



## Original Research

# Comparison of Postoperative Smoking Cessation Rates of Patients with Benign or Premalignant Vocal Cord Lesions

Bilge Türk, Meltem Akpınar, Senem Kurt Dizdar, Kerem Sami Kaya, Alican Çoktur, Berna Uslu Coşkun

Department of Otorhinolaryngology Head and Neck Surgery, Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, Turkey

### Abstract

**Objectives:** It has been determined that cigarette is a risk factor for squamous cell carcinomas of the oral cavity, esophagus, and larynx. We aimed to investigate the role of histopathological diagnosis of the lesion in smoker patients with vocal cord lesion on smoking cessation rates and to determine strategies to help them quit smoking.

**Methods:** In this prospective clinical study, we included 182 (112 male, 70 female) smoker patients who underwent direct laryngoscopy and biopsy due to premalignant (dysplasia) or benign (polyp, leukoplakia, nodule) vocal cord lesions between July 2014 and December 2017 at our clinic. Smoking habits (ex-smoker, current smoker) of all smoker patients were questioned at least 6 months postoperatively, and postoperative smoking cessation rates were compared.

**Results:** When the smoking cessation rates of the patients with benign and premalignant vocal cord lesions were evaluated, the smoking cessation rate of the patients with premalignant vocal cord lesions was 3.45 times higher than that of the patients with benign vocal cord lesions (OR, 3.45; 95% CI, 1.76–6.74) ( $p < 0.001$ ). The postoperative application rate of the patients to smoking cessation outpatient clinics was low (6%). Male patients with premalignant lesions were more likely to quit smoking than female patients ( $p = 0.001$ ).

**Conclusion:** Patients with premalignant vocal cord lesions had higher smoking cessation rates. Premalignant vocal cord lesions require clinical follow-up and treatment because of the risk and potential for their transformation into *in situ* or invasive laryngeal carcinomas.

**Keywords:** Cigarette; tobacco; vocal cord.

Please cite this article as "Türk B., Akpınar M., Kurt Dizdar S., Kaya K.S., Çoktur A., Uslu Coşkun B. Comparison of Postoperative Smoking Cessation Rates of Patients with Benign or Premalignant Vocal Cord Disease. Med Bull Sisli Etfal Hosp 2018;52(2):114–118".

Tobacco is known and has been used by human beings for >2000 years. Previously, it was used within a small environment; however, later, the production of cigarettes and use of tobacco products in the form of cigarettes have rapidly increased. Nowadays, cigarette has become one of the greatest life-threatening health problems for human beings in all age groups, and many studies on its relationship with cancer have demonstrated smoking as a risk factor for cancers of the oral cavity, esophagus, and larynx.<sup>[1-3]</sup>

Despite the deleterious effects of smoking and tobacco products, it has been reported that more than one billion

individuals are smoking cigarettes, and this number is still increasing. The risk of cancer regresses after quitting smoking, and diseases and deaths related to smoking may be prevented.<sup>[4-7]</sup>

Many factors are influential on smoking cessation. When advising smokers to quit smoking, the decrease in their risk of cancer after quitting smoking should be emphasized, as this will convince them to quit easily. Furthermore, another effective motivation for quitting smoking is being aware of the fact that cigarette smoking increases the risk of developing malignancies.

**Address for correspondence:** Bilge Türk, MD. Department of Otorhinolaryngology Head and Neck Surgery, Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, Turkey

**Phone:** +90 532 286 82 13 **E-mail:** drbilgeturk@hotmail.com

**Submitted Date:** November 01, 2017 **Accepted Date:** November 14, 2017 **Available Online Date:** May 31, 2018

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In this study, we aimed to investigate the role of histopathological diagnosis of the lesion in smoker patients with vocal cord lesion on smoking cessation rates and to determine strategies to help them quit smoking.

