

Research Letter

Smoking Cessation at a Safety-Net Hospital: A Radiation Oncology Resident-Led Quality Improvement Initiative



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Abstract

Purpose: Continued smoking among patients with cancer has been associated with increased toxicities, resistance to treatment, and recurrence. This resident-led quality improvement study attempted to increase smoking cessation by providing free smoking cessation medications in the radiation oncology clinic.

Methods and Materials: Twenty currently smoking patients with nonmetastatic cancer were prospectively enrolled. First line treatment was protocol-standardized combined nicotine replacement therapy (patches and lozenges). Therapy was initiated before radiation therapy and given for 12 weeks. Patient self-reported tobacco use was assessed at midtreatment, end of 12-week treatment, 3-month follow-up, 6-month follow-up, and 12-month follow-up.

Results: Within the initial cohort of 20 patients, average years smoked was 36.3 years (median = 37.5). In addition, 85% had attempted to quit previously. Among patients initially enrolled, 3 did not initiate radiation therapy, and 4 were removed from the study by midtreatment due to noncompliance. Midway through treatment, patients had cut self-reported cigarette use to 31% of baseline. However, 75% or more of patients had smoked within the last week at all timepoints assessed. With further follow-up, the number of cigarettes smoked daily continued to rise, reaching 61% of baseline by the 12-month follow-up.

Conclusions: Patients reduced cigarette consumption, but all patients eventually resumed smoking during the 12-month follow-up. Although it is unfortunate that this study did not result in long-term smoking cessation, the results demonstrate the difficulties faced in helping patients with cancer quit, particularly patients seen at a safety-net hospital. Future efforts could be directed at intensified smoking cessation programs, likely incorporating a more standardized counseling component.

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Introduction

Smoking has been linked with increased rates of malignancies and all-cause mortality; however, approximately 42 million Americans smoke.¹ Even after cancer diagnosis, approximately two-thirds of patients continue smoking.² Continued smoking by patients with cancer increases risks of treatment complications and recurrence.^{3–8} Unfortunately, many patients with cancer have limited awareness of the harms of continued smoking.⁹ Oncologists and cancer centers often fall short in providing assistance.^{10–12} National Comprehensive Cancer Network guidelines recommend a combination of pharmacotherapy (combination nicotine replacement therapy [NRT] or varenicline) and behavioral therapy for cessation. In an effort to improve outcomes and combat cost-related access issues for an underserved population undergoing radiation therapy, a resident-led prospective quality improvement initiative to provide free smoking cessation medication was implemented at a safety-net hospital. The primary outcome of interest was assessment of complete smoking cessation.

Methods and Materials

This institutional review board–approved study prospectively enrolled a culturally diverse group of 20 currently smoking patients at a safety-net hospital who were undergoing radiation treatment for nonmetastatic disease between July 31, 2015, and August 7, 2017. First-line treatment was combined NRT (patch and lozenge). Patients weighing >45 kg were given 21 mg/d patches initially for 6 weeks, followed by 14 mg/d patches for 4 weeks and 7 mg/d patches for 2 weeks. If the patient weighed 45 kg or less, they would have been given 14 mg/d patches for the first 6 weeks with the last 6 weeks of therapy the same as described earlier. For nicotine lozenges, patients were provided with 4 mg lozenges if they generally smoked their first cigarette within 30 minutes of awakening and 2 mg lozenges otherwise. These were to be used for breakthrough cravings not sufficiently relieved by the nicotine patches. Second-line treatment was varenicline for patients taking NRT as prescribed who had not reduced their daily number of cigarettes smoked by 75% midway through smoking cessation therapy. Varenicline was to be prescribed at 0.5 mg once daily for days 1 to 3, followed by 0.5 mg twice daily for days 4 to 7, and followed by 1 mg twice daily for the remainder of treatment. The therapy was initiated before RT (no specific duration of smoking cessation therapy before RT was required) and was given during the course of 12 weeks. Baseline patient characteristics were self-reported, and Fagerström scores (to assess baseline nicotine dependence), were calculated for each patient.¹³ Primary outcomes were self-reported smoking

cessation at the end of the 12-week program and at 3-month follow-up.

Results

Among the initial 20 patients who enrolled in the study 3 did not initiate radiation therapy, and 4 were removed from the study by midtreatment due to noncompliance. One patient died as a result of metastatic disease after the 6-month follow up but before 1-year follow-up. Therefore, 17 patients were evaluable at midtreatment, and 13 were evaluable at all other time points except for 1 year follow up where 12 patients were evaluable.

