PRACTICE OBSERVED

Trainees' Corner: Managing Chronic Disease

Diabetes mellitus

III: Complications and organising long-term management

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This article is based on an ad hoc presentation made for vocational trainees in general practice by the MSD Foundation. Further information about the topic-based programmes on which this series is based is available from the MSD Foundation, Tavistock House, Tavistock Square, London WPC1.

Complications of diabetes may be inevitable, but their frequency and severity can depend on how well—or badly—the disease is managed. Good management may, at the least, delay the development of some complications.

Complications

DIABETIC COMA

To be called out to see a patient in a diabetic coma may be an alarming experience. Prevention is important, and the first step is to make sure that the patient knows what can precipitate ketocidosis. Usually it is one of the following: infection; trauma; or omitting insulin, particularly during an illness which causes anorexia or vomiting. If the patient is aware of these and

is able to test his urine for sugar and acetone, the condition may be prevented.

But if ketocidosis does develop, after polyuria and increasing thirst there is usually nausea, and sometime vomiting and acute abdominal pain. If the patient has stopped taking insulin the condition may rapidly worsen. On examination the patient is dehydrated, the breathing heavy and sighing—Kussmaul respiration—and the pulse thin and rapid. You can often smell acetone on the patient's breath, and urine analysis usually shows heavy glycosuria and ketonuria. A full-blown case demands rapid admission to hospital; even then the mortality may be as high as 10%. There the immediate treatment is rapidly acting insulin, intravenous fluids, and aspiration of the stomach. If hospital admission is delayed 40 units of insulin intramuscularly helps to prevent further deterioration on the way to hospital. A normal saline intravenous infusion, if available, is also helpful.

Another form of coma in diabetes is due to hypoglycaemia brought about by taking too much insulin, or taking too little food. If food is delayed for some reason or if the patient indulges in strenuous exercise without extra food to compensate for the activity, then hypoglycaemia may result. On occasions patients on sulphonylureas may develop hypoglycaemia. This form of coma is easier to manage, although it is still better to prevent it by educating the patient to know the warning signs. In fact, it has been suggested that these signs should be demonstrated by making the patient hypoglycaemic under strictly controlled conditions. If the patient—and his family and friends—can recognise these signs they can start treatment at once. Hunger, sweating, palpitation, tremor, dizziness, and mental confusion are the main signs. The patient should be advised ways to keep some lumps of sugar or glucose tablets with him and to take about four if any signs occur. If he becomes unconscious, 1 mg

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of glucagon intramuscularly is effective. If you carry it in your bag it should be checked for expiry dates. The quickest treatment is intravenous dextrose.

We hope it is clear that one of the most important aspects of patient management is to provide sound, accurate, and understandable information as a first stage in the education of the patient. The British Diabetic Association has a series of leaflets that you will find useful if they are presented to the patient in a positive way.

CHRONIC COMPLICATIONS

Diabetic complications occur in the nervous system, including the eyes, and the vascular system, including the kidneys. Infection is another important complication. Neuropathy affects both peripheral and autonomic nerves, is common, insidious, and may occur at any stage of the disease. The symptoms and findings include pain and paraesthesiae, aching calves, trophic ulcers on the soles, urinary stasis, loss of erection, diarrhoea, amyotrophy (rare), postural hypotension, and delayed emptying of stomach. On examination you are likely to find absent or diminished reflexes. In many cases good management leads to improvement in many aspects of the clinical picture, though not usually to objective improvement in nerve function.

Vascular disease, particularly atherosclerosis, is the commonest cause of death in diabetics. Capillary disease is the cause of the largest number of complications. Again strict control probably is the best way to delay both the onset and the progress of vascular complications.

The results of capillary disease may most often be seen in the eye. The appearance is specific. In background retinopathy the first signs you see may be microaneurysms, succeeded by waxy exudates, and haemorrhages. If you find new vessel formation the prognosis without specific treatment is poor.