## Methods

In this prospective clinical study, we included 182 (112 male and 70 female patients) smoker patients who had undergone direct laryngoscopy and biopsy surgery and finally diagnosed with premalignant (dysplasia) and/or benign (polyp, nodule, leukoplasia) vocal cord lesions at our clinic between July 2014 and December 2016. Patients with malignant diseases (laryngeal and/or other malignancies) and those with impaired cognitive functions (dementia, mental retardation) were excluded.

Written informed consent forms were obtained from all participants. The research plan was approved by the medical Ethics Committee of our hospital. (13.12.2016/1345).

At our clinic, 255 patients underwent direct laryngoscopy under general anesthesia and were diagnosed with premalignant or benign vocal cord lesions between July 2014 and December 2016. Of these 255 patients, 33 were lost to follow-up, two had symptoms of dementia, and one had renal cancer. Four patients declined participation in the study. All of these patients were excluded from the study. Thirty-three (15%) patients were nonsmokers. A total of 182 smoker patients with benign and/or premalignant lesions

were included in the study (Fig. 1).

All smoker patients were advised against smoking at the time of their first diagnoses and later during clinical controls. The smoking status and habits of the patients at the time of diagnosis and during the postoperative period (never smoker, quitter, and current smoker) were questioned 6 months after direct laryngoscopy and biopsy surgery at the earliest. Current smokers were defined as patients who used at least 100-pack/year during their life time and still continued to smoke every day regularly. Quitters were defined as patients who currently did not smoke or ex-smokers who quit smoking at least 6 months ago.

We compared the smoking cessation rates of the patients with premalignant and benign vocal cord lesions.

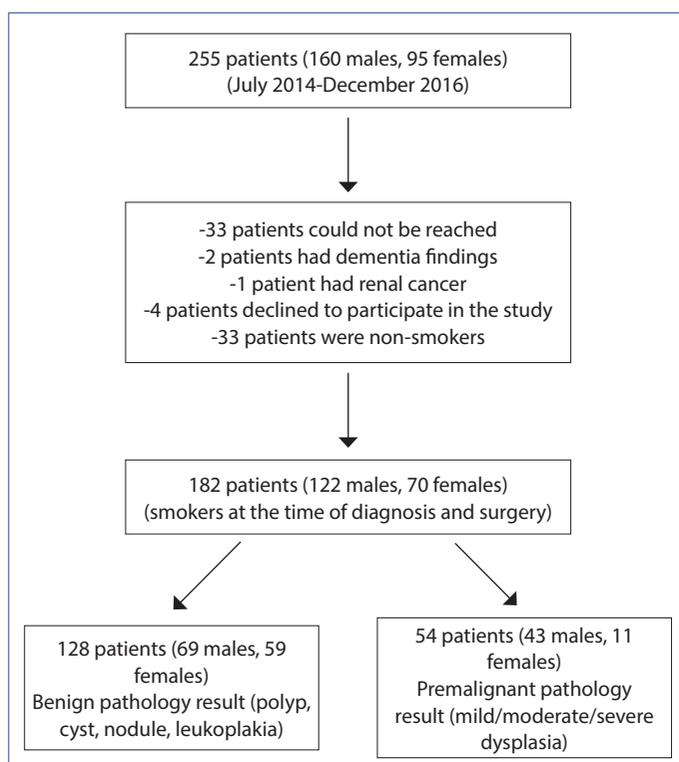
## Statistical Analysis

For statistical analysis, Statistical analysis of the data was performed using IBM SPSS Statistics for Windows, Version 15.0 (IBM, Inc., Chicago, IL, USA) program was used. Descriptive statistical data were given as mean, standard deviation, minimum and maximum for numerical variables, and numbers and percentages for categorical variables. For the comparisons of numerical variables that met the criteria of normal distribution in two independent groups, the Student t test was used. Chi-square test was used for intergroup comparisons of smoking cessation rates. Determinative factors were analyzed using logistic regression analysis. Statistical significance was set at  $p < 0.05$ .

