ORIGINAL ARTICLE

Results of a specific smoking cessation program for patients with arthritis in a rheumatology clinic

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Abstract The purpose of this study is to evaluate an intervention program in smoker patients. We selected consecutive active smoker patients with rheumatoid arthritis, spondyloarthritis, or connective tissue diseases. The intervention consisted of the following: (1) a baseline visit, which included verbal and written advice by the rheumatologist, emphasizing the practical benefits of smoking cessation. Patients completed a questionnaire that included smoking dependence tests and previous attempts to quit. (2) A follow-up visit to the nurse in the 3rd month for reinforcement and the receiving of pharmacological treatment to help patients quit smoking. The primary outcome was total abstinence in the last 7 days of a phone interview at 3, 6, and 12 months. The secondary outcome was a reduction in cigarette consumption by at least 50 %. A total of 945 patients were screened. About 185 (19.5 %) were current smokers, and 152 were included for intervention. In the previous 5 years, the mean annual withdrawal rate was 4.6 %. The smoking cessation rate was 11.8, 14.4, and 15.7 % at 3, 6, and 12 months (OR compared with previous cessation rate 3.8 (CI 95 % 1.8–8.1)). Twenty-nine patients (19 %) reduced $\geq$50 % of the cigarette consumption at 12 months. The linear regression analysis showed that a score of less dependence ($p = 0.03$) and previous attempts to quit smoking ($p = 0.04$) were significantly associated with definitive smoking cessation at 12 months. One out of six patients quit smoking with the aid of an educational program which included verbal and written advice by the rheumatologist and the nurse. As far as we know, this is the first interventional study in smoker patients with arthritis.

Introduction

Smoking has been implicated in the pathogenesis of rheumatoid arthritis [RA], particularly when associated with RF-positive, cyclic citrullinated peptides, and the shared epitope [1–7]. Tobacco use is associated with an increased incidence of rheumatoid nodules [8], with a greater need for conventional and biological treatment [9, 10] and with radiographic progression in early RA [11]. In addition, autoimmune rheumatic diseases are associated with accelerated atherogenesis and increased cardiovascular mortality compared to the general population, particularly RA [12–15].

An increase in anti-DNA [16] and cutaneous manifestations in current smokers has been observed in patients with systemic lupus erytematosus (SLE) [17, 18]. However, antimalarial therapy for cutaneous lesions seems to be less effective in tobacco users [19]. On the other hand, smoking is determinant in the occurrence of thrombotic events in patients with SLE [20].

In ankylosing spondylitis (AS) and axial spondyloarthritis, a worse radiological prognosis in smokers [21, 22] has been reported. Moreover, pulmonary restriction because of involvement of costovertebral and costotransverse joints

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may be an additional problem in patients with chronic obstructive pulmonary disease.

As well as the control of activity of the underlying disease, cardiovascular risk can be reduced by controlling traditional risk factors such as smoking, hypertension, and cholesterol. Counseling against smoking should be mandatory in rheumatology practice, both to patients with arthritis and SLE [2] as well as to their relatives.

Due to the multiple benefits of quitting smoking, advice on smoking cessation is strongly recommended in patients with arthritis. Smoking cessation is one of the European League Against Rheumatism's (EULAR) recommendations for cardiovascular risk management in inflammatory arthritis patients [23]. Brief advice versus no advice increases the rate of quitting [24]. Therefore, doctors should aim to advise smokers to quit during routine consultations.

The aim of the study was to evaluate the impact of an educational intervention by the rheumatologist and the rheumatology nurse on patients who smoked. As far as we know, this is the first interventional study, specifically designed for rheumatic patients. The hypothesis is that when advice emphasizing specific risks for each illness is given by the physician who regularly attends the patient, with nurse collaboration, the probability of success rate is higher.

Materials and methods

We screened consecutive patients with inflammatory rheumatic diseases for smoking status. Patients were attended at the outpatient clinic at the Hospital Universitario de Gran Canaria Dr. Negrin and were given the following diagnoses: RA, SLE, psoriatic arthritis, and AS. Other patients had spondyloarthritis, lupus, collagen disease, or vasculitis.