If you do discover signs of retinopathy in patients under 40 it is best to refer them to hospital. If, however, the patient is over 40 it is not always necessary to refer to a specialist at first. The British Diabetic Association's guidelines are given in table 1.

TABLE 1—British Diabetic Association's plan for managing patients over 40 with diabetic retinopathy. (Patients under 40 should be referred for a specialist opinion)

Retinopathy	Visual acuity	Action	Follow up
Absent	6/6-6/9	Nil	Check visual acuity and fundi every six months; if both worse—ophthalmologist; if retinopathy—ophthalmologist; Check fundi for every
Absent	Worse than 6/9	Send to ophthalmologist and if no better to ophthalmologist	Examine fundi five yearly
Present but mild	6/6-6/9	Nil	Check visual acuity and fundi every six months; if both worse—ophthalmologist; if retinopathy—ophthalmologist; Send to ophthalmologist
Proliferative or severe (moderate or severe)	Worse than 6/9	Send to ophthalmologist	At hospital eye department

Visual acuity using Snellen's Type and fundi must be checked regularly.

If there are similar changes in the glomerular capillaries a renal lesion may develop, indicated initially by proteinuria. Earlier in the disease there may be no other signs of renal damage such as impaired renal function, oedema, and hypertension. Expert opinion will be required when renal function begins to deteriorate.

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Infection in the diabetic must be considered important—it worsens blood glucose control and if severe may cause ketocidosis. There tends to be an increase in the frequency of foot and skin infections—especially fungal. Diabetic patients should usually have a chest x-ray examination on diagnosis and be investigated for any unexplained weight loss or any increase in insulin requirements.

One important aspect of diabetic management that is commonly poor is care of the feet. If there is neuropathy or impaired circulation, or both, even a minor injury may lead to ulceration. You should look for abnormality of shape as well as the colour and texture of the skin, and any ulceration or excessive callusities. There may be absent pulses.

Most foot complications can be avoided if the patient is properly educated to care for his feet—and in this education "why" is as important as "what." The following is a useful list of suggestions: inspect feet daily; maintain scrupulous cleanliness; wear soft socks and pliable shoes; report any ulcers or inflammation; inspect shoes for protrusions; do not walk barefoot; avoid extremes of temperature; cut nails carefully; see a chiropodist; and stop smoking. Treatment of diabetic lesions of the foot consists of rest, relief of pressure, antibiotics, analgesics, treatment by a chiropodist, or surgery.

Organising long-term management

To establish and maintain normoglycaemia.
To achieve and maintain the patient's well-being.
To minimise and delay the onset of complications.

The majority of patients with diabetes can be managed entirely by general practitioners, the exceptions being the brittle type 1 (insulin dependent), some children, and pregnant women. The care of the first two groups may be shared quite effectively with the hospital consultant, but the expectant mother will need specialist care throughout the pregnancy.

The satisfactory organisation of general practice care will include the entire practice team—doctors, nurses, health visitors, reception staff, and, if at all possible, the dietitian. Most doctors have a rather hazy idea of the number of diabetics in their practice, and the first step is to identify these patients. This can be done in several ways. The least accurate but most often used is by memory; a more useful way is to flag notes, particularly if you have an ageing register; better still is a diagnostic register, and finally for the few lucky practices, a computer. By identifying these patients you can get some idea of the size of the problem.

FOLLOW-UP

The next step is to decide how to plan follow-up—individual attendances in ordinary consulting sessions or in clinics. Critics of the latter say that this is getting away from the personal care so vital to good general practice and will lead to the "factory" approach of the hospital diabetic service. The general practice clinic has the advantage of bringing together at one session all the members of the team who have particular expertise, and the fact that they will all be known to the patient over many years overcomes the criticism of impersonality and fragmentation. The general practitioner's ability to provide effective follow-up care for the diabetic patient in an ordinary session may suffer as a result of immediate pressures, such as an influenza epidemic. This argument has been used against general practitioners being able to do the monitoring effectively, but it scarcely holds water if the clinic approach is used.

