RESPONSE TO NICOTINE DEPENDENCE TREATMENT IN SMOKERS WITH CURRENT AND PAST ALCOHOL PROBLEMS

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ABSTRACT

Smoking prevalence among alcoholics is high, and evidence indicates that smokers with a history of alcohol abuse may have more difficulty quitting cigarette smoking. This study is a post hoc analysis comparing the smoking cessation rates of smokers with active or past alcohol problems to the rates in smokers with no history of alcohol problems who were participants in a randomized, controlled trial of smoking cessation therapy. Subjects received either 44 mg/24 hour or 22 mg/24 hour nicotine patch for 4 or 6 weeks, respectively, followed by a tapering schedule to complete 8 weeks of therapy and a randomly assigned behavioral intervention (minimal, brief individual counseling, group therapy). The Self-Administered Alcoholism Screening Test (SAAST) score was used to determine alcohol group assignment (no alcohol problems <7; active alcohol problems ≥7 and still drinking; past alcohol problems if not drinking due to a past history of alcohol problems). Among 382 subjects (171 men and 211 women), 281 had no alcohol problems (74%), 53 had past alcohol problems (14%), and 48 had active alcohol problems (13%). Smoking cessation rates assessed at both weeks 4 and 8 were significantly different across groups (p = 0.026 and 0.002 at weeks 4 and 8, respectively) with lower rates in the groups with past and active alcohol problems when compared to the "no problem" group. At week 26, subjects with past alcohol problems were less likely to be abstinent from smoking than no problem group subjects, but this was not statistically significant (odds ratio = 0.49, 95% confidence interval 0.22 → 1.08). In the short term, smokers with past or active alcohol problems are less likely to quit smoking compared to those with no alcohol problems when treated with nicotine patch therapy for smoking cessation.

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INTRODUCTION

Smoking cigarettes continues to be the most preventable cause of premature death in the United States, accounting for nearly 420,000 deaths in 1990 (1) and over 5 million years of potential life lost (2). Despite these staggering statistics, considerable progress has been made in reducing smoking. Recent surveys have shown smoking prevalence among American adults to be 26% (3), a marked decline from a peak prevalence of 41% in 1966 (4). The decline in smoking prevalence among the general population is due in large part to public education, public policy efforts, and wide application of better intervention techniques. However, this measure of success in the general population has not been reflected among the subgroups of smokers who are active or recovering alcoholics.

Among inpatients treated for alcoholism, DiFranza and Guerrera (5) reported the prevalence of smoking to be 83% compared to 34% in a general population sample. Additional studies have found the prevalence of smoking among active or recovering alcoholics to range from 60%–95% (6–9). In addition, the alcohol–tobacco connection appears to have a dose-response relationship. Heavy drinking has been associated with heavy smoking and vice versa (7,10,11). While these associations hold true in those who currently smoke and use alcohol, evidence of severe nicotine dependence is also found in recovering alcoholics (12).

In a post hoc analysis of nicotine gum studies, Hughes (13) noted that those with a history of alcohol or other drug dependency appeared to be more nicotine-dependent than those subjects with no past alcohol or drug abuse history. Similarly, Hurt et al. (14) reported significantly higher baseline measurements of cigarettes per day based on Fagerström Tolerance Questionnaire (FTQ) scores and plasma cotinine among a group of recovering alcoholics compared to nonalcoholics entering trials of nicotine patch therapy. In both of these studies, subjects with past alcoholism or drug abuse were less likely to stop smoking than nonalcoholic subjects. The same trend toward lower smoking cessation rates in recovering and active alcoholics and heavy drinkers has been shown in a number of other studies in various populations (10,15,16), although this has not been a uniform finding (17,18). Conclusions reached about smoking cessation in recovering and active alcoholics are tempered by the lack of prospective trials in these groups of smokers.

Since alcohol and smoking are so strongly linked and since smoking abstinence may be more difficult to achieve among active and recovering alcoholics, tobacco-related morbidity and mortality is likely to be higher among these subgroups of smokers. Vaillant et al. (19) observed a high mortality risk related to the effects of heavy smoking and drinking among a large cohort of men. In a recent report, Hurt et al. (20) demonstrated increased morbidity and mortality related to smoking among individuals previously treated for alcoholism or other drug dependence. Excess mortality in this cohort was significantly related to tobacco-related disease. These observations clearly point to the need for a more concerted effort at smoking cessation intervention among alcoholics. However, published data examining the issue of smoking cessation treatment in active and recovering alcoholics are limited. In fact,

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virtually all trials of nicotine patch therapy exclude subjects with suspected active alcoholism. For this reason, no previous work has compared the smoking cessation rates of active and recovering alcoholics receiving treatment for nicotine dependence.

