ophthalmologists, under the chairmanship of H.E. Dr V. Tabone, President of Malta, to a briefing on glaucoma diagnosis and treatment. This could form the basis for having a Maltese Ophthalmological Association, for future gatherings for update sessions on various topics. A similar approach may be used for the briefing or training of general practitioners and auxiliary staff in relation to glaucoma management.

The role of opticians and optometrists in the detection and referral of cases of suspect glaucoma also needs to be addressed.

10.4 What are the implications of a glaucoma control programme?

The following matters need to be considered in the development of a glaucoma control programme in Malta, in terms of the resources required :

- Staff. There should be one ophthalmologist on a full-time basis responsible for a glaucoma clinic, or centre, at St Luke's Hospital, to provide sufficient back-up services for a glaucoma programme. There should also be at least one optometrist, and two or more technicians available in such a referral centre.
- Facilities. The glaucoma clinic/centre in St Luke's would need space, but otherwise existing health centres could well serve as peripheral facilities for detection and referral of cases.
- Equipment. There should be available at the glaucoma clinic/centre a YAG laser, one computerized perimeter plus two others for routine visual field examinations, plus photographic equipment. The health centres would benefit from being equipped with slitlamps with applanation tonometers, to reduce the number of referrals to St Luke's Hospital for further examination only. A record system should be developed for the eye care and glaucoma control scheme, as part of the health information system used in the health centres in Malta.
- Drugs. Glaucoma treatment should be free of charge, similar to diabetes and other chronic diseases, provided treatment is prescribed through the governmental health care system.

10.5 Managerial requirements at various levels

A national glaucoma control programme should be managed at the following levels :

- In the Department of Health, through a focal point (person) either in primary health care or in the hospital sections.
- At St Luke's Hospital, through the responsible coordinator in charge of the glaucoma clinic/centre.
- At the health centre level through the responsible ophthalmologist.

A team approach would be needed for the monitoring and evaluation of a glaucoma control scheme, making use of the existing computer database for primary health care in Malta, complementing the information on referrals made, and their follow-up for diagnosis and treatment. It should thus be relatively easy and feasible to have a good monitoring of results, in terms of effectiveness and coverage.

WORKSHOP ON GLAUCOMA

Malta, 19-21 October 1989

OPENING ADDRESS

by

H.E. Dr V. Tabone, President of Malta,
at the Medical School, G'Mangia, Malta

19 October 1989

A symposium on glaucoma invariably elicits from ophthalmologists interest and anticipation; we are not here dealing with a specific clinical or pathological entity, but with a complex variety of symptoms and conditions dominated by a common finding: raised intraocular tension. This syndrome is well-known to eye specialists who are accustomed to treat it with respectful attention.

While there are accepted limits as to what constitutes the normal intraocular tension, we all know that such parameters do not really denote the real upper limit above which glaucomatous changes start. Different eyes can tolerate different pressure levels, even relatively high levels, without harmful effects.

While for descriptive purposes glaucoma is often described as primary and secondary, all cases are really secondary to developmental, circulatory, traumatic and other pathological lesions.

The word glaucoma was probably used by Hippocrates, denoting, however, a different clinical picture from the one we now call glaucoma; Galen called glaucoma a condition which produced blindness which he divided into "suffosions" or "cataracts" that could be operated on and glaucoma which could not; and patients suffering from the latter were destined to permanent blindness. The term was subsequently loosely used for conditions causing blindness before the advent of the ophthalmoscope which showed the specific lesions such as cupping and optic atrophy.

It has long been accepted that increase in intraocular pressure can be brought about either by increases in production of aqueous, whether it be by secretion from the ciliary body or dialysis from the blood vessels in the ciliary region or through the combination of these and other processes; or a decrease in the amount of outflow of aqueous.

It is not uncommon in medicine that effective treatment precedes the proper and complete understanding of the pathology of a specific disease, and this has happily happened also in the case of glaucoma. Deterioration of sight in glaucoma is, in the end, due to damage to the retinal cells and to their axon cylinders which go to form the optic nerve, and as increased intraocular tension is the most important symptom of glaucoma, it is not surprising that the first attempt at relief was through a paracentesis or sclerotomy performed by Mackenzie in 1830. Von Graefe in 1857 followed by a peripheral iridectomy for acute glaucoma, an operation which constituted a milestone in the surgical control of acute episodes of glaucoma.

The next step was medical control of the disease through the discovery by Laquer in 1876 that miotics lowered intraocular tension. This was the first attempt of medical

Annex I

treatment which, curiously enough, was not met initially with enthusiasm probably because ophthalmologists could not then explain the mode of action of this type of treatment. It was de Weckers' turn to take treatment a step further by the introduction of a permanent filtering scar: the results were neither uniform nor sufficiently satisfactory. This attempt led Herbert of Bombay, in 1903, to perform iris inclusion in a filtering scar, a procedure made popular by Holt in Oslo under the name of iridencleisis. Other procedures followed in quick succession: sclerectomy by Lagrange of France, cyclodialysis by Heine of Breslau, both in 1906, and the classical corneo-scleral trephining by Elliot in 1909. These inroads in the management and control of glaucoma have meant that a diagnosis of the disease was no longer tantamount to a sentence of blindness.

