

Difficulties of smoking cessation in diabetic inpatients benefiting from a systematic consultation to help them to give up smoking

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SUMMARY

Aim: To assess the value of systematic smoking cessation consultations for diabetic smokers admitted to hospital.

Methods: All diabetic smokers admitted to the Diabetes Department of Georges Pompidou European Hospital between February 2003 and February 2004 were systematically offered a consultation with a physician specialised in tobacco cessation. Follow-up visits at three, six and nine months were planned.

Results: Of the 306 diabetic patients admitted, 38 (12.4%) were smokers. There were more men than women in the group of smokers and the diabetic smokers were younger than the non-smokers. The smokers had fewer micro-angiopathic complications than the non-smokers, but there was no difference in the frequency of macro-angiopathic complications. The level of nicotine physical dependence was moderate or high for 60% of the smokers. Although all the smokers agreed to the consultation, less than half agreed to drug-based treatments to help them to give up smoking and only 15% returned for the six-month visit. Only one patient had stopped smoking at the six-month visit.

Conclusion: This study demonstrates the difficulties in systematic interventions to help diabetic patients to stop smoking. Diabetic smokers probably constitute a specific population for which the barriers to giving up smoking should be explored.

Key-words: Nicotine dependence · Diabetes · Smoking cessation · Hospital.

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RÉSUMÉ

Difficultés de l'arrêt du tabac chez des patients diabétiques hospitalisés bénéficiant d'une consultation systématique d'aide au sevrage tabagique

Objectif : Évaluer l'intérêt d'une consultation de tabacologie systématique proposée à des patients diabétiques fumeurs hospitalisés.

Méthodes : Tous les patients diabétiques fumeurs hospitalisés dans l'unité de diabétologie de l'Hôpital européen Georges Pompidou entre février 2003 et février 2004 se sont vus proposer systématiquement une consultation avec un médecin tabacologue. Un suivi à 3, 6 et 9 mois était prévu.

Résultats : Parmi les 306 patients hospitalisés, 38 étaient fumeurs (12,4 %). La prédominance masculine était plus marquée dans le groupe des fumeurs. Les patients diabétiques fumeurs étaient plus jeunes que les non-fumeurs. S'ils présentaient moins souvent des complications microangiopathiques que les non-fumeurs, on ne trouvait pas de différence significative quant à la fréquence des complications macroangiopathiques. Le niveau de dépendance physique au tabagisme était moyen ou élevé chez 60 % des patients fumeurs. Si tous les patients fumeurs ont accepté la consultation auprès du médecin tabacologue, moins de la moitié a accepté l'institution d'un traitement pharmacologique d'aide au sevrage tabagique et seuls 15 % sont revenus à 6 mois. Au total un seul patient avait arrêté de fumer à 6 mois.

Conclusion : Cette étude met en évidence les difficultés d'une intervention systématique d'aide au sevrage tabagique auprès de patients diabétiques fumeurs hospitalisés. Les diabétiques fumeurs correspondent sans doute à une population spécifique pour laquelle les barrières à l'arrêt du tabac mériteraient d'être explorées.

Mots-clés : Tabagisme · Diabète · Sevrage tabagique · Hôpital.

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Introduction

In France, tobacco use is responsible for about 66,000 deaths per year, corresponding to about one in nine deaths [1]. The consequences of smoking for diabetic patients are well known and such patients should therefore be encouraged to stop smoking [2]. Smoking increases the risk of micro- and macroangiopathic complications and the severity of these complications in people with diabetes [3,4]. Smoking also has a deleterious effect on lipid metabolism [5] and is associated with increased HbA_{1c} values [6]. Studies in diabetic patients have demonstrated a clear effect of smoking on the risk of mortality, especially from cardio-vascular diseases. Thus the relative risk of death for a diabetic smoker compared with a diabetic non-smoker has been estimated at 2.2 in the Belfast Diet prospective study, whereas a diabetic smoker had 1.9 more chance of having a myocardial infarction than a diabetic non-smoker [7]. Different studies such as the Multiple Risk Factor Intervention Trial, the Finnish Prospective Study and the Paris Prospective Study have all shown that smoking is a risk factor for death due to coronary disease in diabetic patients [8]. But whereas there are good reasons for diabetic patients not to smoke, the prevalence of smoking among people with diabetes is similar to that in the general population: about 23% in the United States in 2001 [9] and 21% in England in 1991-1994 [10]. Helping diabetic patients to give up smoking should therefore be part of the management of these patients [11].