In the current study, our primary aim was to compare the smoking cessation rates of subjects with active, past, or no alcohol problems who were participants in a trial of nicotine patch therapy plus counseling intervention. Our study is unique because this is the first post hoc analysis of response to smoking cessation treatment among smokers with past and active alcohol problems who were participants in a multicenter, prospective, and randomized trial of nicotine patch therapy and counseling.

METHODS

This study is a post hoc analysis of a two-site (Rochester, MN and Madison, WI), randomized, placebo-controlled trial of varying doses of nicotine patch treatment and levels of counseling intervention. Details of the original study are described in a previous report (21).

Participants

Subjects were recruited at two sites via press release and advertisements for a smoking cessation study using nicotine patch therapy. Eligible subjects were at least 20 years of age, smoking at least 15 cigarettes per day for at least 1 year, the only member of the household participating in the study, and able to provide informed consent. Exclusion criteria included hypersensitivity to nicotine patch, recent myocardial infarction, or other unstable cardiovascular or medical condition. Pregnant or lactating women were also excluded.

Procedures

An initial physical examination and laboratory evaluation was completed for each subject to identify important or serious medical conditions. A subset of 382 subjects (out of 504 total subjects) was included in the study. This included all subjects at the Rochester, MN site ($n = 250$) and approximately half ($n = 132$) of the subjects at the Madison, WI site. (Due to administrative problems, the first 122 subjects at the Madison, WI site were not included in this study.) The Self-Administered Alcoholism Screening Test (SAAST) was administered at study entry to consecutive subjects (22). Subjects were classified as having no alcohol problems, active alcohol problems, or past alcohol problems using the SAAST. The first item of the SAAST is a two-part question:

1a. Do you have a drink now and then?

1b. If you don't drink now, did you stop drinking because of problems with alcohol?

Subjects who answered "No" to Part 1a and "Yes" to Part 1b were classified as having past alcohol problems. The remaining subjects were classified according to their SAAST score. Subjects with a score <7 were classified as having no alcohol problem while those with a score ≥ 7 were classified as having active alcohol problems. Other baseline data collected on each subject included demographic information, detailed smoking history, Fagerström Tolerance Questionnaire score (23), and plasma cotinine level.

Treatment

In a double-blind fashion, subjects were randomly assigned to receive either 22 mg/day or 44 mg/day nicotine patch therapy for 6 weeks and 4 weeks, respectively. This was followed by dose reduction to 22 mg/day and 11 mg/day each for 2 weeks (44 mg/day group) or 11 mg/day for 2 weeks (22 mg/day group) to complete 8 weeks of therapy. Subjects were also randomly assigned to receive one of the following three levels of behavioral intervention: (a) minimal (self-help material only), (b) individual (physician intervention plus three brief individual counseling sessions by a study nurse), or (c) group therapy (1 hour of group counseling weekly for 8 consecutive weeks). Seven-day point prevalence, self-reported smoking abstinence was considered to be confirmed by an expired carbon monoxide level <10 ppm. All analyses were performed on an intent-to-treat basis. Subjects who failed to follow up were counted as smoking.

