The smoker with diabetes: a difficult challenge

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Introduction

Over the past 40 years the serious damage to health associated with smoking has become clear.¹ Cigarette smoking has been identified as the main avoidable cause of death and disability in the United States. The overall mortality ratio for adult cigarette smokers versus non-smokers is about 1.7; it increases with the amount smoked and is directly proportional to the duration of smoking. In the United States there are approximately 400,000 excess deaths each year from smoking and tobacco use, with smoking accounting for one in every 6 deaths in the United States and remaining as the single most preventable cause of death in American society (chronic obstructive lung disease, cancer deaths particularly lung cancer, and coronary heart disease). Other disease risks include atherosclerotic and occlusive peripheral vascular disease and cerebral vascular disease and stroke. In addition, cigarette smoking causes substantial morbidity, smokers reporting more acute and chronic symptoms than people who have never smoked. It is estimated that about one quarter of all regular cigarette smokers are killed early by their smoking, losing on average 10 to 15 years of their life. The health costs and loss of productivity due to cigarette smoking are staggering.

Smoking and atherosclerosis in diabetes

Diabetes is associated with an increased risk of vascular complications (macro-vascular and micro-vascular disease) and it is clearly important to clarify whether smoking aggravates diabetic complications and whether there are specific effects of smoking relevant to the diabetic patient.

There is evidence from several studies that there is a 2- to 3-fold increase in the risk of coronary heart disease in smokers with diabetes compared to non-smokers who are diabetic. The risk of coronary heart disease is twice that in a diabetic compared with a non-diabetic; therefore the risk of

coronary heart disease in a smoking diabetic could be 4 to 6 times greater than in a non-smoking non-diabetic. Data on the effects of stopping smoking on macro-vascular disease in diabetic patients are scarce and there are no data supported by objective markers of smoking, such as breath carbon monoxide and urinary cotinine levels. However, it is likely that stopping smoking is beneficial to diabetic patients.^{2,3}

Smoking and diabetic microangiopathy

In recent years there has been interest in the possible role of smoking in the development and/or progression of diabetic micro-vascular complications.^{2–4} This subject has recently been reviewed.^{2,3} An association between cigarette smoking and proliferative diabetic retinopathy has not, to date, been confirmed. However, many studies now suggest that smoking is a risk factor for macro-proteinuric nephropathy in younger diabetic patients.^{5,6} A major problem in defining the risk of cigarette smoking in cross sectional studies may be the result of selective mortality, smokers with proteinuria dying prematurely. Also none of the studies examining the relationship between smoking and micro-vascular disease have used objective markers of smoking and rely on patients telling the truth about their current and past smoking habits. Other associations that have been reported in diabetic patients with cigarette smoking are the occurrence of limited joint mobility and Dupuytren's contracture, symptomatic peripheral neuropathy and impotence.²

Insulin action and smoking

It has been suggested that smoking hampers subcutaneous blood flow and reduces insulin absorption from the subcutaneous tissues.² Also, smoking increases the secretion of catecholamines, growth hormone and cortisol, hormones which counteract insulin action and could thus lead to an increased insulin requirement in diabetic patients. However,

the clinical relevance of a possible effect of smoking on insulin requirement appears to be minimal and, in practice, starting or stopping smoking is not a major determinant of daily insulin requirements.⁷

The smoking habits of diabetic patients

The prevalence of smoking in diabetic patients varies greatly from country to country and seems to reflect the smoking habits of the general population.^{2,8,9} It is disappointing that the frequency of smoking in diabetic patients does not appear to be different from that in the non-diabetic population. In an adult diabetic clinic in Liverpool 31% of diabetic patients admit to being current smokers, 21% ex-smokers and 48% life-long non-smokers.⁸ Older age groups have much fewer current and ex-smokers than younger diabetic patients and this may be due to an excess mortality among smokers, leaving a higher prevalence of non-smokers among the survivors.

In any study of smoking habits, an objective marker of smoking (breath carbon monoxide, urinary cotinine) must be used. Smoking markers have demonstrated that a significant number of newly diagnosed diabetic patients, who are actively smoking, deny the habit.¹⁰ Another study has shown that almost half the adolescents and young-adults attending a young-person's diabetic clinic smoke (raised urine cotinine levels), although only one third admit this.¹¹

The design of a smoking questionnaire study may be important. In one diabetic clinic in Liverpool, 31% of patients admitted to current smoking when given a questionnaire specifically asking about smoking habits.⁸ However, when the same clinic population was surveyed about painful neuropathy symptoms, 40% admitted to current smoking.¹² In both surveys 48% of the clinic population reported that they had never smoked. This finding suggests that many diabetic smokers, when challenged directly about their smoking habits, report themselves as ex-smokers.