## Results

In total, 128 (69 male and 59 female) smoker patients with a mean age of  $47 \pm 15$  years (range, 25 to 80 years) were diagnosed with and treated for benign vocal cord lesions, and 54 (43 male and 11 female) smoker patients with a mean age of  $55 \pm 15$  years (range, 33 to 77 years) were diagnosed with and treated for premalignant vocal cord lesions (Table 1). These patients were divided into benign and premalignant group, respectively.

The mean age and gender distribution of the benign and premalignant groups were analyzed. The mean age and



**Figure 1.** Flow diagram of the study.

**Table 1.** Distribution of age and sex of patients with benign and premalignant lesions of the vocal cord

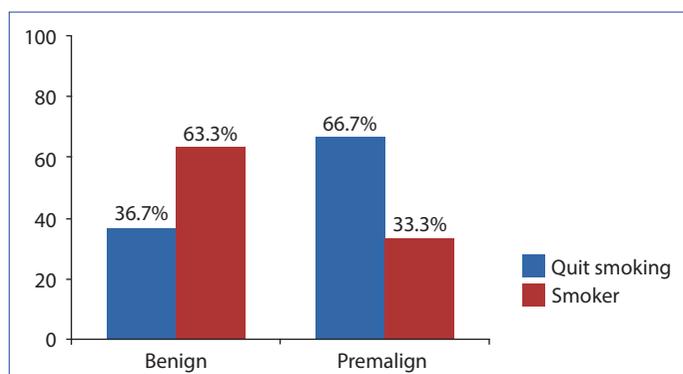
|               | Benign    |         | Premalignant |         | p      |
|---------------|-----------|---------|--------------|---------|--------|
|               | Mean±SD   | Min-Max | Mean±SD      | Min-Max |        |
| Age           | 47.6±12.1 | 25-80   | 55.2±10.7    | 33-77   | <0.001 |
| Sex           |           |         |              |         |        |
| Male (n, %)   | 69        | 53.9    | 43           | 79.6    | 0.001  |
| Female (n, %) | 59        | 46.1    | 11           | 20.4    |        |

rate of male sex in the premalignant group were significantly higher than those in the benign group ( $p < 0.001$ , and  $p = 0.001$ , respectively) (Table 1).

The smoking cessation rate was 3.45-fold higher in the premalignant group than in the benign group (OR, 3.45; 95% CI, 1.76–6.74). This difference was statistically significant ( $p < 0.001$ ) (Table 2, Fig. 2).

Significantly higher smoking cessation rates were detected in male patients with premalignant vocal cord disease than in male patients with benign laryngeal disease ( $p = 0.001$ ) (Table 3).

A statistically significant difference was not found between the mean ages of the patients with benign and premalignant vocal cord lesions ( $p = 0.525$ ,  $p = 0.589$ ) (Table 4).



**Figure 2.** Graphic demonstrating smoking cessation rates of the patients with benign and premalignant lesions of vocal cord.

**Table 2.** Smoking cessation rates of patients with benign and premalignant lesions of the vocal cord

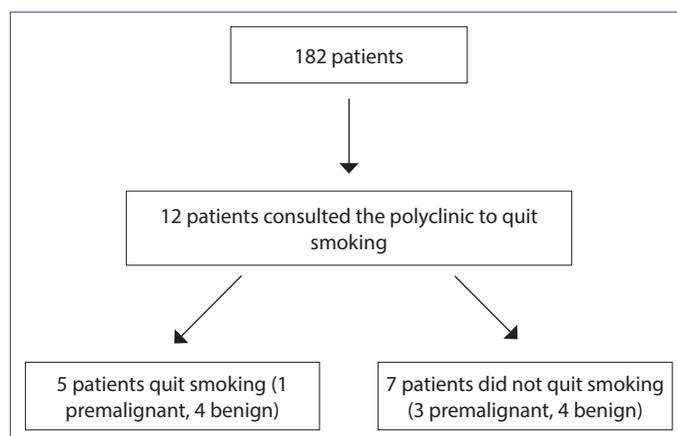
|              | Benign |      | Premalignant |      | p      |
|--------------|--------|------|--------------|------|--------|
|              | n      | %    | n            | %    |        |
| Smoking      |        |      |              |      |        |
| Quitters     | 47     | 36.7 | 36           | 66.7 | <0.001 |
| Non-quitters | 81     | 63.3 | 18           | 33.3 |        |