Statistical Analysis

The SAAST scores were used to classify subjects according to alcohol problem status as described above. Baseline characteristics were compared across the three groups simultaneously using one-way analysis of variance for continuous variables and the chi-square test for discrete variables and between active and past alcohol problem groups using the two-sample t-test and chi-square test. Logistic regression was used to assess the relationship between the groups and 7-day point prevalence smoking cessation rates at the end of weeks 4, 8, and 26. Univariate analysis was performed using a model that included two dichotomous independent variables (active and past alcohol problems) which together defined alcohol problem status as either active, past, or no alcohol problems. Multivariate analysis was performed using a model which, in addition to the above two indicator variables, included independent variables defining site (MN versus WI), behavioral intervention (individual or group counseling versus minimal contact), initial nicotine patch dose (22 mg versus 44 mg), and the dose by behavioral intervention interaction. The selection of these additional variables for the multivariate analysis was based on the analysis by Jorenby et al. (21) which found smoking cessation at 4 weeks to be significantly associated with site, dose, and behavioral intervention (minimal versus individual versus group) with a significant dose by behavioral intervention interaction. Since no differences were found between individual and group counseling conditions, these conditions were combined in our analysis. To further adjust for differences between the alcohol groups, an additional multivariate analysis was performed which included, in addition to the independent variables described previously, independent variables defining the baseline characteristics found to be significantly different across the three alcohol groups (gender, cigarettes per day [CPD], and Fagerström Tolerance Questionnaire [FTQ] score). Pairwise comparisons of the groups with respect to smoking abstinence were performed in separate analyses. These pairwise analyses are summarized using the odds ratio which is a measure of how much more likely (or unlikely) abstinence from smoking is among one group compared to another. In all cases, two-tailed p-values ≤ 0.05 were considered statistically significant.

RESULTS

Among the 382 participants, 281 (74%) were classified as having no alcohol problem, 53 (14%) were classified as having past alcohol problems, and 48 (13%) were classified as having active alcohol problems. The subject and treatment characteristics are given in Table 1. When compared simultaneously, the three groups were found to be significantly different with respect to gender, baseline cigarettes per day, and level of nicotine dependence as measured by the Fagerström Tolerance Questionnaire.

TABLE 1
Patient and Treatment Characteristics

Characteristic	No Alcohol Problem		Past Alcohol Problem		Active Alcohol Problem		p-Value[a]
	n	Mean ± SD	n	Mean ± SD	n	Mean ± SD	
Age, years	281	45.2 ± 12.3	53	43.8 ± 10.8	48	42.8 ± 11.2	NS
Gender	281		53		48		0.001
Female		61%		42%		37%	
Male		39%		58%		63%	
Other smoker(s) in household?	281		53		48		NS
Yes		40%		42%		58%	
No		60%		58%		42%	
CPD[b]	281	26.4 ± 9.1	53	30.6 ± 12.1	48	29.8 ± 11.3	0.004
Plasma cotinine, ng/ml	274	182 ± 85	51	214 ± 123	48	186 ± 97	NS
Attempts to stop	263	2.9 ± 2.7	49	2.9 ± 3.8	46	3.0 ± 2.3	NS
FTQ score[c]	275	6.9 ± 1.8	52	8.4 ± 1.7	48	7.8 ± 1.9	<0.001
SAAST score	281	2.8 ± 1.7	36	19 ± 6.9	48	9.8 ± 4.3	<0.001[e]
Study Site	281		53		48		NS
Rochester, MN		66%		70%		58%	
Madison, WI		34%		30%		42%	
Treatment Assignment[d]	281		53		48		NS
22 mg, minimal contact		17%		17%		13%	
22 mg, counseling		36%		23%		29%	
44 mg, minimal contact		15%		19%		25%	
44 mg, counseling		32%		42%		33%	
Missed Follow-Up Visit	281		53		48		
Week 8		15%		26%		15%	NS
Week 26		14%		23%		10%	NS

[a] p-value associated with chi-square test or one-way analysis of variance for discrete and continuous variables respectively, comparing all three alcohol groups simultaneously (NS = not significant, $p > 0.05$).
[b] Cigarettes per day.
[c] Fagerström Tolerance Questionnaire.
[d] Treatment assignment by patch dose and behavioral intervention: minimal contact = self-help material only, and counseling = either individual or group counseling intervention. The number of subjects in the counseling groups is larger than the minimal contact group because both counseling conditions were combined for analysis.
[e] p-value is for comparison across the three groups. When mean SAAST scores between alcohol groups are compared, the group with past alcohol problems has significantly higher scores ($p < 0.001$) than the active alcohol problem group.

