INDIVIDUAL STUDY

Diabetes—a disease for general practice

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DIABETES is a common disease. A working party appointed by the College of General Practitioners in 1962 reported, in a 95 per cent complete survey of 19,412 patients in Birmingham, an incidence of 1·33 per cent (0·64 per cent already diagnosed cases and 0·69 per cent previously unknown) and J. Harkness (1962) in a 97 per cent complete survey of 1,503 patients found an incidence of 1·2 per cent (0·6 per cent known and 0·62 per cent unknown).

It may be assumed therefore that the average practitioner with 2,460 patients on his list has 15 or 16 known diabetics and a further 14–18 awaiting diagnosis. It follows that every doctor has an adequate number of patients under his care to provide him with clinical experience necessary to maintain his competence in looking after them.

This is a disease simple to diagnose, multifarious in its manifestations, long in its course and gratifyingly responsive to treatment. In short it is the ideal disease for the general practitioner to diagnose, observe and treat with interest.

Yet increasingly it has become common practice for the general practitioner to regard the detection of glycosuria as the signal for referral of the patient to hospital. Once referred, the patient is kept on the hospital books for life, doomed to take time off work, travel and wait to see a fresh houseman at almost every attendance at the diabetic clinic scrummage. His notes get thicker and thicker so that both he and the young doctor find the fleeting consultations more and more unrewarding. Is this desirable or necessary?

Taking the College of General Practitioners 1962 survey figure of 0·64 per cent quoted above, a district hospital serving a population of 250,000 patients would be indirectly responsible for 2,960 already diagnosed diabetics. If the hospital assumes direct responsibility for the surveillance, this would entail an attendance of 31 patients at each weekly diabetic clinic if each patient was seen but once annually. By contrast the average general practitioner (who in 1970 had 2,460 patients) would have 16 known diabetics on his list and would only need to see 0·38 diabetics weekly for a single annual attendance. Clearly the average diabetic requires several attendances annually so that a policy of hospital surveillance inevitably means a huge diabetic clinic with the dissatisfaction and depersonalisation this entails for both the unfortunate patients and staff.

Optimum use of resources

The National Health Service patient has available to him domiciliary facilities under the direction of his general practitioner and hospital facilities under the direction of a consultant. It is the function of his general practitioner to see that he is cared for with the optimum use of these resources and this is rarely the same as maximum. To achieve optimum use it helps to have a clearly defined concept of the complementary roles of these two prime doctors.

In my view:

(1) The general practitioner should only refer a patient to a hospital consultant if the diagnosis or treatment requires wisdom, knowledge, skills or facilities which he is unable to provide himself.

(2) The consultant should return the patient to his own doctor as soon as his care falls within general-practitioner competence.

(3) All men are different and general practitioners are no exception. For the consultant to gauge when the patient can be discharged requires a knowledge of his doctor. To enable him to acquire this knowledge it is preferable for the general practitioner to select one consultant in each specialty and to refer all patients to him exclusively.

These principles have guided my relationship with the hospital during my time in practice and this paper is largely an account of its application in diabetes.

Incidence

TABLE I—INCIDENCE

Age	*Number of diabetics*	*Patients at risk*	*Percentage incidence*
Under 30	0	999	0
30+	3	348	0·9
40+	5	292	1·7
50+	6	258	2·3
60+	6	211	2·8
70+	4	136	3·0
Total	24	2244	1·04

There are 2,244 patients in the practice of whom currently there are 24 patients known to have diabetes, 14 females and ten males. This represents an overall incidence of 1·04 per cent which, although 0·4 per cent and 0·47 per cent respectively higher than the known cases in the two surveys quoted above, leaves it likely that there are between three and seven patients awaiting discovery. I am fortunate in having no diabetic children with their much greater problems and worries for the doctor. The incidence rises steadily through each decade reaching a maximum of 3·0 per cent of those over 70 years old.

Diagnosis

Age at diagnosis

Over 10 years—one
Over 20 years—one
Over 30 years—five
Over 40 years—three
Over 50 years—seven
Over 60 years—six
Over 70 years—one

Thus most patients were of the maturity-onset type with 17 diagnosed after the age of 40 and only seven before.

Mode of presentation

Thirst—six
Routine examinations for unrelated complaints—five
Weight loss—three
Acute lower respiratory infection with gross obesity—three
'Pulheem' or insurance medical examinations—two
Pruritus vulvae—two
Polyuria—two
Sore toe and ulcer of the leg—one

Pain in the feet—one
Malaise—one
Referred by optician for reduced visual acuity—one
Abscess—one
Sudden deafness—one
Thrush balanitis—one
Hunger and dry mouth—one
Sore tongue—one

The patient's symptoms at the initial consultation are listed; direct questioning after the discovery of glycosuria often revealed others.