**Table 3.** Distribution of the smoking cessation rates among male and female patients with benign and premalignant lesions of the vocal cord

|              | Benign |      | Premalignant |      | p     |
|--------------|--------|------|--------------|------|-------|
|              | n      | %    | n            | %    |       |
| Male         |        |      |              |      |       |
| Smoking      |        |      |              |      |       |
| Quitters     | 23     | 33.3 | 28           | 65.1 | 0.001 |
| Non-quitters | 46     | 66.7 | 15           | 34.9 |       |
| Female       |        |      |              |      |       |
| Smoking      |        |      |              |      |       |
| Quitters     | 24     | 40.7 | 8            | 72.7 | 0.050 |
| Non-quitters | 35     | 59.3 | 3            | 27.3 |       |

When the effects of benign-premalignant lesions on smoking cessation were adjusted according to age and sex, the smoking cessation rate in the premalignant group was significantly higher (3.42-fold) than that in the benign group ( $p = 0.001$ ) (Table 5).

During interviews with the patients, they were asked if they had received professional support for smoking cessation, and only 12 (6%) out of the 182 patients said that they had consulted a smoking cessation outpatient clinic, only five of them quit smoking. These 12 patients had premalignant ( $n = 4$ ) and benign ( $n = 8$ ) lesions. One out of five ex-smokers had premalignant lesions, and the remaining four patients had benign lesions (Fig. 3).



**Figure 3.** The number (%) of patients who applied to outpatient clinics and quitters.

**Table 4.** Distribution of smoking cessation rates among patients with benign and premalignant lesions of the vocal cord according to age groups

|              | Age Mean±SD | p     |
|--------------|-------------|-------|
| Benign       |             |       |
| Quitters     | 48.4±12.9   | 0.525 |
| Non-quitters | 47.0±11.6   |       |
| Premalignant |             |       |
| Quitters     | 55.8±10.9   | 0.589 |
| Non-quitters | 54.1±10.7   |       |

**Table 5.** Smoking cessation rates adjusted according to age and sex in patients with benign and premalignant lesions of the vocal cord

|                     | p     | OR   | 95.0% C.I. |
|---------------------|-------|------|------------|
| Enter Model         |       |      |            |
| Age                 | 0.390 | 1.01 | 0.99 1.04  |
| Sex (male)          | 0.340 | 0.73 | 0.38 1.40  |
| Group (prealignant) | 0.001 | 3.42 | 1.66 7.04  |

## Discussion

Long-term smoking is strongly correlated with heart diseases, stroke, and various types of cancers, and it harms almost all organs.<sup>[8, 9]</sup> Smoking control programs have basically targeted the prevention and quitting of smoking to protect the population from the harmful effects of smoking and to decrease the rates of smoking. Many motivations and factors are effective on smoking cessation. Smoking rates can possibly decrease with increased awareness of the potential harmful effects of smoking.

Smoking has been determined to be a major risk factor in the development of laryngeal squamous cell carcinoma and Reinke edema.<sup>[10, 11]</sup> In this study, we evaluated whether the diagnoses of benign or premalignant vocal cord diseases had any effect on smoking cessation among smokers. The smoking cessation rates of patients with premalignant vocal cord diseases were significantly higher than those of patients with benign lesions ( $p=0.001$ ).

In a study, the participants indicated that guidance from non-smoker instructors, educators, and physicians was more influential in smoking cessation.<sup>[5]</sup> In this study, all examining and attendant physicians suggested their patients to quit smoking. Although all patients in our study were told that tobacco products are carcinogenic agents and harmful to health, 99 (53.2%) of the 182 study participants did not quit smoking. Non-quitters had benign vocal cord disease ( $n=81$ ) or premalignant vocal cord disease ( $n=18$ ).