The smoking status was defined as current smoker, past smoker or never smoker patients. In the former smoker group of patients, we took note of the time of smoking cessation and calculated the yearly rate of spontaneous abandon in the last 5 years. The inclusion period duration was 7 months (June–December 2011). Active smokers (patients who smoked more than 1 cigarette per day and independently of the motivation status) were invited to participate in a prospective observational study with an educational intervention. The study protocol was approved by the institutional review board, and all participants gave their written consent. The following information was collected from active smokers: age, sex, packs/year smoked, previous quit attempts, as well as from other smokers at home and at work, and advice given by other doctors.

The preparation phase to quit was assessed with the Prochaska questionnaire translated into Spanish [25]. There are four stages of change describing smokers and former smokers: (1) precontemplation, (2) contemplation, (3) action, and (4) maintenance [25]. In the precontemplation stage, the individual does not recognize smoking as a problem. In the contemplation stage, the individual is gathering information about smoking, such as contacting a health care provider. In the preparation stage, intention and behavior begin to come together and the individual is preparing to enter the action stage in the next 30 days. After 6 months of not smoking, the individual reaches the maintenance stage when different skills may be needed to prevent relapse. The dependency of tobacco was assessed with an adapted and validated Spanish version of the Fagerström test [26], with a score >7 representing high dependence of nicotine. The degree of motivation to quit smoking was assessed with the Richmond test translated into Spanish [27]. A motivation score of 7–9 is moderate, and a score of 10 is high motivation.

The intervention consisted of two phases:

1. A baseline visit, which included the rheumatologist's verbal or written advice, was adapted in a specific informational form for rheumatic patients, on the benefits of quitting smoking. The recommendations were made following a protocol agreed upon by all doctors of the department, at the end of the regular medical visits with duration of 3–5 min. The message was transmitted in a positive way in order to emphasize the benefits of quitting smoking in general, and specifically the improvement in cardiovascular risk and the benefits for the evolution of rheumatic disease. In addition, all patients received written documentation with helpful tips on how to quit smoking. To summarize, this document contains ten leading messages for smokers:

   1. Find a good reason to quit. Being motivated is essential. Once you feel fully motivated, remember that your reasons for quitting will help you to overcome moments of weakness.
   2. Ask for help from the people living with you. Tell the people around you about your intention to quit smoking in a few days time.
   3. Choose a specific day, preferably one on which you will be particularly active or busy.
   4. Throw away all cigarettes, ashtrays, lighters, and everything related to smoking.
   5. Avoid as far as possible places and situations that remind you of smoking or induce cravings to smoke.
   6. Ask people around you not to smoke in your presence.
   7. During the first days, embark on any activity to keep you occupied over a long period of time.

8. When you are offered a cigarette, say "No thanks, I don't smoke." You will soon be as a nonsmoker.

9. Reward yourself for not smoking. Calculate how much you will save by not buying tobacco and buy yourself something or go to the cinema.

10. Be optimistic. If you slipup and smoke a cigarette, take heart and remember the reasons that prompted you to try to stop smoking. Seek medical support and try again.

11. If you cannot quit smoking independently, ask for medical help. There are various treatments that are effective in achieving total smoking cessation. Remember that quitting smoking is good for your health and the health of others.

2. A telephone follow-up visit in the 3rd month to the rheumatology nurse, which included smoking status (not change, reduction of consumption, or abandon) verbal reinforcement, the offer of an additional visit, and the possibility of pharmacological treatment to help quit. The first nursing visit lasting 20 mins consisted of the following: comprehensive information on the benefits of quitting, detection of barriers or obstacles for not quitting, and risk and strengthening motivation in order that detailed information on the best way to quit smoking in a personalized way was made available. This included the patient determining "D Day" (day of abandonment) and the evaluation of psychological dependence. Finally, the nurse analyzed possible needs for pharmacological support and offered it voluntarily to patients with high nicotine dependence, following standard practice.