Table 1 displays patient characteristics from the initial cohort. Within the initial cohort of 20 patients, the average age was 55.8 years, average age of smoking initiation was 18.3 years, average years smoked was 36.3 years, average cigarettes smoked daily at study entry was 15.6 cigarettes, and average Fagerström score was 4.75 (median = 5.5). In addition, 85% had attempted to quit in the past. Among those who tried to quit, 23.5% had used medication to try to quit in the past. At the time of the initial survey, 45% of patients reported smoking the first cigarette of the day within 5 minutes of waking up.

Figure 1 shows the percentage of patients who reported smoking within the past week before each survey interval. 75% or more of patients had smoked within the last week at all timepoints assessed (Fig 1). Figure 2 shows the average percent of baseline cigarettes smoked daily at each survey time point. Midway through treatment, patients had cut self-reported cigarette use to 31% of baseline. All patients compliant with therapy who continued on the study after midway had cut cigarette use by at least 75%, and thus, no patient was transitioned to varenicline. With additional follow-up, the number of cigarettes smoked daily continued to rise closer to baseline, reaching 61% of baseline by the 12-month follow-up.

Discussion

Although every patient relapsed at some point in time, patients did report a reduction in number of cigarettes smoked. At the 12-month follow-up, patients smoked an average of 39% fewer cigarettes per day than before the intervention. It appears that the smoking cessation program was most successful in the early phases (at mid treatment patients smoked 69% fewer cigarettes, and at the end of treatment of treatment patients smoked 59% fewer cigarettes), compared with 39% reductions at both 6- and 12-month posttreatment. Thus, although the intervention was not effective in promoting complete cessation; patients did reduce the number of cigarettes they smoked. There are indications that smoking reduction improves comorbidities and treatment toxicities^{13,14};

Table 1 Baseline characteristics of patients enrolled in smoking cessation study

Patient ID	Age	Years smoking	Cigarettes per day	Attempted to quit in past	Med to quit	Fagerström score*	Treated site	AJCC stage group
1	51	38	30	Yes	No	6	Lung	IIIA
2	52	41	20	Yes	Yes	7	Head/neck	IVB
3	56	42	40	Yes	No	9	Breast	IB
4	48	35	10	Yes	No	6	GI	IIIB
5	56	37	10	Yes	No	1	Breast	IIB
6	64	38	10	Yes	No	2	Breast	IA
7	61	47	10	Yes	No	7	GI	IIIA
8	59	41	3	No	N/A	4	Lung	IIIA
9	55	10	20	Yes	Yes	3	Head/neck	IVA
10	65	40	4	Yes	No	0	Breast	DCIS
11	53	40	20	Yes	Yes	7	GI	I
12	53	33	12	Yes	No	5	Breast	IIB
13	57	35	20	No	N/A	5	Prostate	IIA
14	58	34	10	Yes	No	3	Prostate	IIB
15	52	32	20	Yes	No	7	Breast	IIA
16	59	48	20	Yes	Yes	6	Head/neck	IVB
17	52	35	15	Yes	No	8	Breast	IIB
18	60	44	20	Yes	No	6	Head/neck	IVB
19	50	21	5	Yes	No	0	Cervix	IIIB
20	55	34	12	No	N/A	3	Head/neck	III

Abbreviations: AJCC = American Joint Committee on Cancer; ID = study identification number; Med = medication (eg, nicotine replacement, bupropion, or varenicline); N/A = not applicable.

* Fagerström score: 1 to 2 = low dependence; 3 to 4 = low to moderate dependence; 5 to 7 = moderate dependence; 8 + = high dependence.

however, total cessation provides much greater benefits. The high rate of smoking recidivism may be due to this patient population’s high degree of stress related to their cancer diagnosis, their high level of addiction as indicated by their baseline characteristics, or the variety of socioeconomic pressures faced by patients treated at this safety-net hospital.¹⁵ Anecdotally, many patients reported a significant life stressor in addition to their cancer diagnosis, which ultimately led to their relapse.

A variety of factors contribute to continued smoking among patients with cancer. For instance, those with

lower socioeconomic status may be less likely to successfully quit.¹⁶ Disease extent and treatment intensity may also play a role.¹⁷ Other important factors include readiness to quit, nicotine dependence, age, and race.¹⁸ Particularly among our patients, who often had prolonged cancer diagnoses and had likely seen several providers who advised smoking cessation, addiction may have been particularly strong.