Men were more commonly represented in both the active and past alcohol problem groups compared to a predominance of women in the no alcohol problem group. Higher levels for cigarettes per day and Fagerström Tolerance Questionnaire scores were obtained in both alcohol problem groups compared to the no problem group. Although not statistically significant, similar results were obtained with plasma cotinine levels. The highest levels for cigarettes per day, Fagerström Tolerance Questionnaire score, and plasma cotinine were observed in the past alcohol problem group, although active versus past alcohol problem groups were not found to be significantly different with respect to any of the baseline characteristics listed in Table 1. There was no difference across the three groups in the percent with other smoking household members and no difference in missed follow-up visits at weeks 8 and 26. The mean SAAST scores were significantly different ($p < 0.001$) when compared across the three groups (as expected, since group membership was in part defined by SAAST score). But of more interest is that the mean SAAST scores were significantly greater in the past alcohol problem group when compared to the active alcohol problem group ($p < 0.001$) as shown in Table 1. This finding should be interpreted with caution since only 36/53 of the past alcohol problem group fully completed the SAAST. The remaining members of the group simply noted that they had stopped drinking because of past problems with alcohol.

The odds ratios for the relative frequency of smoking cessation for the three groups at weeks 4, 8, and 26 are given in Table 2 and 1-week point prevalence smoking cessation rates are displayed in Figure 1. From a univariate analysis, the percent of subjects abstinent from smoking was found to be significantly different across the three groups at week 4 and at week 8 with the highest abstinence rate observed in the no alcohol problem group and the lowest abstinence rate observed in the past alcohol problem group. Pairwise comparisons of the three groups were performed with respect to abstinence from smoking at weeks 4, 8, and 26. At week 4, abstinence from smoking was significantly less likely ($p < 0.05$) among the past alcohol problem group than among the no problem group (odds ratio = 0.46). At week 8, abstinence from smoking was significantly less likely among both the past and active alcohol problem groups than among the no problem group (odds ratio = 0.37 and 0.52, respectively). Although not statistically significant, the likelihood of abstinence was lower among the past alcohol problem group than among the active problem group at all periods (odds ratio = 0.65, 0.72, and 0.53 at weeks 4, 8, and 26, respectively).

Using a multivariate analysis to adjust for study site, patch dose, and counseling intervention, we found abstinence from smoking at week 4 to be significantly less likely ($p < 0.05$) among the past alcohol problem group than among the no alcohol problem group (odds ratio = 0.46). Abstinence at week 8 was found to be significantly less likely among both the past and active alcohol problem groups than among the no problem group (odds ratio = 0.39 and 0.50, respectively). When all three groups were

TABLE 2
Comparison of One-Week Point Prevalence Smoking Cessation Rates

Pairwise Comparisons[b]	Univariate[a] Odds Ratio	95% CI	p	Multivariate A[a] Odds Ratio	95% CI	p	Multivariate B[a] Odds Ratio	95% CI	p
4 weeks			0.026			0.026			NS
NON vs. ACT	0.71	0.38 → 1.31		0.64	0.34 → 1.20		0.71	0.37 → 1.38	
NON vs. PAST	0.46	0.25 → 0.83		0.46	0.25 → 0.84		0.51	0.27 → 0.98	
ACT vs. PAST	0.65	0.30 → 1.42		0.79	0.34 → 1.85		0.95	0.39 → 2.27	
8 weeks			0.002			0.003			0.012
NON vs. ACT	0.52	0.28 → 0.96		0.50	0.27 → 0.94		0.49	0.26 → 0.95	
NON vs. PAST	0.37	0.20 → 0.70		0.39	0.21 → 0.73		0.43	0.22 → 0.84	
ACT vs. PAST	0.72	0.32 → 1.61		0.92	0.38 → 2.20		0.97	0.39 → 2.38	
26 weeks			NS			NS			NS
NON vs. ACT	0.92	0.45 → 1.85		0.95	0.48 → 1.94		1.01	0.48 → 2.13	
NON vs. PAST	0.49	0.22 → 1.08		0.48	0.22 → 1.07		0.57	0.25 → 1.33	
ACT vs. PAST	0.53	0.20 → 1.44		0.55	0.20 → 1.52		0.57	0.20 → 1.65	

[a] All analyses were performed using logistic regression with smoking status as the dependent variable. The *p*-values displayed are based on a two-tailed test comparing all three alcohol groups simultaneously. The odds ratio and corresponding 95% confidence interval (CI) is given for each pairwise comparison, where in all cases the reference group is listed first. The odds ratio represents the relative frequency of smoking cessation compared to the reference group. The first multivariate model (A) includes independent variables defining alcohol group, study site, counseling intervention, initial patch dose, and dose-by-counseling interaction. The second multivariate model (B) includes independent variables defining alcohol group, study site, counseling intervention, initial patch dose, dose-by-counseling interaction, gender, Fagerström Tolerance Questionnaire score, and baseline cigarettes per day.
[b] NON = no alcohol problem (n = 281); ACT = active alcohol problem (n = 48); PAST = past alcohol problem (n = 53).