One of the most important tools must be the patient's medical record. Diabetes is a chronic illness requiring entries in the ordinary medical record over many pages. This must cause difficulties in trying to follow the course of the condition. Despite adding to the number of sheets in the record, a flow

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DIABETIC DATA SHEET

Formal Name: _____ Surname: _____
Address: _____ Date of birth: _____
M S W D Sep

Occupation: _____
Smokes: _____ Cigarettes/day: _____

Age / year of onset: _____

Presentation and/or presenting complaints: _____

Previous dietary features: _____
Current diet: _____

Previous medication: _____
Current medication: _____

Weight change: _____ Angina: _____
Paraesthesiae: _____ Claudication: _____
Visual acuity: _____ Feet problems: _____
Family history of diabetes: _____

EXAMINATION: Wt _____ Ht _____ BP _____
Fund: _____ Visual acuity: _____
Lungs: _____
Heart: _____
Feet: _____
Pulses: _____
Skin: _____
Reflexes: _____
L: _____
R: _____
A: _____
V: _____
S: _____
T: _____
Other: _____

INVESTIGATIONS: GTT _____
HbA1c _____
Urine: _____
Cholesterol: _____
Proteinuria: _____
Glycosuria: _____
ECG: _____
MSU: _____

chart is the answer (figure). This enables you to see on one or at the most two pages all the data concerning the illness, and, equally important, it acts as a reminder when to carry out the regular checks for complications. Audit is also made easier.

Having agreed on a policy of "when" and "how," the next decision is who does what (table II). Assuming the clinic setting is chosen, the most appropriate approach is to delegate. The receptionist keeps the separate appointment book and handles the bookings up to a year ahead. The nurse greets the patient,

TABLE II—Suggested protocol for diabetic clinic

- Personal
One or two doctors
One or two community nurses
One dietitian
One receptionist
First nurse
- (1) At every visit:
 - (a) Weigh in shoes and indoor clothing
 - (b) Obtain and test urine specimens with Urinets (and Ketodians for those on diet)
 - (c) Enter results on diabetic chart
 - (d) Put patient in consulting room or examination room and inform second nurse
 - (2) Annually (or as per annotated appointments list):
 - (a) As (1-c) above, but in addition:
 - (i) Check visual acuity in each eye with and without glasses with Snellen's chart
 - (ii) Ask patient to have right arm and remove trousers, shoes, socks or stockings; and lie on couch and check blood pressure
 - (b) Feet: next patient and repeat procedure
 - (3) Ask patient about:
 - (a) Any symptoms
 - (b) Welling
 - (c) Suppleness
 - (d) Vision
 - (e) Anger
 - (f) Anger
 - (g) Anger
 - (h) Anger
 - (i) Anger
 - (j) Anger
 - (k) Anger
 - (l) Anger
 - (m) Anger
 - (n) Anger
 - (o) Anger
 - (p) Anger
 - (q) Anger
 - (r) Anger
 - (s) Anger
 - (t) Anger
 - (u) Anger
 - (v) Anger
 - (w) Anger
 - (x) Anger
 - (y) Anger
 - (z) Anger
 - (4) Check patient's urine testing book
 - (5) Ask patient to have right arm and remove trousers, shoes, socks or stockings; and lie on couch and check blood pressure
 - (6) Check patient's glucose (and urea and cholesterol) analysis or when indicated
 - (7) Check patient's glucose (and urea and cholesterol) analysis or when indicated
 - (8) Inform doctor of diabetic patient's status
 - (9) Repeat 1-7 with next patient when first nurse has put number in next room

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V: _____
S: _____
T: _____
Other: _____

INVESTIGATIONS: GTT _____
HbA1c _____
Urine: _____
Cholesterol: _____
Proteinuria: _____
Glycosuria: _____
ECG: _____
MSU: _____

Flow chart on which to record all the information about a patient's diabetes. It also reminds the doctor when to carry out regular checks for complications.

inquires about his health, asks if a repeat prescription is needed, then weighs him, checks the urine for sugar and protein, and does an "on the spot" plasma glucose test. The findings are recorded on the flow chart while the patient waits to see the doctor, who confirms or rectifies the findings, signs the prescription, and discusses any questions the patient raises. The dietitian is also to hand if any problems are identified regarding diet or weight.