Variable outcome: The primary variable outcome was the percentage of smokers with total abstinence in the last 7 days of a phone interview at 3, 6, and 12 months. The secondary endpoint was a reduction in cigarette consumption by at least 50 %. Patients who did not attend follow-up consultations or who or died at the end of the study were considered as continue smokers.

Statistical analysis

We compared the characteristics of patients who quit smoking at 12 months with patients who continued smoking. Significance of possible differences between groups was calculated using the student's t test for continuous variables and the χ^2 test for categorical variables. A lineal regression analysis to detect the variables associated with smoking cessation was also carried out, in which the dependent variable was smoking cessation at 12 months. The Statistical Package for Social Sciences (version 15.0) for Windows was used for the analysis of data.

Results

We interviewed 945 consecutive patients who attended rheumatology clinics. Mean age was 54 years (range 15–89), 666 were women (70 %), and 279 were men (29 %). The numbers of ever-smokers were 177 men (63 %) and 177 women (36 %). A total of 527 patients (55 %) never smoked, and 185 (19.5 %) were current smokers (Table 1).

In the previous 5 years, 55 out of 238 smokers quit smoking, so the annual withdrawal rate was 4.6 %.

Thirty-three patients did not agree to participate in the protocol (16 men and 17 women, mean age 52 y), 14 of them with RA, 10 with spondyloarthritis, 5 with collagen vascular diseases, and 4 with other diseases. Finally, 152 patients agreed to participate in the intervention study. About 54 were men, and 98 were women with a mean age of 50 years (SD 11, range 17–75 years). The distribution of patients by disease was as follows: 55 RA, 45 spondyloarthritis (16 AS 8 psoriatic arthritis and 20 with other diseases), 40 with collagen vascular diseases and vasculitis (13 SLE, 7 scleroderma, 2 Sjögren, 18 other diseases), and 12 other inflammatory diseases (6 palindromic rheumatism, 3 with undifferentiated arthritis and 2 with juvenile arthritis). The patients were selected by 7 Rheumatologists and 2 Rheumatology fellows, although a total of 141 patients (92 %) were selected by 5 staff Rheumatologists.

The nurse gave advice and reinforced the message by phone to 139 patients; 38 of them had an appointment visit. Fifteen smokers (9.8 %) accepted drugs in order to quit smoking, which in all cases was Varenicline.

The smoking cessation rate in 152 participants was 11.8 % at 3 months, 14.4 % at 6 months, and 15.7 % at 12 months. The OR of smoking cessation at 12 months was 3.8 (CI 95 % 1.8–8.1) compared to the previous smoking cessation rate. In 55 patients (36 %), a reduction in smoking by 30 % or more was observed and 29 patients (19 %) reduced ≥50 % of the cigarette consumption at 12 months. Therefore, 79 patients (52 %) either stopped or

Table 1 Smoking status in 945 patients with inflammatory rheumatic diseases

Disease	Screened	Ever smoked	Former smokers	Current smokers
Rheumatoid arthritis	400 (42)	165 (41)	96 (24)	69 (17)
Spondyloarthritis	209 (22)	121 (58)	66 (31)	55 (26)
Collagen vascular diseases and vasculitis	253 (26)	101 (40)	56 (22)	45 (17)
Others diseases	73 (7)	29 (39)	13 (17)	16 (22)
Total	945 (100)	418 (44)	233 (24)	185 (19)

Values represent number (percent)

reduced tobacco consumption at 12 months. Nineteen of 24 patients who quit at 12 months received only medical advice and phone reinforcement from the nurse, and 5 patients had additional clinic visits to the nurse (3 of them received treatment with Varenicline).

Smoking cessation rate at 12 months was higher in patients who expected to quit in the next 30 days (19 %), than in patients who expected to quit in the next 6 months (10 %) and who did not expect to quit in the next 6 months (6 %). In the same way, cessation rate at 12 months was higher in patients with low dependence (Fargeström test <7) than in patients with high dependence (18 vs. 10 %) and higher still in patients with high motivation to quit (18 %) than in patients with low motivation (13 %).