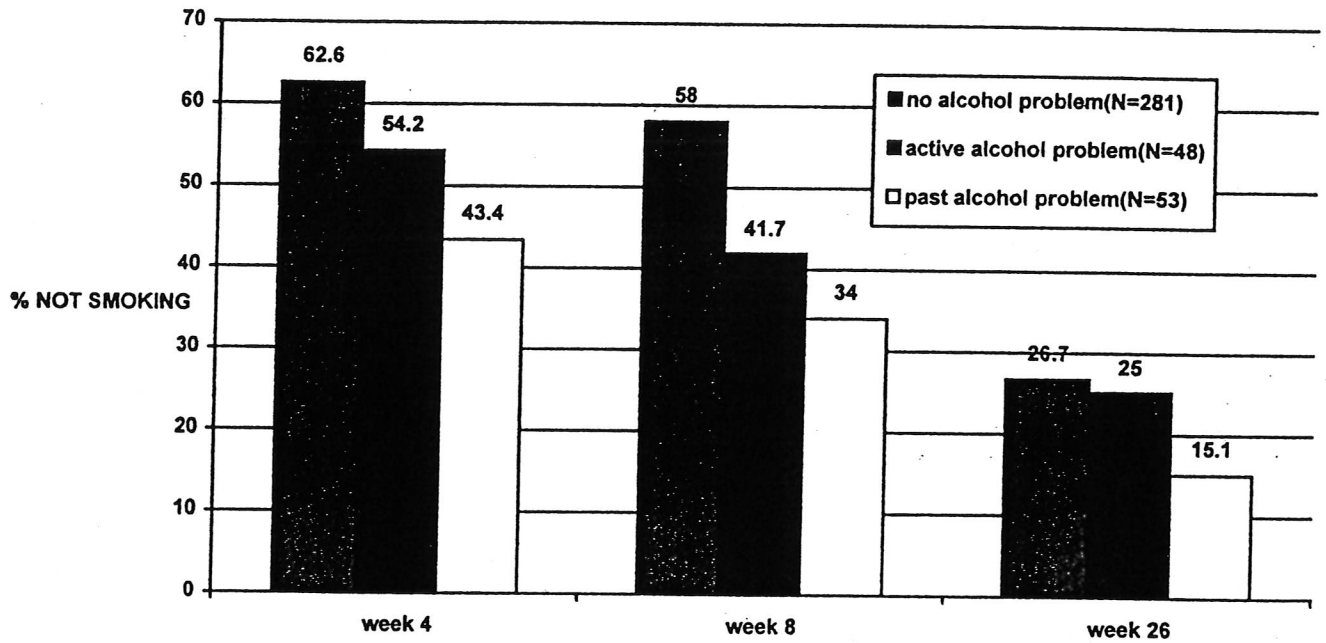

FIGURE 1: Abstinence rates according to alcohol group are displayed. One-week point-prevalence smoking abstinence was confirmed by expired carbon monoxide <10 ppm.

compared simultaneously, smoking cessation rates were significantly different at weeks 4 and 8 (p = 0.026 and 0.003, respectively) but not at week 26. The multivariate model was expanded by including independent variables found to be significantly different across alcohol groups (gender, baseline cigarettes per day, Fagerström Tolerance Questionnaire score). When these were included, the same pairwise comparisons were again found to be significant (i.e. abstinence from smoking at week 4 was less likely among the past alcohol problem group than among the no problem group [odds ratio = 0.51] and abstinence from smoking at week 8 was less likely among both past and active alcohol problem groups than among the no problem group [odds ratio = 0.43 and 0.49, respectively]). When comparing all three groups simultaneously in this model, there was a significant difference noted only at week 8 (p = 0.012). Because the number of subjects in the past and active alcohol problem groups was small, we were unable to note any significant alcohol group by treatment interaction.