Weight at diagnosis

The weight of the patient is recorded at diagnosis and beside it in brackets is noted the desirable weight from the Metropolitan Life Assurance Company tables which take into account sex, height and build.

½–1 stone overweight—one
1–2 „ „ —four
2–3 „ „ —four
3– „ „ —three
5– „ „ —two
(Fat but unrecorded —one)

Nine patients were either underweight or approximately normal and of these, five required insulin at diagnosis. Fifteen patients were overweight and of these only two required insulin initially; both of these had pneumonia at presentation and by the time of their discharge from hospital their diabetes was controlled by diet alone.

The urine of obese, middle-aged patients is tested at every opportunity; this applies also to those with pruritus, recurrent skin sepsis, leg and foot ulcers and cataracts. There are facilities for collecting specimens in the surgery.

Management

Initial

(1) A full examination is made paying particular attention to the fundi and circulation of the legs and feet.
(2) A random blood sample is taken for glucose estimation. If this is markedly elevated the diagnosis is regarded as confirmed. If it is normal or borderline a glucose tolerance test is arranged.
(3) A chest x-ray is requested to exclude pulmonary tuberculosis.
(4) The patient is advised about urine testing and the recording of the results. The forms enclosed with every bottle of 'Clinitest' tablets are used and the columns headed 'before breakfast', 'before mid-day meal' and 'before evening meal' are marked for completion. He is asked to test his urine three times daily until he has been stabilised. Thereafter he does this on Sundays and Wednesdays only, these days being chosen as they are evenly spaced and representative of both leisure and work. Subsequently this chore may be reduced to once a month. However, all patients are exhorted to test three times daily if they should become ill and to report if the glycosuria becomes out of control.

Arrangements for care

Ten were investigated at home.
Six were diagnosed and stabilised before coming under my care.
One was diagnosed and investigated from a hospital antenatal clinic.
One was referred to medical outpatients 13 years ago for no obvious reason.

Six were admitted directly to medical wards by arrangement with the consultant or resident. Apart from glycosuria, the main features leading to this course of action are listed below.

TABLE II
PATIENTS ADMITTED TO HOSPITAL

Sex	*Age*	*Presentation*	*Reasons for admission*	*Blood glucose per 100 ml*
Male	37	pain in the feet	weight loss	596 mgm
Male	56	sudden deafness in one ear	weight loss; urinary infection	470 mgm
Male	56	bronchopneumonia 18 stone	drowsiness	—
Female	62	decreased visual acuity	retinopathy; weight loss; distended bladder and presumed hydronephrosis; leg wasting	660 mgm
Female	63	respiratory infection; obesity	drowsiness	340 mgm
Female	69	acute bronchitis; gross obesity	heart failure	—

Treatment

Diabetes is associated with an imbalance between the production of insulin and the demand for it in maintaining the blood glucose at the optimum level. This imbalance may be due to an absolute deficiency in insulin production or to a relative deficiency which is unable to cope with dietary excess, obesity, infection or pregnancy. In these states of relative insulin deficiency, the first aim of treatment is the correction of the precipitating factor. In pregnancy the sooner the patient is under the combined supervision of a consultant physician and obstetrician the better.

Diet

Dietetic instruction is simple but ensuring compliance is not. As most patients are overweight the instruction is the same as for obesity. They are asked to eat no sugar, sweets or ice-cream; no cakes, puddings or biscuits; bread is limited to between two and four thin slices and potato to a medium-sized one daily. Fats may need to be restricted also. The weight is recorded at each consultation and provides the text for the day.

Thin patients will almost certainly be on insulin and have a diet sheet provided by the hospital.

Drugs

In all fields of therapeutics, as a general rule, it is best to use and be familiar with a few of each class of drug. On the other hand one is loath to change the treatment of a well-controlled patient for the sake of uniformity so three forms of sulphonylurea are used: tolbutamide, chlorpropamide and glibenclamide.

Recently the biguanides have been prescribed as the drug of first choice in those presenting with obesity. One severe but incorrigible happy-go-lucky patient with early-onset diabetes, large doses of insulin but poor control and a weakness for cakes has achieved a remarkably improved control by adding a biguanide and considerably reducing the doses of insulin. Currently patients are being switched from phenformin to metformin owing to the rare occurrence of severe lactic acidosis with the former.

The methods of treatment now being used are:
Diet alone—Seven patients
Sulphonylurea alone—six patients
Biguanide alone—four patients
Insulin—three patients
Sulphonylurea and biguanide—three patients
Insulin and biguanide—one patient

In America, the University Group Diabetes Program (1970) found in a controlled trial that, owing to cardiovascular disease, the group treated with tolbutamide had more than twice as high a mortality as those groups treated with insulin and a placebo. These figures have been greeted with some British scepticism; however, these standardised mortality ratios taken from the *Digest of Health Statistics* (Department of Health and Social Security 1971) are not reassuring.