Indeed, smoking cessation always generates important benefits among diabetic patients, in terms of mortality as well as morbidity. An international study including about 4500 diabetic patients showed that the risk of death depended on the patient's smoking history and the length of time for which the patient had been smoking [12]. The risk of death is 25% higher in patients who have smoked for more than 10 years than in those who have never smoked, and is clearly higher than that in subjects who have more recently stopped smoking. This result demonstrates the importance of encouraging patients to give up smoking as soon as possible after the diagnosis of diabetes. Several studies have demonstrated the efficacy of methods to help patients stop smoking in the general population [13]. But diabetic patients seem to find it more difficult to give up smoking than other people [14]. A few rare studies have reported disappointing results for methods in encouraging and helping diabetic patients to stop smoking [15]. However, none of these studies proposed systematic consultations with a doctor specialised in smoking cessation. The aim of this study was to determine the value of such consultations for diabetic smokers admitted to hospital.

Methods

Study population

All the diabetic patients admitted to the Diabetes Unit of Georges Pompidou European Hospital over the course of one year (February 2003 to February 2004) were included. This unit has eight beds. Patients admitted to the unit are referred by general practitioners or via in- or out-patient consultations. They are hospitalized for improvement of glycaemic equilibrium and education. Most of them do not have any serious intercurrent illness.

Systematic smoking cessation consultations during hospitalization

All the patients who smoked were included and attended a consultation with a doctor specialising in smoking cessation. At the beginning of the one-week hospital stay, a nurse from the department gave each of the patients declaring that they were currently smoking a smoking cessation consultation form (validated by the Société de Tabacologie) to fill in [16]. The patient was then seen by the specialist doctor, who discussed the various items on the form with the patient and proposed help with giving up smoking, including a prescription for nicotine replacement therapy (NRT) if necessary. The dose was initially adapted according to the results of the Fagerström test [17]. The dose was subsequently readjusted according to urinary cotinine concentrations.

Inclusion criteria

A consultation with a doctor specialising in smoking cessation was offered to all type 1 and type 2 diabetes patients who smoked, regardless of the number of cigarettes smoked per day and with no exclusion criteria. All agreed to attend such a consultation.

Data collected

We recorded socio-demographic data and data for a number of variables concerning the smoking profile of the patients at the first consultation: number of cigarettes smoked per day, number of attempts to give up lasting at least seven days, how long the patient had been smoking, level of nicotine physical dependence (as assessed by the Fagerström test), degree of motivation to give up smoking (on a scale of 0 to 10) and results of screening for symptoms of anxiety and depression (using the Hospital Anxiety Depression (HAD) scale) [18]. The history of diabetes was also recorded: type, duration, micro- and macroangiopathic complications, cardiovascular risk factors. The following clinical parameters were recorded: weight (in kg) and arterial blood pressure (BP in mmHg). Fasting blood sugar and lipid profiles were also carried out, including determina-

tions of total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides and glycosylated haemoglobin. Urinary cotinine concentration was measured in $\mu\text{mol/l}$, using colorimetric Barlow method. Carbon monoxide (CO) levels in expired air were also measured (in ppm).

Follow-up

Subsequent consultations were planned for all the patients included regardless of whether they had agreed to give up smoking. Consultations with the smoking cessation doctor and the endocrinologist were planned for three, six and nine months after the initial consultation. These consultations were designed to determine whether the patient had continued to smoke, changes in urinary cotinine concentration, weight, blood pressure and blood sugar and lipid parameters. The patients were contacted by telephone to arrange a medical consultation and the taking of a blood sample. However, several patients did not turn up for the appointment arranged by telephone for the three-month visit and we decided to send letters by post to inform patients of their appointments for the six-month visit. Faced with the failure of both these methods, we asked patients to have the various examinations carried out in community-based medical laboratories close to their home and to communicate the biological results to us via their general practitioner.

Statistical analysis

A comparative descriptive statistical analysis of the smoking and non-smoking subpopulations of diabetic patients was first carried out. Despite the small size of the

samples obtained from follow-up visits, we then compared the median values of clinical (weight), sugar and lipid (levels of glycosylated haemoglobin, total cholesterol and triglycerides) and smoking status (urinary cotinine concentration and urinary cotinine/creatinine ratio) variables at three and six months after the initial consultation. We tested the significance of differences using Wilcoxon rank tests.