Some studies have demonstrated that female smokers faced more difficulty in quitting smoking than male smokers.<sup>[12, 13]</sup> In the present study, the smoking cessation rates of male smokers with premalignant vocal cord disease were significantly higher than those of male smokers with benign disease ( $p=0.001$ ); however, a significant difference in the smoking cessation rates was not observed in the female patients of both groups ( $p=0.050$ ).

In this study, we evaluated whether the presence of premalignant or benign vocal cord lesion had any effect on smoking cessation status. We detected higher smoking cessation rates in patients with premalignant vocal cord laryngeal lesion. The possibility of contracting cancer is one of the most important motivational factors effective on smoking cessation. We thought that one of the reasons for higher smoking cessation rates in patients with premalignant vocal cord disease might stem from the fear of contracting cancer. Explaining the adverse effects of smoking on the disease to the patients, calling them for follow-up visits to keep the disease under control, may be other influential factors for patients taking smoking cessation more seriously.

The best results from smoking cessation therapy are obtained from supportive therapy comprising a combination of pharmacotherapy, behavioral therapy, and motivation.<sup>[14]</sup> Besides increasing the number of advertisements about smoking cessation products (i.e., nicotine bands, nicotine gums, nicotine protep bands), increasing the number of smoking cessation interventions has been found to be associated with successful smoking cessation programs.<sup>[15, 16]</sup> It may be helpful to direct patients to smoking cessation outpatient clinics for professional support and pharmacotherapy.

During the follow-up of the patients on an ambulatory basis, not only their disease states but also their smoking status should be questioned. Interventions such as providing behavioral and psychological support, rather than prescription of drugs, informing the patients in detail about smoking and its deleterious effects, sending informative messages to their phones may be much more effective in reducing smoking cessation rates particularly in patients with smoking-induced diseases.

In a study by Argüder et al.<sup>[17]</sup>, the authors recommended providing all smokers individualized pharmacological support treatment with proven effectiveness without any contraindication in addition to adequate behavioral training and demonstrated that appropriate treatment given for a sufficient period increased the smoking cessation rates. In our study, 12 (6%) smoker patients said that they had called smoking cessation hotline and consulted smoking cessation outpatient clinics, and only five of them indicated that they could quit smoking. Advising all smoker patients to consult smoking cessation outpatient clinics may increase the number of quitters.

Health care professionals should tell the non-quitters about the smoking-induced diseases and its carcinogenic effects more in detail and comprehensively; visual materials (pamphlets) should be used and the patients should be warned and encouraged to receive professional help when needed. All of these measures may increase smoking cessation rates.

Premalignant vocal cord lesions require close clinical follow-up and treatment because of their chances of transformation into in situ or invasive laryngeal carcinomas. Quitting smoking carries clinical importance for the prevention of relapse or malignant transformation of these lesions. Calling the patients with premalignant lesions more frequently for control, drawing attention of the patients toward potential malignant diseases more often, raising awareness of them concerning increased risk of cancer, and augmenting their motivations for smoking cessation, all together make the patients take this issue more seriously. Explanation of

deleterious and carcinogenic effects of smoking to the patients in detail and encouraging (motivating) them to get professional help during smoking cessation process may aid in increasing smoking cessation rates. Further studies with greater number of patients, which enable the conduction of multivariate analysis with multiple variables, may provide additional contributions to this issue.

### Disclosures

**Ethics Committee Approval:** Written informed consent forms were obtained from all participants. The research plan was approved by the medical Ethics Committee of our hospital. (13.12.2016 / 1345).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Financial support:** The authors have not received any financial support for this study.

**Authorship contributions:** Concept – B.T., S.K.D., K.S.K.; Design – B.T., M.A., K.S.K.; Supervision – B.T., M.A., B.U.C.; Materials – B.T., S.K.D., K.S.K., A.Ç.; Data collection &/or processing – B.T., S.K.D., K.S.K., A.Ç.; Analysis and/or interpretation – M.A., B.U.C.; Literature search – B.T., A.Ç.; Writing – B.T., M.A.; Critical review – M.A., B.U.C.

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