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Patient willingness and barriers to receiving a CT scan for lung cancer screening

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Abstract

CT scans are becoming a more common method for detecting lung cancers at an earlier, potentially more curable, stage of disease. There is currently little data on attitudes and beliefs about screening for lung cancer. This paper presents the results of a 2011 survey of adult current and former smokers that queried about past use of CT scanning and reasons for having or not having the screening done. A random-digit dialed telephone survey was administered to a representative sample of 1,290 US adults. Logistic regression analyses were used to examine the correlates of having the test while controlling for the covariates. A total of 13.4% (n=45) of the sample had ever had a CT scan to detect lung cancer. Of current smokers, 14.6% had received a CT scan, as compared with 12.7% of former smokers. The oldest age group (55+) was significantly more likely to have received a CT scan than the younger age groups. 78.5% of current smokers and 81.4% of former smokers indicated willingness to get the test if advised to do so by their doctor. Among those who said they were not willing to get screened, lack of insurance coverage was cited by 33% of current smokers and 25% of former smokers. Additionally, 33% of current smokers were afraid to find out whether they had cancer. The main barrier to CT scanning for lung cancer is likely to be insurance coverage for the test, which would be a burden for those on limited and fixed incomes. Next steps should include further research into the effect of increased public education about the availability, risks, benefits and barriers to lung cancer screening.

Keywords

lung cancer; barriers to screening

Introduction

Low-dose spiral computed tomography (CT) scans have been introduced as a way to detect lung cancers at an earlier, potentially more curable, stage of disease [1]. CT scans have been

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shown to improve detection of smaller chest nodules, increasing early detection of lung cancer [2], [3], [4]. The largest randomized trial of CT scanning for lung cancer, the National Lung Cancer Screening Trial (NLST) found a 21% decrease in lung cancer mortality and a 7% decrease in all-cause mortality in those getting CT scans compared to the chest radiography group [5]. However, questions still remain about who should be screened, and how often [4]. While most adults are enthusiastic about cancer screening [6], there is little data on attitudes and beliefs about screening for lung cancer. A 2001 study by Silvestri et al [7] found that smokers, compared to former and never smokers, were less likely to consider CT screening. Resistance to screening among smokers was due in part to misperceptions about the benefits of early detection and an optimistic belief that they were unlikely to get cancer compared to former smokers and never smokers. This paper presents the results of a 2011 nationally representative sample of adult current and former smokers that queried about past use of CT scanning and reasons for having or not having the screening done.

Methods

A random-digit dialed telephone survey was administered to a representative sample of 1,290 US adults, both smoking and non-smoking, by the Survey Research and Data Acquisition Resource (SRDAR) at Roswell Park Cancer Institute in 2011. The response rate was 42%.

CT Scan Measures

Interviewers defined the CT scan procedure and then asked respondents if they had been administered a CT scan for lung cancer ever, and in the past year. They were also asked if they were willing to undergo the procedure if advised to by their doctor. 334 respondents were classified as current or former smokers and included in these analyses. Those who responded that they had not had a CT scan for lung cancer in the past 12 months were asked about their reasons for not doing so. Those who responded that they had been scanned were asked about their reasons for having it.

Smoking Status

A current smoker was defined as someone who reported that they had smoked 100 cigarettes in their lifetime, and currently smoke every day or some days. A former smoker was defined as someone who reported that they had smoked 100 cigarettes in their lifetime, and did not currently smoke at all.

Other Covariates

Demographic covariates include sex, age, race/ethnicity, income, and education (see Table 1).

Statistical Analysis

The data were weighted to the age, race, and gender distribution of the population of the US, as well as for variable probabilities of selection into the sample. Cross-tabulations were used to examine the association between the CT scan measures and smoking status. Logistic

regression was used to examine the correlates of having the test while controlling for the covariates. Analyses were conducted using SPSS version 16.0.

Results

A total of 13.4% (n=45) of the sample had ever had a CT scan to detect lung cancer. Among those aged 55+, 20.6% had received a CT scan to detect lung cancer. Of current smokers, 14.6% had received a CT scan, as compared with 12.7% of former smokers (see Table 2). Those who had not had a CT scan were asked "Would you have this test if it were recommended by your doctor?" 78.5% of current smokers and 81.4% of former smokers indicated that they would. Those who said they would refuse a CT scan were asked why not. Among current smokers, the most commonly cited reasons were: not wanting to find out if they had cancer, and lack of insurance. Among former smokers, the most commonly cited reason for not having the screening was a belief that they did not have lung cancer. The oldest age group (55+) was more likely to have received a CT scan than the younger age groups (18–39 and 40–54). No other differences were found in sex, race, or smoking status.

Conclusions

Screening for lung cancer by spiral CT scanning is still uncommon, with only about 1 out of 7 current and former smokers reporting having ever been screened. However, the findings do suggest that both current smokers and former smokers were willing to consider being screened if advised by their doctor to do so. This result seems to be consistent with previous studies which have shown high enthusiasm from patients to undergo cancer screening if recommended to do so by their doctor (Schwartz, 2004). The main barrier to CT scanning for lung cancer is likely to be insurance coverage for the test which would be a burden for those on limited and fixed incomes. Several respondents in the survey mentioned lack of insurance as a possible reason not to have the test, and we know from other screening exams that insurance coverage is a critical barrier delaying wide scale adoption of screening tests.