Results

All the diabetic patients ($n=306$) admitted to hospital for a week were included. These patients included 38 smokers (12.4%). There were more men than women in both groups (smokers and non-smokers), but this male predominance was significantly more marked among smokers than among non-smokers (73.7% vs. 51.9% men). The diabetic smokers were younger than the non-smokers. The mean age of the smokers was 42.5 ± 14.5 years. Our population consisted mostly of type 2 diabetes patients: 82% of the non-smokers and 53% of the smokers had this type of diabetes. The mean duration of diabetes was longer for the non-smokers than for the smokers (11.6 ± 9.9 years versus 9.3 ± 9.9 years). The mean body mass index of the smokers was lower than that of the non-smokers (26.5 ± 5.7 kg/m^2 vs. 28.6 ± 6.5 kg/m^2), but this difference was not statistically significant. Finally, the smokers had fewer microangiopathic complications (30.6% vs. 52.6%), but no significant difference was observed between the two groups for macroangiopathic complications. Table I shows the demographic and clinical data for the study population.

Table I
Characteristics of diabetic smokers and non-smokers ($n=306$).

	Smokers ($n=38$)	Non-smokers ($n=268$)	P
Age (years) (.SD)	42.5 ± 14.5	56.2 ± 14.7	<0.0001
Sex (% women)	26.3	48.1	<0.05
Type of diabetes (% type 2)	52.7	81.7	<0.001
Duration of diabetes (years) (.SD)	9.3 ± 9.9	11.6 ± 9.9	NS
Microangiopathy (%)	30.6	52.6	<0.05
Macroangiopathy (%)	36.1	37.1	NS
Treated high arterial BP (%)	37.8	55.8	0.05
Treated dyslipidaemia (%)	32.4	44.2	NS
Body mass index (kg/m^2) (.SD)	26.5 ± 5.7	28.6 ± 6.5	NS
HbA _{1c} (%) (.SD)	9.2 ± 2.3	8.8 ± 2.1	NS
Plasma total cholesterol (mmol/l) (.SD)	4.9 ± 1.4	5.0 ± 1.2	NS
Plasma LDL cholesterol (mmol/l) (.SD)	3.0 ± 1.1	4.2 ± 1.9	NS
Plasma HDL cholesterol (mmol/l) (.SD)	1.0 ± 0.3	1.1 ± 0.7	NS
Plasma triglycerides (mmol/l) (.SD)	2.1 ± 1.5	1.9 ± 1.4	NS
Microalbuminuria (mg/24h) (.SD)	194.4 ± 278.2	230.0 ± 760.2	NS

Mean glycaemic equilibrium was poor in both smokers and non-smokers, with glycosylated haemoglobin levels of 9.2% in smokers and 8.8% in non-smokers. Sugar and lipid data are presented in table I.

Thirty-five of the 38 smokers completed the questionnaire for the smoking cessation consultation. The level of nicotine physical dependence was high (Fagerström score ≥ 7) or moderate (Fagerström score of 5-6) for 60% of the patients. The mean number of cigarettes smoked per day was 19.2 ± 13.4 and the mean length of time for which patients had been smoking was 22.1 ± 12.9 years. The initiation of NRT was accepted by 16 of the 35 patients who completed the form (45.7%). Seven patients (20%) did not want to give up smoking and the other 12 (34.3%) wanted some time to think about it. The tobacco consumption characteristics of these patients are shown in table II.

The 35 smokers who completed the form were called for follow-up visits at three (T3), six (T6) and nine (T9) months. Only 12 of the 35 patients (31%) agreed to come for the T3 visit, six patients (15%) attended the T6 visit and three (7%) attended the T9 visit. Clinical, sugar and lipid, and smoking status data were collected at each consultation (presented in table III as medians [min; max]). A significant decrease ($P < 0.05$) in glycosylated haemoglobin levels was observed in five patients at T6. Only one patient had stopped smoking completely at T6 and three patients had decreased their cigarette consumption.

Table II
Tobacco consumption characteristics of the diabetic smokers (n=35).

