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Study of diagnostic accord between general practitioners and an ophthalmologist

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Abstract

Objectives—To identify diagnostic accord and disagreement between general practitioners and an ophthalmologist and thereby determine how undergraduate and non-specialist postgraduate ophthalmic training could be improved.

Design—Comparison of diagnosis of presenting conditions by general practitioners and one ophthalmologist in patients consulting general practitioners for ophthalmic problems during March 1989 to February 1990.

Setting—12 general practices in west Nottingham.

Patients—1474 patients presenting to the study general practitioners with new ophthalmic conditions or new episodes of recurrent conditions.

Main outcome measures—Diagnoses of general practitioners and ophthalmologist.

Results—1121 (76%) of patients with eye problems agreed to see the ophthalmologist and most were seen within three days. Sufficient data for comparison were available on 1103 patients. Diagnostic agreement was found in 638 cases (58%), but potentially serious misdiagnosis was found in only 15 cases; management in three of these cases would have ensured later identification. Most commonly confused conditions were infective and allergic conjunctivitis, blepharitis, and dry eyes. General practitioners assessed visual acuity in only 114 cases yet eight of the 15 patients seriously misdiagnosed had reduced acuity, an important diagnostic sign.

Conclusions—Most ophthalmic disease seen in general practice does not require specialised equipment for diagnosis. Most cases of misdiagnosis have no serious consequences for the patient. Undergraduate and postgraduate training in ophthalmology should ensure that common conditions can be easily differentiated and more serious conditions identified and referred.

Introduction

Eye disease is responsible for over 2% of general practice consultations.^{1,2} Most medical schools now teach ophthalmology as a formal course, but the proportion of formal clinical teaching time allocated is usually less than 2%.³

In a recent study of general practitioners 68% admitted to having "uncertainties about eyes" while 10% affirmed the statement "eyes scare me stiff."⁴ It is therefore unsurprising that studies of diagnostic accuracy of referrals to ophthalmic clinics,^{5,6} abilities to detect asymptomatic eye disease,⁷ and the use of steroid eye drops in eye disease^{8,9} have reflected poorly on general practitioners.

How accurately do these hospital based studies reflect general practitioners' ophthalmic abilities? General practitioners manage most ophthalmic prob-

lems presenting to them. Referred cases are likely to represent those in which the practitioner has uncertainties or where ophthalmic management is thought necessary. In a study of eye disease presenting to a London community health centre² 30 patients were examined by an ophthalmologist as well as their general practitioner. Agreement was found in only 12 cases.

We conducted a study to assess the ophthalmic diagnostic accuracy of general practitioners in a larger sample to determine any important disagreements and thereby provide useful information for the planning of undergraduate and postgraduate ophthalmic training. The study is not an attempt to show that an ophthalmologist using specialised equipment can identify more eye conditions than general practitioners.

Subjects and methods

Between March 1989 and February 1990 we studied patients of 17 general practitioners in the western sector of the city of Nottingham to examine the rates of ophthalmic disease in a defined population of 36 018.

Patients presenting to their general practitioner with eye problems were recorded by practitioners in books of questionnaires. Practitioners were asked to record their working diagnosis, investigations, treatment, and follow up arrangements. Specific questions included whether visual acuity was assessed or fluorescein staining used. Patients diagnosed by the general practitioner as having either a first episode of an ophthalmic condition or a new episode of a recurrent ophthalmic condition were asked by the practitioner if they would see an ophthalmologist as part of a research project. Patients who agreed were seen by a single ophthalmologist (JHS) as soon as possible after presentation to the general practitioner at the general practitioner's surgery or by domiciliary visit. The ophthalmologist carried out a problem oriented ophthalmic examination using a 3 m Snellen chart, Perkins hand-held tonometer, portable slit lamp, and diagnostic pharmaceuticals as required. Laboratory investigations were not used, and all diagnoses were based on history and clinical examination as in previous epidemiological studies of eye disease presenting to emergency departments.¹⁰ None of the general practitioners had worked in ophthalmology after graduation.

Questionnaires completed by general practitioners and ophthalmologist on each patient at the time of consultation were analysed with the statistical package SPSSX. The general practitioners' and ophthalmologist's diagnoses of the presenting condition were then compared. Diagnoses were considered to agree if the presenting condition diagnosed by the general practitioner was confirmed by the ophthalmologist. When conjunctivitis was the only diagnosis specified by the general practitioner the type of conjunctivitis implied

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—for example, infective or allergic conjunctivitis—was determined from the treatment prescribed by the general practitioner where possible.

Results

A total of 1474 people consulting their general practitioners with eye problems were invited to see the study ophthalmologist; 1121 (76%) accepted. Of these, 800 (71%) were seen within three days of presentation to their general practitioner (mean 3 days, median 2 days, mode 1 day). The distribution was skewed by a few patients with chronic symptoms presenting for ophthalmic assessment some weeks after presenting to their general practitioner.