Other procedures have been introduced in an attempt at diminishing the production of aqueous through the application of heat and other types of energy to the ciliary region. Modern techniques, modern equipment and new forms of energy such as lasers, have been brought to bear on the control of the formation and outflow of aqueous, and newer drugs used locally and systemically are contributing to the fight against this condition. Experiments currently being carried out on animals are trying to establish the real cause of the optic nerve degeneration and atrophy, and in particular the part played by vascular conditions as well as that played mechanically by the deformation of the lamina cribrosa strangulating the nerve fibres while they pass through it. Computerized medicine has also brought into play better methods of diagnosing the visual damage produced by increased intraocular pressure, earlier diagnosis and therefore the possibility of earlier treatment before irreversible damage is done.

The disease is still with us and it still remains a formidable enemy to fight and conquer; medicine is better equipped for this onslaught but the price we all have to pay is constant vigilance to diagnose early, prompt and constant attention for failures in treatment and for recurrence of activity after periods of apparent quiescence. Glaucoma is a lifelong condition, requiring lifelong control. We are fortunate that the medical profession can now reassure patients that they can retain lifelong useful sight provided they follow scrupulously the instructions of their medical advisers. With this positive message towards the control of glaucoma, I have pleasure in declaring this seminar open, wishing all a fruitful discussion for the benefit of your patients, actual or potential.

WORKSHOP ON GLAUCOMA

Malta, 19-21 October 1989

OPENING SPEECH

by

Hon. Dr G. Hyzler
Parliamentary Secretary of Health

19 October 1989

Fellow Colleagues, Specialists, Ladies and Gentlemen,

Glaucoma is known to be an important cause of preventable blindness in the population. Unfortunately, in the past, glaucoma was never looked at from a national point of view. Until now, we did not even know just how great a problem it really was in Malta.

This current initiative was started just two years ago when our local specialists got together with the international Initiative Against Avoidable Disablement (IMPACT) and the Prevention of Blindness unit of the World Health Organization. A multinational team was formed and, with our local coordination, a programme to tackle glaucoma was set up.

This programme is divided into three phases:

Phase 1 was the population survey in the over-forty-year-olds to see just how prevalent glaucoma really is in Malta.

Phase 2 is this workshop, where we hope to examine in detail the results of the survey and together lay down the foundations for the next, most important part.

Phase 3 will be the implementation of a Glaucoma Control Programme for Malta, based on the strategies identified in the next few days.

The population survey has shown us that there are about 4000 Maltese over 40 years of age who are suffering from glaucoma and half of these are not even aware of the situation. The study also showed that there are many more Maltese who are borderline cases and require following up closely if the effects of this condition are to be averted.

The survey also gave us some indication of the risk factors for this condition. We all know how prevalent diabetes and hypertension are in Malta, but until now we have had no indication of their influence on glaucoma.

As you are aware, the treatment of this condition is very costly and takes up a lot of clinic hours. Also, screening for glaucoma is not without its costs. I am sure you will agree with me, however, that the reduction in the quality of life brought about by even partial blindness is a much greater cost to the nation than what we will be spending on prevention. I sincerely hope that this workshop will increase the awareness in the community of this disabling condition. We, as doctors, are perpetual students who are

Annexe II

always ready to learn new aspects especially about those diseases we come across every day. This workshop, I am sure, will have something to say about glaucoma to teach each and every one of us.

The workshop will end on Saturday with a panel discussion on the possible strategies for the control of glaucoma in Malta. I wish to invite all here present to contribute freely to this discussion. I will certainly take up the points raised and I will do my best to see that when a Control Programme is set up, it will include as many of your recommendations as possible.

I cannot end this speech without congratulating the team who worked on this project. They have produced a truly excellent report on the survey and have put a lot of time and effort into organising this workshop.

I wish you all a fruitful and interesting workshop.

PREVENTION OF BLINDNESS

TABLE 1. CATEGORIES OF VISUAL IMPAIRMENT ^a

Category of visual impairment ^b	Visual acuity ^c with best possible correction	
	Maximum less than	Minimum equal to or better than
1	6/18 20/70 3/10 (0.3)	6/60 20/200 1/10 (0.1)
2	6/60 20/200 1/10 (0.1)	3/60 (finger counting at 3 metres) 20/400 1/20 (0.05)
3	3/60 (finger counting at 3 metres) 20/400 1/20 (0.05)	1/60 (finger counting at 1 metre) 5/300 (20/1200) 1/50 (0.02)
4	1/60 (finger counting at 1 metre) 5/300 (20/1200) 1/50 (0.02)	Light perception
5	No light perception	
9	Undetermined or unspecified	

^aAdapted from *International classification of diseases. 1975 revision*. Geneva, World Health Organization, 1977.

^bCategories of visual impairment 1 and 2 are referred to as "low vision" and categories 3, 4, and 5 as "blindness". If the extent of the visual field is taken into account, patients with a visual field no greater than 10° but greater than 5° around central fixation should be placed in category 3, and patients with a field no greater than 5° around central fixation should be placed in category 4, even if the central acuity is not impaired.

^cFor the first four categories of visual impairment, the different lines of figures in each box of the visual acuity columns represent the same level of acuity expressed according to different notations. The first line gives the notation used with the Snellen 6-metre scale (and, where applicable, the corresponding ability to count extended fingers at a set distance); the second line gives the equivalent notation used with the 20-foot scale; the third line gives the decimal notation.

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