Score for nicotine physical dependence	
(% Fagerström ≤ 4)	40.0
(% Fagerström between 5 and 6)	34.3
(% Fagerström ≥ 7)	25.7
Number of cigarettes per day	19.2 ± 13.4
How long the patient had been smoking (years) (.SD)	22.1 ± 12.9
Number of attempts to give up lasting at least 7 days (.SD)	1.3 ± 1.8
CO in expired air (ppm) (.SD)	10.9 ± 12.2
Motivation to give up (scale of 0 to 10) (.SD)	5.6 ± 2.7
Urinary cotinine concentration (amol/l) (.SD)	44.4 ± 30.2
Urinary cotinine/creatinine ratio (amol/mmol) (.SD)	5.2 ± 2.8
History of depression (%)	31.4
Hospital Anxiety Depression score	
(% A-HAD ≥ 11)	17.1
(% D-HAD ≥ 11)	8.6
Initiation of NRT (%)	45.7

Discussion

During a one year-period, we have tried to propose a systematic smoking cessation consultation with a specialized physician to every diabetic smoker hospitalized in the Diabetes Department of a French university hospital. The prevalence of smoking in the 306 diabetic patients under study was low (12.4%). The smokers were younger (68% were between 25 and 54 years of age) than the non-smokers (60% over the age of 54 years). The smokers had fewer chronic complications, essentially microangiopathic ($P < 0.05$) and fewer associated cardiovascular risks than the non-smokers, probably due to the age difference. The two groups also differed in terms of blood sugar and lipid levels. We found that 60% of the smokers were highly or moderately dependent on nicotine. One third had a history of depression and depressive symptoms were found among almost one out of ten.

Our intervention was not very effective. Although all the smokers agreed to attend the consultation with the smoking cessation specialist, less than half agreed to NRT and only 15% came back for the six-month consultation, despite repeated phone calls and letters. Only one patient had given up smoking at six months.

The difficulties we met during this study correspond to those already published. Very few data are available from other studies of interventions to help diabetic patients to stop smoking [2,5].

In 1993, Sawicki et al. compared cognitive behavioural therapy (CBT) and minimal counselling in 89 patients with diabetes (types 1 and 2), in a prospective randomised study [15]. At six months, 5% of the CBT group and 16% of the minimal counselling group were demonstrated to

Table III
Clinical, sugar/lipid and tobacco use parameters in diabetic smokers. Comparison of initial median values (T0) with median values at three (T3) and six (T6) months.

	δ T0-T3	P	δ T0-T6	P
Weight (kg)	-1 [-9;5] (n=9)	0.6	0.5 [-9;8] (n=6)	0.8
HbA_{1c} (%)	-0.5 [-4.4;1.3] (n=12)	0.2	-1.1 [-5.9;-0.2] (n=5)	0.043
Plasma total cholesterol (mmol/l)	-0.3 [-2.9;1.6] (n=12)	0.06	0 [-3.4;1] (n=7)	0.7
Plasma triglycerides (mmol/l)	-0.3 [-2.6;4.6] (n=12)	0.14	-0.2 [-2.2;1.5] (n=7)	0.5
Urinary cotinine concentration (amol/l)	-10.5 [-61.5;65] (n=9)	0.4	-6.1 [-31;30.3] (n=7)	0.5

have stopped smoking, based on urinary cotinine determinations.

In 2000, Canga et al. evaluated the efficacy of patient management by nurses trained in smoking cessation methods combined with NRT (in the form of transdermal patches) for patients physically dependent on nicotine, in a population of 280 diabetic adults (68% type 2 diabetes) [19]. The 147 diabetic patients who smoked (71% of whom smoked at least 20 cigarettes per day) and received assistance from trained nurses were compared with 133 diabetic smokers who were simply advised to stop smoking. At six months, 17% of the patients in the smoking cessation programme had stopped smoking, versus only 2% in the control group.

In Canga's study, the patients in the intervention group who did not stop smoking altogether nevertheless reduced their daily tobacco consumption by six cigarettes, whereas no such decrease was observed in the control group. In our study, six of twelve patients (50%) had decreased their tobacco consumption at three months, and this decrease persisted for three of the six patients who returned for the six-month visit. This decrease in tobacco consumption was confirmed by a decrease in urinary cotinine concentration.