Table 2 shows the differential characteristics of patients who stopped smoking at 12 months versus patients who continued smoking. In a linear regression analysis in which the dependent variable was smoking cessation at 12 months, a score of less dependence ($p = 0.03$) and previous quit attempts ($p = 0.04$) were significantly associated with definitive smoking cessation.

There were no significant differences in the smoking cessation rate irrespective of the rheumatologist who gave the advice ($p = 0.07$). However, successful results ranged from 4 to 24 % in those doctors who included >10 patients. Three doctors got >15 % abandons at 12 months, which included for intervention a total of 106 patients (69 %).

Discussion

Prevalence for smoking in RA patients is around 15 % as was shown in a multinational study among 7,307 patients [9], with high differences between countries in the percentage of women who smoked (29–1 %). Similar prevalence of smoking (16 %) was found in an international inception cohort of patients with SLE [28], and even higher rates were found in AS patients from the GESPIC cohort (30 %) [22].

Patients who smoke have a higher risk of lung diseases, cancer, and cardiovascular problems. What is more, smoking is a known risk factor for RA, but controversy exists on the effects of active smoking on the course of arthritis. A register cohort and a multicenter study of early RA concluded that smoking cessation did not appear to influence any change in disease activity in short term [29, 30]. However, other early arthritis studies show that smoking is associated with more radiological damage [11], and in a post hoc analysis of the BeSt study, smoking was independently associated with treatment failure and reintroduction of infliximab [31].

Table 2 Characteristics of patients who stopped smoking at 12 months and those who continue smoking

	All patients	Abstinence at 12 months	Patients who continued smoking at 12 months	p
Number of patients	152	24	128	p
Number of women	98 (64)	14 (58)	84 (65)	0.49
Age, years, mean (SD)	50 (11)	51 (12)	49 (10)	0.29
Diagnosis: RA/SpA/connective tissue diseases	55/45/40	9/9/5	46/36/35	0.88
Number of pack-year, mean (SD)	29 (17)	25 (22)	30 ± 17	0.08
Test of smoking dependence (0–10), mean (SD)[a]	4.3 (2)	3.3 (1)	4.5 (2)	<0.01
Test of motivation to quit smoking (0-10), mean (SD)[b]	6.1 (2)	6.7 (2)	6,0 (2)	0.06
Decided to quit smoking next 30 days[c]	92 (60)	18 (75)	74 (57)	0.11
Previous period without smoking	103 (67)	23 (95)	80 (62)	<0.01
Smokers at home	70 (46)	8 (33)	62 (48)	0.17
Smokers at work	69 (45)	10 (41)	59 (46)	0.68
Medical advice by the GP	84 (55)	15 (62)	69 (54)	0.43
Visit to the nurse	38 (25)	5 (21)	33 (26)	0.60
Drug treatment for smoking abstinence	15 (9)	3 (12)	12 (9)	0.63

Values represent number (percent) unless stated otherwise

[a] Fagerström test at baseline; 9–10 is very high dependence

[b] Richmond test at baseline; 9–10 is very high motivation

[c] Prochaska stage/preparation phase to quit smoking at baseline

In AS patients, smoking is associated with poorer outcome and is a predictive factor of radiological progression [22, 32].

Healthy lifestyles leading to a desirable body weight, a healthy diet, regular exercise, and not smoking could account for an 84 % reduction in cardiovascular risk [33]. On the other hand, a multicentric French trial showed the short-term benefit of a nurse led program on the management of RA comorbidities including cardiovascular [34]. Based on these facts, rheumatologists and nurses should recommend their patients to quit smoking. Our study shows that an educational intervention for smoking cessation in

patients with inflammatory or autoimmune rheumatic diseases is feasible in clinical practice and increases the probability of quitting smoking. The rate of smoking cessation was multiplied by nearly four times in our patients compared with previous spontaneous cessation rate.