This study has several limitations. The most important is the small sample size. Furthermore, although the residents had some training in smoking cessation, their training was

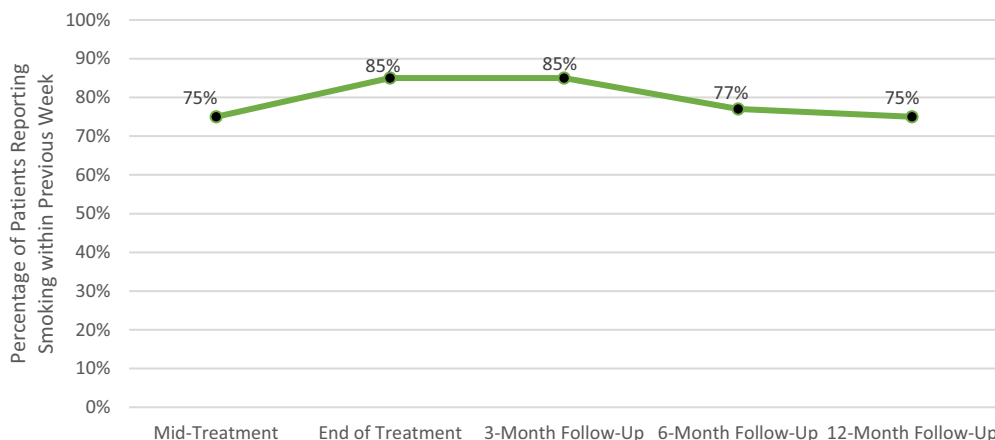


Figure 1 Rates of self-reported smoking during and after smoking cessation treatment.

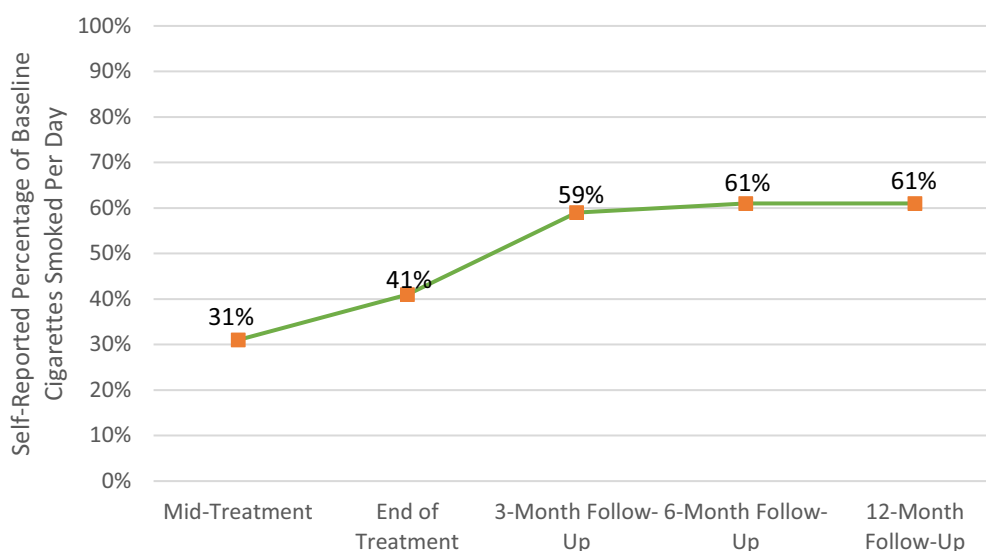


Figure 2 Rates of self-reported cigarettes smoked daily during and after smoking cessation treatment. Results reported as a percentage of number of cigarettes smoked at study entry.

not to the level of trained smoking cessation counselors. All patients were offered referral to an institutional smoking cessation program, but all patients declined due to the limited times meetings were available. An earlier transition to varenicline for patients who continued smoking any amount may have improved outcomes and could be considered in future studies. This study addressed a very specific demographic; thus, the results of this study may not be applicable in other settings.

Conclusions

Based on the results of this study, efforts may better be directed at increasing referrals to trained smoking cessation counselors (who can help arrange for both medication therapy and behavioral therapy) rather than actively managing smoking cessation in the radiation oncology clinic, at least among similar patient populations. An “ask advise connect” strategy incorporating the electronic medical record may be one method for increasing smoking cessation counseling and subsequently, quit rates.^{19,20} Surveys of International Association for the Study of Lung Cancer (IASLC) and American Society of Clinical Oncology (ASCO) members indicate that only one-third of providers felt adequately trained in providing smoking cessation interventions.^{10,12} Thus, future studies could focus on provider education with an emphasis on the availability of local resources to assist with smoking cessation.

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