Our study, and those by Canga et al. and Sawicki et al., demonstrate the poor results obtained with smoking cessation methods in diabetic patients. This suggests that diabetic smokers may display specific features not common to other groups of smokers. This seems particularly likely given that the prevalence of smoking in our population was low, much lower than that of the general population [20] but similar to that found in a French survey among outpatients with type 2 diabetes treated with oral antidiabetic drugs and/or insulin [21]. Solberg et al. showed that diabetic smokers present several specific features: they are more likely to feel depressed, are less involved in the management of their diabetes and are often less ready to give up smoking than are other groups of the population [22]. One third of our population of smokers had a history of depression. Indeed, smoking has been recognised as an independent factor associated with the risk of depression among individuals with diabetes [23,24]. In addition, the prevalence of comorbid depression has been shown to be significantly higher in this population compared with non-diabetic patients (OR=2.0) [25]. Moreover moderate or heavy nicotine dependence was found in 60% of our diabetic smokers. At last, even if we did not use a detailed scale of motivation like Q-mat [26], our population of smokers did not appear to be very motivated to give up smoking. This could explain our poor results in the follow-up of our patients, along with the fact that the fear of taking up weight after smoking cessation is more often declared by diabetic smokers [27]. Some diabetic patients may thus continue to smoke because they think it could help them control their weight [28].

Our study has some limitations. Firstly, it should not be considered as an intervention study. We have proposed systematically a smoking cessation consultation to every diabetic smoker and we have organized a follow up. But we did not check the smoking status of diabetic inpatients using biochemical validation. Thus the prevalence of smoking among our population may have been underestimated since some patients could have hidden their smoking behaviour. Furthermore, no control group was constituted. Secondly, our results should not be generalized since our population presented specific characteristics.

Given the poor participation of diabetic smokers in the smoking cessation programmes offered to them [29], we no doubt need to propose more radical strategies. The actions envisaged should depend on the degree of motivation to give up smoking and the intensity of nicotine dependence. Nothing can be achieved if the subject is not really motivated to give up smoking. The motivation to give up smoking tends to increase very gradually over time [30,31]. According to the Transtheoretical Model of Change, developed by Prochaska and DiClemente, smokers are not in an homogenous state with respect to their readiness to quit smoking: a smoker passes through different stages of change (precontemplation, contemplation, preparation, action and maintenance) on the way to smoking cessation [32,33]. In this respect, Ruggiero et al. showed that most diabetic smokers are in the precontemplation stage (57.8%) [34]. And according to Kim et al., only one third of diabetic smokers are in the preparation stage [35]. Smoking cessation advice can lead to progression through the stages of change. Strategies designed to encourage motivation have been shown to be of value [36,37]. In particular, motivational interviewing, which has been developed by Miller and Rollnick [38] is a brief treatment approach that incorporates specific counselling strategies, including personalised feedback, to create a supportive, non confrontational environment through which smokers can resolve ambivalence and initiate change [39]. Pros and cons of smoking can be assessed through a decisional balance to understand the cognitive and motivational aspects of decision making.

The education of diabetic smokers should focus on several issues. Firstly, diabetic smokers should be taught about microangiopathic complications, the risk of which is increased by smoking. Indeed, although macroangiopathic complications are known by almost all diabetic smokers, only one third of them are aware of the relation between tobacco smoking and microangiopathic complications [27]. Secondly, diabetic smokers should be given information on smoking cessation treatments. Indeed, Gill et al. showed that only 34% had ever heard of NRT and among those who received information, only 49% considered it safe with diabetes [40]. This is of particular importance since NRT is well tolerated among diabetic smokers and thus its use should be encouraged. Moreover new pharmacological

treatments should be soon available, including rimonabant which has shown to be promising in clinical trials for the treatment of tobacco dependence and metabolic risk factors [41]. Finally, according to the practice guidelines issued by the Agence Française de Sécurité Sanitaire des Produits de Santé (the French agency for the evaluation of medicinal products) [31] and the American Diabetes Association [5], the prescription of drugs to help patients to give up smoking should always be accompanied by structured follow-up. The poor compliance with the smoking cessation intervention proposed in this study should lead us to consider the barriers to stopping smoking in this specific population, with a view to envisaging other means of management, such as telephone help-lines, for example [42].

Conclusion

The results of our study demonstrate the difficulties encountered when trying to help diabetic patients to give up smoking. Diabetic smokers clearly constitute a specific population and the barriers to giving up smoking in this group should be studied in more detail. Targeted interventions relating to motivation and the use of original management tools could be evaluated. The training of health professionals in the giving of smoking cessation advice is an essential element in improving the management of diabetic patients.

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