TABLE III
MORTALITY RATIOS

Year		*1961*	*1965*	*1968*	*1969*
All causes	Male	103	99	100	100
	Female	108	99	100	98
Diabetes	Male	83	88	100	101
	Female	97	99	100	101
Ischaemic heart disease	Male	89	98	100	100
	Female	95	93	100	96
Hypertensive heart disease	Male	159	117	100	100
	Female	171	118	100	98

They show that against a background of a fractionally falling total mortality there has been an 18 per cent rise in the male diabetic mortality during the period of widespread use of oral hypoglycaemic drugs. The mortality from ischaemic heart disease appears to have almost stabilized after 1965. Contrastingly, the general use of effective hypotensive drugs has been followed by a dramatic fall in the figures relating to hypertensive heart disease.

No doubt these uncertainties will be resolved eventually by research. In the meantime, there seems no other therapeutic course to follow except the present one but with a wary eye.

Follow-up

T. L. Cleave *et al.* (1966) persuasively attribute most diabetes and its vascular concomitants (and much else beside) to a high intake of quickly absorbed, concentrated carbohydrate especially in the form of sugar but also milled grain. For diabetes this high intake has to be maintained for at least 20 years before the consequences are revealed. As well as evolutionary theory, a wealth of epidemiological evidence is adduced in favour of this hypothesis. If so, the general practitioner has an important prophylactic role to play in the education of all age groups in safe nutrition.

The 24 patients have had a total of 148 patient/years of surveillance since their diabetes was diagnosed; this is a sizeable burden for one practitioner to add to or subtract from the work of a diabetic clinic. Only one of these patients is now under the care of the hospital. The exception, a 34 year-old man with claudication and an absent popliteal pulse, was recently referred to the diabetic clinic for advice and is now awaiting aortography with a view to possible surgery. The rest have either never been to medical

TABLE IV
FOLLOW-UP

Years since diagnosis	*Number of patients*	*Patient/years*
1	3	3
2	5	10
3	3	9
4	1	4
6	3	18
7	1	7
8	1	8
9	3	27
12	2	24
15	1	15
23	1	23
Total	24	148

outpatients since they came into the practice (11 patients), have been discharged by the consultant knowing our policy (eight patients), have been discharged from other hospital's clinics at the request of the patient followed by a letter to the consultant concerned (four patients) or the patient has just ceased attending hospital (the happy-go-lucky patient mentioned above).

During 1971, these 24 patients were seen 158 times, an average of 6·6 times each. The practice is run with a low consultation rate which during the same year amounted to 3,105 per thousand patients at risk.

The diabetic patients were seen just over twice as frequently as the average patient but 158 consultations only amounts to three consultations, equivalent to 30 minutes of surgery time, each week. These patients, even if they were attending a hospital diabetic clinic, would presumably require as many consultations as other practice patients. It can therefore be reasonably estimated that the time required for this work is 15 minutes weekly.

Ensuring attendance

With a disease liable to so many complications it is essential to ensure that all patients are seen regularly. One of the side-effects of caring for diabetics in general practice is that the patients do not regard themselves as very different from other people, and are less concerned. This is all to the good, but the corollary is that they tend to think it less important to attend to their diet, test their urine, take their treatment or indeed to attend their doctor.

It follows that it is necessary to have a system for ensuring that they do attend as desired. The methods used are:

(1) We have a complete appointment system but only book for three months ahead. This caters for most patients but not for the few seen at longer intervals.

(2) Drugs are usually supplied in the exact quantities required to last until the next appointment.

(3) All patients on regular medication of any kind have a small yellow card kept in the record envelope and folded over the top of the current continuation card for easy retrieval. On this card are listed all the drugs being prescribed, their dose and the date and quantity of each prescription. If a patient telephones for a repeat prescription my secretary refers to this card and also to the date of the last attendance, reporting any lapses to me.

(4) For those conditions requiring regular surveillance a simple card index system housed in a small box is kept on the consulting room desk. The diabetic patients all have a card tagged with a coloured adhesive label which folds over the top edge of the card so that it can be identified from the top as well as the front.

Each card lists the significant features of the diabetic history; only important items are entered on it, clinical notes being made in the record envelope as usual. The index cards are filed in sections labelled: This month; September; October; November; etc.; 1973; 1974; 1975; Moved; Dead. The card is put forward to the month in which it is wished to see the patient next. At the end of the month there should be no cards left in 'This month' but there usually are; these can be pursued by letter, telephone or health visitor. In each month the cards in each diagnostic category are filed in alphabetical order so that they can be rapidly found while the patient is sitting down.