One limitation to this study is the self-reported data. It is possible that there is over-reporting occurring, with participants possibly reporting they received the CT scans to detect lung cancer when a CT scan may have been ordered for another reason. There was also a low (42%) response rate, and a small n in the stratified data. While these limitations may prevent us from drawing any generalizable conclusions from this data, this study does provide some contextual information for the topic of patient willingness and barriers to CT scanning for the detection of lung cancer, and indicates some avenues for further inquiry. Next steps should include further research into the effect of increased public education about the availability, risks, benefits and barriers to lung cancer screening, and the effects of risk perception on rates of screening in eligible populations.

References

1. Manser RL, Irving LB, de Campo MP, Abramson MJ, Stone CA, Pedersen KE, Elwood M, Campbell DA. Overview of observational studies of low-dose helical computed tomography screening for lung cancer. Respirology. 2005 Jan; 10(1):97–104. [PubMed: 15691245]

2. Sone S, Takashima S, Li F, Yang Z, Honda T, Maruyama Y, Hasegawa M, Yamanda T, Kubo K, Hanamura K, Asakura K. Mass screening for lung cancer with mobile spiral computed tomography scanner. Lancet. 1998 Apr 25; 351(9111):1242–5. [PubMed: 9643744]

3. Henschke CI, McCauley DI, Yankelevitz DF, Naidich DP, McGuinness G, Miettinen OS, Libby DM, Pasmantier MW, Koizumi J, Altorki NK, Smith JP. Early Lung Cancer Action Project: overall design and findings from baseline screening. Lancet. 1999 Jul 10; 354(9173):99–105. [PubMed: 10408484]

4. Bach PB, Mirkin JN, Oliver TK, Azzoli CG, Berry DA, Brawley OW, Byers T, Colditz GA, Gould MK, Jett JR, Sabichi AL, Smith-Bindman R, Wood DE, Qaseem A, Detterbeck FC. Benefits and Harms of CT Screening for Lung Cancer: A Systematic Review. JAMA. 2012 May.20:1–12.

5. Aberle DR, Adams AM, Berg CD, Black WC, Clapp JD, Fagerstrom RM, Gareen IF, Gatsonis C, Marcus PM, Sicks JD. National Lung Screening Trial Research Team. Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med. 2011 Aug 4; 365(5):395–409. [PubMed: 21714641]

6. Schwartz LM, Woloshin S, Fowler FJ Jr, Welch HG. Enthusiasm for cancer screening in the United States. JAMA. 2004 Jan 7; 291(1):71–8. [PubMed: 14709578]

7. Silvestri G, Nietert P, Zoller J, Carter C, Bradford D. Attitudes towards screening for lung cancer among smokers and their non-smoking counterparts. Thorax. 2007; 62(2):126–130. [PubMed: 17101739]

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Table 1

Characteristics of survey participants who had ever received a CT scan, weighted data

	n	%	OR	CI lower	CI upper
Smoking Status					
Current Smoker	19	14.5	1.0	REF	
Former Smoker	26	12.7	0.6	0.30	1.26
Sex					
Female	25	16.6	1.0	REF	
Male	20	10.9	0.6	0.33	1.20
Age					
18–39	9	7.3	1.0	REF	
40–54	10	11.9	2.0	0.74	5.25
55+	26	20.6	4.1	1.69	9.99
Race					
White	30	13.6	1.0	REF	
Black	8	15.4	1.4	0.56	3.47
Hispanic	6	16.7	2.1	0.79	5.79
Other	0	0.0	0.0	0.00	0.00

Table 2

Responses to CT scan questions from 2011 national survey by smoking status, weighted data.

Now I'm going to ask you a few items about a new test used to detect lung cancers. A CT scan is similar to an x-ray, except that for this test you lie on a table that slides into a tunnel that takes a picture of the lungs. If something abnormal is found, it usually results in follow-up tests or surgery. (Asked among 334 current and former smokers)	**Weighted Current smoker (n=130)**		**Weighted Former smoker (n=204)**	
	%		**%**	
1. Have you ever had this test to detect lung cancer? (% Yes)	14.6		12.7	
1a. Have you had it in the past 12 months? (% Yes)	3.8		2.5	
2. Would you have this test if it were recommended by your doctor? (%Yes)	78.5		81.4	
3. I am going to read you a list of reasons why some people may decide NOT to get a CT scan for lung cancer. Which of the following reasons would you say is important to you for NOT getting this test? (Asked among 14 current and former smokers who answered 'No' to Q.2)	N=7		N=7	
	N	**%**	**N**	**%**
You don't have insurance and the test would be too expensive	2	33.3	2	25.0
You are afraid to find out whether you have lung cancer	2	33.3	1	12.5
You are worried that your health insurance would not cover the cost	1	16.7	3	42.9
It is unlikely that you have lung cancer	1	14.3	5	71.4
You don't know where to have the test done	1	14.3	1	12.5
You are worried about the additional tests that would be necessary if this scan found something	0	0.0	1	14.3
No particular reason	0	0.0	0	0.0
Some other reason (Specify):	2	33.3	3	37.5
Claustrophobia/tight spaces				
Exposure to radiation				
Belief in homeopathic medicine/religious beliefs				
4. I am going to read you a list of reasons why some people may decide to get a CT scan for lung cancer. Which of the following reasons would you say is important to you for getting this test? (Asked among 267 current and former smokers who answered 'Yes' to Q.2)	n=102		1=166	
	N	**%**	**N**	**%**
You want to be able to diagnose lung cancer as early as possible	101	99.0	156	94.0
You want to follow your doctor's recommendations	94	93.1	163	98.8
You feel you are at risk for lung cancer	73	71.6	67	40.6
You are sick or have had medical problems	65	63.7	93	56.4
Some other reason (Specify):	24	23.5	52	31.5
Early Detection				
Experienced lung cancer in family or friend				
For children/family				
Health problems/symptoms				
Past exposure				