Since there were generally nonsignificant differences between those with current and past alcohol problems, an analysis was performed that combined these groups in order to compare those with no alcohol problems to the group with a positive alcohol problem history. This analysis was performed using a multivariate model that adjusted for site, patch dose, counseling intervention, gender, baseline CPD, and FTQ score. From this analysis, absti-

nence from smoking at week 4 was found to be significantly less likely ($p = 0.05$) among subjects with a history of alcohol problems than among persons with no alcohol problems (odds ratio = 0.60, 95% CI = 0.36 to 1.00). Abstinence from smoking at week 8 was also found to be significantly less likely ($p = 0.002$) among positive alcohol history subjects when compared to those with no alcohol problems (odds ratio = 0.45, 95% CI = 0.27 to 0.76). At week 26, there was no difference in the likelihood of smoking abstinence between those with and without an alcohol history ($p = 0.43$). Although those with current and past alcohol problems were combined for these analyses, the number of subjects in each of the four treatment groups was still small. Consequently, we did not detect a significant alcohol group by treatment interaction.

DISCUSSION

The major finding of this study is that a history of current or past alcohol problems is significantly associated with poorer short-term smoking cessation outcomes regardless of nicotine patch dose or behavioral intervention. Each alcohol problem group had a significantly lower smoking cessation rate during and at the end of active treatment than did the no alcohol problem group. When both (active and past) alcohol problem groups were combined and compared to the no problem group, similar results were obtained. In the multivariate analysis, after adjusting for study site, patch dose, counseling intervention, and factors associated with alcohol problems (male gender, higher baseline cigarettes per day, and higher Fagerström Tolerance Questionnaire score), we still found that alcohol group membership was a significant predictor of abstinence at the end of smoking cessation treatment (week 8). At 6 months, the difference among groups was not statistically significant, although the past alcohol problem group had approximately a 50% chance of remaining abstinent from cigarettes compared to the no alcohol problem group. These results are in accord with others who have reported poor long-term stop rates in recovering alcoholics (9,13,14). Also consistent with previous observations is the finding that severity of nicotine dependence was greater in the groups with active and past alcohol problems than among those with no alcohol problems (13,14). Cigarettes smoked per day and Fagerström Tolerance Questionnaire scores were significantly different among the three groups with higher levels on each measure in the groups with past or active alcohol problems.

Somewhat surprising was the observation that the group with past alcohol problems had lower stop rates at each assessment than did the active alcohol problem group. Although the differences were not statistically significant, at 6 months the relative chance of smoking cessation was approximately 50% when comparing the group with past alcohol problems to the active problem group. These results contrast with those of Breslau et al. (18) who reported a three-fold better spontaneous smoking cessation rate in those with past alcohol disorder symptoms versus those with persistent alcoholism. However, the Breslau et al. (18) study was a cohort study of younger individuals (mean age 26) who did not meet criteria for nicotine dependence and had quit smoking without any known nicotine dependence intervention. In contrast, our study included older subjects (mean age 45) who were nicotine dependent and engaged in a study of smoking cessation intervention. In addition, Breslau et al. (18) may have included subjects who were still using alcohol in the group with past alcohol abuse or dependence. In our study, those with past alcohol problems had self-reported abstinence from alcohol, while those who reported alcohol problems but were still drinking any amount were designated as having active alcohol problems. These differences may account for the disparate results between the studies. Unfortunately, because of small numbers of subjects, no definite conclusions can be reached about the efficacy of specific patch and counseling interventions among the alcohol problem groups. Replication of this study with a larger sample size is needed.

There are several possible explanations for the reduced likelihood of smoking cessation among those with active and past alcohol problems compared to those with no alcohol problems. Smokers with past or current alcohol problems appear to be more nicotine dependent than do those with no alcohol problems. In our study, the highest mean level of cigarette consumption, Fagerström Tolerance Questionnaire score, and baseline plasma cotinine were observed in the past alcohol problem group, although these differences did not all reach statistical significance. In addition to our study, other investigators have made similar observations (13,14). Keenan and coworkers (12) noted more intense cigarette smoking and more daily cigarette smoke exposure in those with a history of alcohol abuse (whether still drinking regularly or abstinent from alcohol) compared to nonalcoholics. The role of major depression, which is common in both alcoholics and smokers, may also be an important factor in poor smoking cessation outcomes (24–26). In one study, over one-third (39.3%) of 61 abstinent alcoholics treated for smoking cessation met lifetime criteria for major depression independent of their alcohol use (24). A past history of major depression has been correlated with worse smoking cessation outcomes, and depressed mood has been associated with increased risk for smoking relapse (24,26).