Diagnostic accord was examined in 1103 patients for whom data were complete enough to enable accurate matching of records. There were 419 men and 684 women, which reflected the sex distribution of patients presenting with eye problems to general practitioners in this study.

As expected the range of ophthalmic diagnoses recorded by general practitioners was not as wide as that of the ophthalmologist. Table I shows the proportions of the commoner conditions diagnosed by the general practitioner and the ophthalmologist. The commonest conditions presenting in general practice were infective and allergic conjunctivitis, dry eyes, cataract, blepharitis, and chalazion.

The diagnoses of the general practitioners and the ophthalmologist agreed in 638 cases (58%). The level of agreement was similar for all general practitioners.

Though the general practitioners' diagnoses were incorrect in the remaining 565 cases, in 550 of these

TABLE III—Sensitivities, specificities, and positive predictive values for general practitioners' diagnoses of ophthalmic conditions

Diagnosis	Sensitivity	Specificity	Positive predictive value (%)
Chalazion	0.58	0.995	86
Dendritic ulcer	0.75	0.999	75
Infective conjunctivitis	0.86	0.83	71
Cataract	0.69	0.98	70
Dry eyes	0.40	0.98	68
Allergic conjunctivitis	0.59	0.96	67
Anterior uveitis	0.44	0.998	67
Senile macular degeneration	0.42	0.995	62
Glaucoma	0.74	0.99	55
Stye	0.60	0.99	35
Blepharitis	0.23	0.96	27
Refractive disorders	0.09	0.99	23
Migraine (with eye symptoms)	0.67	0.98	20

cases no serious ocular or systemic complications resulted from the misdiagnosis or subsequent management. The diagnoses most often confused by the general practitioners were infective and allergic conjunctivitis, blepharitis, and dry eyes. Infective conjunctivitis was the condition most overdiagnosed by general practitioners. Allergic conjunctivitis and dry eyes were the most commonly misdiagnosed conditions.

In only 15 cases was it considered that the general practitioners' misdiagnosis or mismanagement could have had serious visual or general health implications for the patient (table II). Though the general practitioner's diagnosis was incorrect, in three of these cases the course of management taken should have led to recognition of the correct diagnosis. In the remaining 12 cases this was not so. Eight of these 15 patients had reduced visual acuity in one or both eyes. It is therefore of particular interest that visual acuity was assessed in only 114 of the 1103 cases and fluorescein staining was used in only 13 cases.

Sensitivities and positive predictive powers of the general practitioners' diagnoses were calculated for each diagnostic group and are given for the commoner conditions in table III. These reflect the accuracy of the general practitioners' diagnosis of the condition in all patients seen (sensitivity) and the likelihood of having the condition diagnosed by the general practitioner (positive predictive power).

Discussion

We assumed that the ophthalmologist's diagnosis was correct despite the delay between presentation to the general practitioner and the ophthalmic assessment. Though this delay was minimised, changes in the physical signs may have occurred. However, this is unlikely to be an important factor for the differences in diagnoses of the general practitioner and ophthalmologist.

The patients compared in the study could have been unrepresentative of the study population as a whole since they are more likely to be patients causing diagnostic or management difficulties for the general practitioner or patients unresponsive or dissatisfied with their treatment. Since most patients accepted ophthalmic assessment at their first visit to their general practitioner we hoped that these influences would be limited. The general practitioners in the study were a keen, self selected group who agreed to have their ophthalmic practice scrutinised. How representative this group are of general practitioners overall cannot be determined.

Despite these unavoidable problems our results are encouraging as diagnostic agreement was found in nearly 60% of cases and the misdiagnoses in the remaining cases were unlikely to be associated with serious complications. The diagnoses most often

TABLE I—Diagnosis of commoner eye conditions by general practitioners and ophthalmologist

Diagnosis	No (%) of cases diagnosed by: (presenting condition only)	
	General practitioners	Ophthalmologist
Infective conjunctivitis	425 (39)	345 (31)
Allergic conjunctivitis	119 (11)	136 (12)
Dry eyes	52 (5)	87 (8)
Cataract	48 (4)	40 (4)
Blepharitis	43 (4)	46 (4)
Chalazion	32 (3)	50 (5)
Chronic glaucoma	31 (3)	23 (2)
Migraine (with eye symptoms)	29 (3)	9 (1)
No abnormality detected	22 (2)	45 (4)
Stye	19 (2)	15 (1)
Refractive disorders	11 (1)	15 (1)
Age related macular degeneration	10 (1)	15 (1)
Anterior uveitis	6 (0.5)	9 (0.8)
Dendritic ulcer	4 (0.3)	4 (0.3)
Other	252 (23)	264 (24)
Total	1103	1103

TABLE II—Comparison of general practitioners' and ophthalmologist's diagnoses in 15 cases with important disagreement