Anti-smoking counselling and the diabetic patient

Changing a behavioural pattern which is re-enforced many times each day and comprises a pharmacological dependence is a major challenge. Most smokers in the general population have tried to give up at least once and several controlled trials have shown that simple advice in general practice can help some smokers to stop.¹³ Many diabetic patients are aware of the hazards of smoking and wish to give up, but, despite this, diabetic patients probably smoke as heavily as non-diabetic subjects (or more) and smoking is particularly prevalent

amongst young patients, who have most to lose by continuing.^{8,9} The large percentage of the diabetic population who smoke is particularly disappointing as many of them are regularly seen by their general practitioner and/or their hospital diabetic clinic doctors and will have been counselled about the health hazards of smoking.

Several studies have assessed the effectiveness of anti-smoking counselling in patients with diabetes using objective markers of smoking.^{10,11,14,15} In addition to advice on how to stop smoking, the counselling stressed the health hazards of smoking and emphasized the association of smoking with the development of diabetic complications. In one study, 60 young patients with diabetes, who wished to stop smoking, received standard anti-smoking counselling and were reviewed 6 months later.¹⁴ Half of these young patients were also seen at home with their families by a diabetes specialist nurse and the counselling was re-enforced. Although many of the patients claimed to have cut down or stopped smoking, urinary cotinine concentrations did not confirm this. In fact, only one patient actually stopped smoking and he had sustained a myocardial infarction during the study. Similar poor results were found in an Australian study.¹⁵ Many children and young adolescents with diabetes become addicted to nicotine despite regular anti-smoking advice to themselves and their families.¹¹

Some patients claim to stop smoking when given anti-smoking advice at the time of diagnosis of diabetes and it is recognized that a significant life-event, such as myocardial infarction, can induce some smokers to stop.^{8,16} In a study of newly-diagnosed, mostly middle-aged, diabetic patients, anti-smoking counselling did appear to be effective in a few patients, but unfortunately the urinary cotinine concentration in many of the other newly diagnosed patients actually increased.¹⁰

Why can't people with diabetes stop smoking

Most people with diabetes, who smoke, wish to stop, but are usually unsuccessful.^{8,9} Younger patients may have particular difficulty in stopping and often are unable to mount a serious attempt even when voluntarily enrolled in a specific stop-smoking programme.¹⁴ Much better results have been obtained from smoking cessation programmes with non-diabetic subjects in general practice and after myocardial infarction.^{13,16} People with diabetes frequently explain their inability to stop smoking by saying they are already too restricted by the diabetic treatment regimen, particularly the diet, and that they develop a 'craving' for cigarettes when deprived of nicotine.¹⁴ The marked and almost unbearable unpleasantness experienced after abstinence from nicotine often induces a

desire to eat sweet carbohydrates, which appear to modulate and improve mood and lead to weight gain.¹⁷ This observation may explain why patients with diabetes, who are forbidden to consume large amounts of sugary foods, are unable to cope with nicotine withdrawal. Nicotine is known to reduce the consumption of sweet tasting foods.¹⁷ Many smokers increase their nicotine intake in the first few months after the diagnosis of diabetes.¹⁰ These patients may be using nicotine as an aid to help them comply with a reduced sugar, diabetic diet.

Conclusions

The prevalence of smoking in diabetic patients does not differ from that in the non-diabetic population and many people with diabetes under-report their smoking habits. Smoking is a major cardiovascular risk factor in diabetic patients and may be related

to the development of macroproteinuric nephropathy. It must be assumed that stopping smoking is particularly beneficial to diabetic patients and further research into programmes to encourage diabetic patients to stop smoking are needed. Nicotine addiction reduces appetite, particularly for sweet tasting foods, and nicotine withdrawal is associated with an increased desire for sweet foods. Dietary restrictions and the social and psychological problems experienced by people with diabetes in coping with their treatment regimens may therefore counteract anti-smoking advice, which is often successful in other disease groups, but has little impact on diabetic patients. Whether greater success will be achieved by pharmacological aids, such as nicotine chewing gum, is not known. Obviously the best advice to young patients with diabetes is not to start smoking, because, once they acquire the habit, they may find it impossible to give up.

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