Once a year, or more often if indicated, a comprehensive examination is carried out. Visual acuity and blood pressure are checked by the nurse; the fundi, lower limb reflexes, sensation, peripheral pulses, and condition of the feet are checked by the doctor. Full biochemical screening is also done. If weight, urine tests, plasma glucose, urea, and cholesterol concentrations, or blood pressure are unsatisfactory entering them in red in the record highlights at subsequent visits the fact that the objectives of management are not being achieved. Where shared care is undertaken, a suitable co-operation card on the lines of the one used for shared maternity care would be valuable.

ONE HUNDRED YEARS AGO The President of the Pharmaceutical Society of Liverpool, exhibited last week a sample of eugenol, which had been placed in his hands on the previous day. He said it had recently been noticed as a very energetic antiseptic, and was also said to be a remedy for toothache. Both these properties could be readily understood, as oil of cloves, from which it was obtained, as well as oil of peppermint, had long been used to prevent ink, starch, paste, etc., from becoming mouldy. The oils had also been long regarded as remedies for toothache. It was also known as eugenol or carvophyllol acid, having a formula $C_{10}H_{12}O_2$, and forming salts with bases. He said, it would be interesting to determine its rotatory power on a solution with oil of cloves, which he would do before the next meeting. (British Medical Journal, 1881.)

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Beyond the Surgery

General practitioner to a football club

STUART CARNE

The invitation to become a football club medical officer came out of the blue in a most casual way. The previous club doctor at Queen's Park Rangers had died and a successor was required. One of my patients was steward to the directors, and he told them that he thought his doctor would be interested. From such small seeds do acorns grow.

Attendance at matches

The role and function of a medical officer to a professional football club has never been defined precisely; a committee of football league medical officers is now producing a protocol. By regulation of the Football Association a qualified medical practitioner must be present at every game. Usually the home team doctor deals with the medical problems in both teams. Very few medical officers travel to an away game unless it is a special match—for example, the Cup Final. Many clubs travel overseas, often several times during the year. Again, the club doctor rarely goes unless it is an important match.

At home games I sit in the directors' box on a gangway, which is convenient when I want to go down to the dressing room to attend to a major injury quickly. The man who rushes on to the pitch with a medical bag is the club physiotherapist. I attend only if there is a serious injury on the pitch—for example, if a player is unconscious or has a compound fracture. I see all other injuries in the club's medical room. In the case of ordinary sprains and bruises, this is at the end of the game.

Criticism is often levelled at the frequency with which players appear to be seriously injured during a game and require the services of the physiotherapist, only to recover miraculously in a short time. Those not accustomed to this type of injury find it strange and think the player is shamming. Only rarely is this the case. Often the initial pain of even a minor injury can be quite severe and the player is not sure whether or not he has sustained any serious damage, and whether or not continuing the game might convert what is only a minor injury into something more serious. What he needs is reassurance and this is provided by the physiotherapist. A young colleague who went with our team to one of the tropical countries tells me that some of the players there sat down in order to get a rest from the heat, but that does not happen back in Britain.

Common injuries

Stitching up lacerations is not too common a task in association football. I have to stitch a wound probably less than a dozen times a year, including second team matches. These injuries

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The players

Every professional player has to have a medical examination before being signed by the club. The club will want to know not only the present physical state of the player but also the presence of any lesion likely to hinder future performance. Normally these examinations are carried out by the club doctor. With a young apprentice player about to start his career the problems are relatively straightforward, but when a transfer fee of £1m—or even more—is at stake, and there are any doubts, I will seek the opinion of the appropriate specialist.

It is important in such an examination to distinguish the relevant from the irrelevant lesions. For example, a hearing defect can be disregarded as many players do not listen to the