Consultations

At the follow-up consultations the patient brings his 'Clinitest' record sheets which are stapled together and remain in his care with any new treatment instructions entered. He is weighed. He brings a freshly passed sample of urine; this is tested for sugar (and acetone if necessary) as a cross check. Turbid samples are looked at under the microscope for pus cells and motile bacilli.

The patients are examined as appropriate for any complaints but the fundi are looked at about annually. Blood samples are taken when indicated and from time to time in others as there are occasional disparities between the amounts of sugar found in the urine and blood.

Complications

The complications discovered are listed below and occurred in a number of patients. Many were manifest at diagnosis and some resolved on stabilisation.

Vascular	Claudication—three
	Foot ulcers—two
	Angina—two
	Myocardial infarction—one
	Sudden deafness—one
Neurological	Impotence—two
	Leg wasting and weakness—two
	Bladder neck obstruction and bilateral hydronephrosis—one
	Peripheral neuritis—one
Ocular	Cataracts (two have had extractions)—four
	Micro-aneurysms—two
	Retinal haemorrhage—two
	Blindness—one
Obstetric	Two mothers had one Caesarean live birth
	One mother had two stillbirths
Infective	Urinary with cultures of 100,000 organisms/ml.—six
	Staphylococcal pneumonia—one
	Abscess in the buttock—one
Miscellaneous	
	Xanthelasma—two
	Fat atrophy—one
	Jaundice—one possibly due to chlorpropamide

Hospital referrals for diabetes and its sequelae (other than at diagnosis)

Medical	inpatients	for restabilisation—one
	outpatients	for absent popliteal pulse—one
Eye	outpatients	five, three for cataracts (two have had extractions)
		glaucoma—one
		retinopathy—one
Genito-urinary		three, for recurrent urinary infection—two
	out-patients	for haematuria and urinary infection—one

Death

By memory, referral to death certificate counterfoils, and returned medical record cards the following 15 deaths occurring during the past 21 years have been recalled. There can be no guarantee that this is a comprehensive list but it is likely.

Age	*Number of deaths*
Over 50 years	two
Over 60 years	three
Over 70 years	five
Over 80 years	five

Cause of death

Cardiovascular	cardiac	four
	cerebral	three
Infective	pneumonia	three
	renal	one
Diabetes		two
Malignancy		one
Unknown		one age 92 in a nursing home

Of the two listed as dying of diabetes one aged 74 died suddenly after a month in hospital, the postmortem revealing no significant abnormality other than oedematous lungs.

The other was a successful business man aged 57 who had had a neuropathic bowel disturbance. He was apparently well controlled by insulin but was obstinate in his refusal to attend surgery, indeed he had recently ignored two requests for him to make an appointment. Two days prior to his death he developed severe diarrhoea and vomiting but forbade his wife to send for the doctor until he lapsed into coma in the middle of the night. He died from the inhalation of bloody vomitus. The autopsy showed nothing other than this and acute gastric ulceration and haemorrhage but I have no doubt that he was in diabetic coma; his urine was loaded with glucose.

Discussion

During the decade 1959–69, the hospital medical staff in England and Wales rose by 5,968 to a total of 22,001 while the number of general practitioners fell by 1,396 to 21,505. This significant shift in the distribution of medical man power was accompanied by an increase in the male expectation of life at birth of 0·7 years compared with an increase of 1·7 years in the preceding decade. Expectation of life is but a crude measure of medical success but any great change in efficiency might reasonably be expected to had had more effect in this parameter.

In 1969 the cost of general medical services in England and Wales was £129 million amounting to £2·64 per head of total population whereas the cost of a single outpatient attendance at London teaching hospitals (acute) was £3·59 and at non-teaching hospitals

(acute) was £2·34. It is evident that general practice is vastly cheaper than hospital care (*Digest of Health Statistics*, 1971).

The opening of laboratory and radiological facilities to the general practitioner and the developments of the pharmaceutical industry have enormously increased his scope for diagnosis and treatment so that wide fields of medicine are now open to domiciliary care. In the background are the consultants and their hospital resources for more difficult or specialised problems.

The modern patient rightly does not expect amateur attention. If on the other hand he sees that his own doctor refers him to hospital for all except trivial matters he will naturally deduce that he is there primarily to deal with these and make good use of him for this purpose. The converse also applies. Further, I believe that the frequency is inversely related to the duration and thoroughness of consultation and a low attendance rate is an essential prerequisite for this. One of the principal skills of general practice is the moulding of the pattern of demand for its attainment.

Diabetes is a typical medical condition which can be looked after at home with occasional, transient specialist help from the hospital, yet it is now largely regarded as the responsibility of the hospital by consultants, general practitioners and patients alike. I am sure this is wrong.

Summary

The care of diabetics in a general practice is described. The advantages of home as opposed to hospital care are discussed.

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