In a literature search, we only find a few smoking cessation strategies in arthritis patients. In 2002, a sample group of 22 patients underwent a multiple intervention on lifestyle, but the smoking cessation rate was poor [35]. A similar approach with general counseling on cardiovascular risk factors in a lupus clinic was later published; at 3 years, 90 % of the smoker patients remembered smoking cessation counseling, 70 % had received help to reduce it, and 47 % had either reduced or stopped smoking [36]. An RA and smoking public awareness campaign was launched in September 2011 in Scotland. Local media and online social networks reported the story, and mail drops were sent to RA patients. The smoking and RA awareness campaign successfully increased patients' knowledge of the link between RA and smoking and the effects of smoking on arthritis and its treatment. The study suggested that RA smokers may be motivated to quit by learning that RA is a smoking related disease [37].

A rate of 0.3–1 % of yearly spontaneous abandonment of smoking has been reported. Between 5 and 10 % of smokers remain abstinent after brief medical advice and a written document [38].

According to some authors, if monitoring of smoking cessation is carried out effectively, the abstinence rate increases by up to 20 % [38]. Counseling by a nurse has been shown to be effective compared with no advice or brief advice [39, 40].

Many clinicians do not consistently offer smoking cessation treatments to their smoker patients. Motivating the patient may be done through motivational interviewing, in which the clinician uses non-confrontational counseling to resolve the patient's ambivalence about quitting, by encouraging choices which are consistent with the patient's long-term goals [41]. Motivational interviewing increased 6-month cessation rates by about 30 % compared with general care and proved higher if smokers received two or more sessions rather than just one [42].

A shorter type of intervention that can be carried out by doctors not trained in motivation techniques should focus on five points: personally relevant reasons to quit, risks associated with continued smoking, rewards for quitting, and roadblocks to successful quitting, with repetition of counseling at subsequent clinic visits [43].

In motivated patients, 6-month abstinence rates increased significantly with more minutes of total contact. [44]. Counseling itself should be empathic and supportive, and should also provide an opportunity to warn the patient about obstacles to quitting while at the same time, motivating him/her to plan strategies for avoiding and resisting the temptation to smoke. These factors are as follows: living with a smoker, excessive alcohol consumption, and fear of gaining weight [45]. On the other hand, the health care system can implement effective delivery of interventional programs especially in primary care.

Patients are made aware of the influence of smoking in the occurrence of cancer, cardiovascular or pulmonary diseases, but they know little about the specific benefits of quitting smoking in their rheumatic diseases, and the Rheumatologist seems to be the most appropriate person to explain these to them. Our study shows an acceptable efficacy through a simple integrated strategy of care that is applicable to many hospitals. A medical report advises that patients most likely to quit smoking are those who plan to quit in the following months, or those who have less tobacco dependence or related serious illnesses. Also included are elderly people who have a "no smoking" family and work environment [39, 45]. Rheumatic diseases such as RA, SLE, and AS have in fact some of these predictors for quitting smoking. We found that a lower dependence on smoking as well as previous attempts at quitting was associated with long-term success on smoking cessation. So, every effort should be made to give advice to all patients, but in particular, those patients with inflammatory or autoimmune rheumatic diseases should be identified from the outset at a routine clinic. The personal and motivational counseling, combined with a later offer of nicotine-replacement therapy, was shown to increase 6-month quit rates (24 vs. 4 % in the control group) in a randomized trial [43]. Thus, our results are in agreement with previous effective interventional programs.

Our study has the limitations of any observational design. We did not use objective methods to ensure quitting such as determining saliva cotinine tests or exhaled carbon monoxide, so our data are based only on the affirmations of the patients about their changes in smoking habits. In many studies on smoking cessation, the objective test correlates well with the patients responses.

In conclusion, an educational program for smoker patients in rheumatology clinics, which includes verbal and written advice by the rheumatologist and the nurse, gets one out of six patients quit smoking at 12 months. As far as we know, this is the first specific intervention for smoking cessation in a rheumatology department in smokers with arthritis. It has the advantage of a simple design that can be easily integrated into routine daily practice.

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