Ophthalmologist's diagnosis	General practitioners' diagnosis	Patient referred	Visual acuities	
			Right	Left
Neurotrophic keratitis	Frontal nerve neuralgia	No	6/12	6/12
Anterior uveitis	Infective conjunctivitis	No	6/12	6/12
	No diagnosis	No	6/12	6/18
		No	6/5	6/18
		No	6/9	6/24
Open angle glaucoma	Postoperative pain	No	6/6	CF
Rubeotic glaucoma	Cataract	No	6/12	6/12
	Cataract with infective conjunctivitis	Eye emergency department	NPL	HM
Acute glaucoma	Cataract and blocked tear duct	No	NPL	6/6
	Infective conjunctivitis	No	HM	6/9
Retinal hemi-artery occlusion	Migraine	No	6/6	6/6
Retinal branch vein occlusion	No diagnosis	No	6/6	6/6
Benign intracranial hypertension	Migraine (with eye symptoms)	No	6/5	6/5
Space occupying intracranial lesion	Migraine (with eye symptoms)	Neurology clinic	6/5	6/5
Dystrhyroid optic nerve compression	Graves' disease	Optician	CF	CF

CF=counting fingers, HM=hand movements, NPL=No perception of light.

confused by general practitioners were all external eye diseases requiring no specialised equipment for their diagnosis. General practitioners were noted to be reluctant to diagnose allergic conjunctivitis outside the "hay fever season" and teenage and young adult age groups. Though misdiagnosis of these conditions is unlikely to have serious consequences, the correct diagnosis could relieve patients' symptoms earlier and might avoid unnecessary hospital referral.

APPROPRIATE MANAGEMENT

These conditions may be differentiated by history and simple examination. The history should include visual acuity (since the common eye problems seen in general practice rarely reduce visual acuity); purulent discharge and concurrent upper respiratory tract infections (infective conjunctivitis); itching and watering (allergic conjunctivitis); grittiness, heaviness of the lids, and preponderance or exacerbation of symptoms when concentrating (dry eyes and blepharitis). Systemic conditions that may be associated with ocular conditions—for example, rheumatoid arthritis, thyroid disease, and atopy—should be considered.

Examination should begin by recording the visual acuity of each eye independently. The low level of recording of acuity was particularly disappointing since most practices have Snellen charts or near test types.¹¹ Reduced visual acuity may be the only sign alerting the general practitioner to the presence of the rarer, more serious ophthalmic conditions rather than common eye conditions. Over half of the patients in whom serious misdiagnoses occurred had reduced visual acuity.

The eyes should then be examined with a bright pen torch in a logical sequence from anterior to posterior, starting with examination of the eyelids and lashes and proceeding to the conjunctiva, cornea, anterior chamber, iris, and pupil reactions. An ophthalmoscope can be used to examine lens and vitreous opacities against the red reflex and for examination of the optic disc and fundus.

Fluorescein stain is a useful, quick, and inexpensive adjunct to the examination of unilateral red eyes and dry eyes. Fluorescein is taken up by breaks in conjunctival and corneal epithelium, staining them green. This is more clearly seen if a cobalt blue filter is added to the pen torch.

Details provided by a simple ophthalmic examination are helpful to ophthalmologists when allocating clinic appointments of an appropriate degree of urgency. Unfortunately such details are often lacking in referral letters.¹²

MISDIAGNOSIS

In only 15 cases was the general practitioner's misdiagnosis or inappropriate management considered to have a serious outcome for the patient. Examination of these patients shows that 20% had migraine with ophthalmic symptoms diagnosed (table II). Migraine should not be diagnosed until other more serious diagnoses have been excluded.

Most patients diagnosed as having glaucoma had had the diagnosis suggested by their optician. This is reflected in the sensitivity of 0.74 for general practitioners' diagnosis of glaucoma (table III). Missed glaucoma in patients presenting directly to the general practitioner accounted for a further 20% of the potentially seriously misdiagnosed cases despite the presence of clear major physical signs.

GUIDELINES

Our results reaffirm the guidelines for course content given in a previous report identifying areas of emphasis in an ophthalmology course.³ Most eye problems present to and are dealt with by the general practitioner, and undergraduate and non-specialist postgraduate ophthalmic training should aim at recognition and differentiation of conditions commonly encountered in general practice. These include, infective and allergic conjunctivitis, dry eyes, cataract, blepharitis, and chalazion. In addition, the identification and management of common chronic ophthalmic conditions should be taught to enable appropriate referral of such cases to ophthalmic services.

By routinely using the simple ophthalmic examination technique on patients presenting with eye problems, general practitioners will realise that they are able to diagnose most conditions presenting to them without specialised equipment and within their normal consultation periods. In addition, the use of treatment protocols developed with local ophthalmic departments could help maximise the likelihood of successful management and reduce hospital referrals due to failures of treatment.

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