Subjects with past alcohol problems appeared to respond less well to therapy for nicotine dependence than the other groups. The past alcohol problem group consistently had the lowest smoking cessation rate. Significant differences between those with past alcohol problems and those with no alcohol problems were noted at weeks 4 and 8 (end of patch therapy), but the difference between these two groups at week 26 narrowly failed to achieve statistical significance. In addition, a nonsignificant trend toward lower smoking cessation rates was noted in the past alcohol problem group compared to the active problem group. Explanation for these observations is speculative but includes the possibility that the elimination of one substance (alcohol) may engender increased dependence on or use of the other (nicotine) (27). Recovering alcoholics may use tobacco as part of their recovery plan to avert relapse to alcohol. One study by Colby et al. (28) found that 58% of 95 substance abusers in treatment reported they smoked cigarettes to cope with urges to drink alcohol. This may be augmented by the legacy of alcohol dependence treatment which is the firmly held belief that trying to stop smoking may jeopardize recovery from alcohol dependence (29). This belief has made the treatment community reluctant to incorporate nicotine dependence treatment into treatment for alcohol and other drug dependencies.

In this study, we did not assess the effect of nicotine dependence intervention on alcohol use among those with past or active alcohol problems. Growing numbers of reports indicate that smoking cessation does not adversely affect alcohol or drug abstinence (9,30). A recent smoking cessation trial involving 205 recovering alcoholics found the relapse rate to alcohol or drugs to be 4% during the 12-month follow-up (30). Nevertheless, future research should include alcohol and drug use assessment as an important outcome of nicotine dependence interventions.

This study has several important limitations. This is a post hoc analysis of data collected as part of a trial of smoking cessation intervention. Therefore, important data such as the severity of alcohol problems and the length and stability of recovery from alcohol problems were not assessed. The small sample size in the groups with alcohol problems limits our ability to assess any differential effect of the smoking cessation interventions. In addition, although alcohol dependence was not an explicit exclusion criterion for participation, a small number of potential subjects may have been excluded if liver enzyme tests were abnormal due to active alcoholism. This could have restricted the range of outcomes in the active alcoholic group. Subjects in this study responded to advertisements, completed study assessments, were retained in the study for 26 weeks, and were motivated to stop smoking. All of these factors (regardless of alcohol problem status) will limit comparisons to the general population. Another limit to the generalizability of the results is that the active alcohol problem group in this study may differ substantially from alcoholics who are engaged in treatment for alcoholism. In addition, since we did not assess duration of alcohol abstinence in our past alcohol problem group, this could have created enough heterogeneity to make comparisons to recovering alcoholic groups difficult. The response to nicotine dependence treatment might vary widely for subjects with different levels of alcohol problem severity or different lengths of stable alcohol recovery. We believe that the entry medical history and examination by experienced clinicians probably limited this kind of wide intersubject variability, although no systematic effort was made to accomplish this. Lastly, the SAAST relies on self-report to assess alcohol use history but has been validated in other outpatient populations (31). We did not use other diagnostic instruments to confirm alcohol abuse or dependence. However, the SAAST has been shown to have high sensitivity and specificity when used as a screening instrument in a general population (32). The study by Davis et al. (32) demonstrated that the SAAST has a sensitivity of 98% and a specificity of 96% when the threshold score of 7 is used in a group of nonalcoholic outpatients and a group of 473 alcoholic patients diagnosed by *Diagnostic and Statistical Manual of Mental Disorders III* (33) criteria. The strengths of our study include the prospective collection of data; two separate study sites; and the use of a validated, standardized instrument to assess alcohol problem status.

Our observations lead to some important conclusions and raise several questions for future research. We have confirmed that smokers with active and past alcohol problems are more nicotine-dependent than those with no alcohol problems. The mechanisms working to bring about higher levels of nicotine dependence, especially in those with past alcohol problems, are uncertain and should be a focus of future research. Individuals with past alcohol problems are not as likely to achieve abstinence from smoking over the short-term when compared to smokers without a history of alcohol problems. A validated diagnostic instrument should be used in clinical trials to identify active, recovering, and nonalcoholics because of the close association between smoking and alcoholism and particularly since this classification impacts smoking cessation outcomes. The fact that alcoholics previously treated for alcohol dependence more often die from diseases related to nicotine addiction than from alcohol-related conditions should motivate future research to determine effective nicotine dependence treatment for this group of smokers.

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