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THE EFFECT OF SMOKING ON THE MORPHOLOGY OF LUNG CANCER

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Abstract

Smoking as a cause of cancer development has been the subject of research by the International Agency for Research on Cancer (IARC) [1, 2]. The highest rates are for lung (up to 90% of cases), oral cavity (92%) and larynx (87%) cases [3]. Smoking is one of the most important causes in the etiology of lung cancer [3, 4].

The purpose of the study was to determine whether smoking had an effect on the morphological type of lung cancer. One hundred and fifty patients with histologically proven lung cancer by gender, age, smoking experience, and morphology of lung cancer were studied.

The number of men is twice that of women; the highest number of patients is between 40 and 60 years of age. 76.6% of patients are active smokers, 88.6% of them have used cigarettes for more than 10 years, and 59% have smoked more than 20 cigarettes daily. Of the nonsmoking patients, 48.6% are passive smokers.

The distribution by morphological type of lung cancer in smokers indicates that the ratio of squamous type of cancer (59%) is the highest, followed by adenocarcinoma (29.5%), and small cellular cancer (11.3%).

Key words: lung cancer, smoking, risk factor

Introduction. Pulmonary cancer is one of the most common oncological diseases. In 2000, 1.2 million people were diagnosed worldwide, 1.5 million in 2008 and 1.8 million in 2016 [5].

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According to the data on all types of cancer lung cancer is the most common cause of death in men and second in women. In Bulgaria, lung cancer is the most common malignancy in men and the fifth most common in women. In 2016, over 4000 Bulgarians were diagnosed with the disease. In Europe, 270 000 of those diagnosed with the disease die each year.

The purpose of the study was to determine whether smoking had an effect on the morphological type of lung cancer.

Material and methodology. One hundred and fifty patients with histologically proven lung cancer are studied. History, laboratory and imaging studies are used. The main method of diagnosis is bronchological examination (fibrobronchoscopy, FBS) with biopsy material taken for pathomorphological examination.

Of the 150 patients studied, 64% were male and 36% were female (Fig. 1).

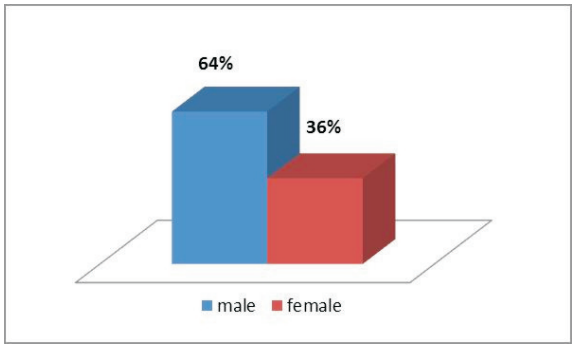


Fig. 1. Distribution of patients studied ($n = 150$) by gender

According to age distribution, 58% are between 40 and 60 years of age and 42% are over 60 years of age (Fig. 2).

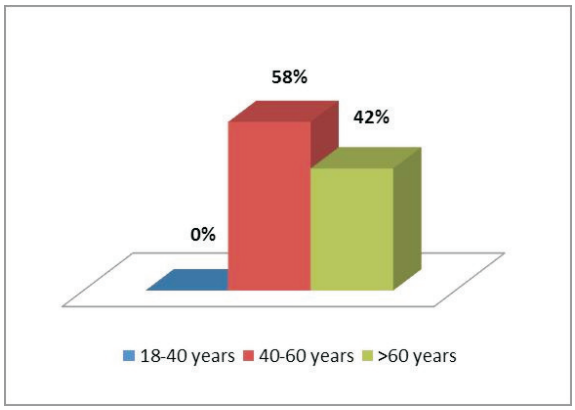
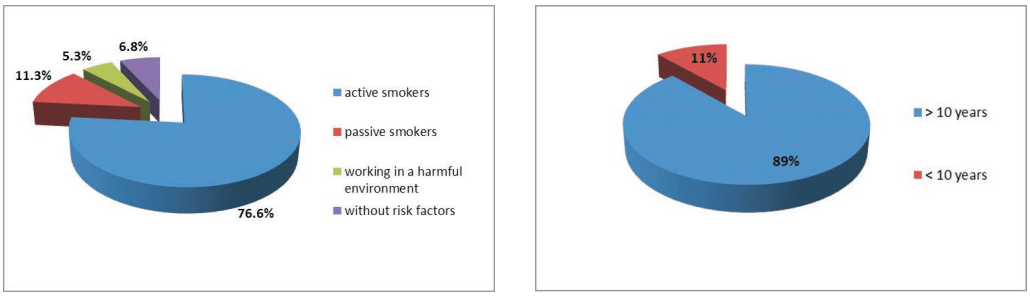


Fig. 2. Distribution of patients studied ($n = 150$) by age: 18–40 years, 40–60 years, > 60 years

According to the anamnestic data, 65.3% of patients report co-morbidities and therapy. The most common diseases are: arterial hypertension, type 2 diabetes mellitus and chronic obstructive pulmonary disease (COPD).

In a risk factor analysis, 76.6% of patients reported smoking, the remaining 23.4% denied it but 11.3% were passive smokers; 5.3% worked in a harmful environment – mines or factories for paints and varnish, and 6.8% did not identify a risk factor (Fig. 3a).



(a) (b)

Fig. 3. Distribution of all patients ($n = 150$) according to risk factors (a), and (b) distribution of patients smokers ($n = 115$) by smoking period

According to years of smoking, patients ($n = 115$) are divided into two groups: more than 10 years – 88.6%, and less than 10 years – 11.4% (Fig. 3b); in terms of the number of cigarettes smoked: more than 20 cigarettes a day – 59% and less than 20 cigarettes a day – 41%.

When comparing the anamnestic data and the results of pathomorphological examinations of materials, in patients in whom the main risk factor is smoking, the most common morphological type of lung cancer is 59% of squamous cancer, followed by 29.5% of adenocarcinoma, and 11.5% of small cell cancer.

In nonsmoking patients ($n = 35$) morphological types of lung cancer are: adenocarcinoma in 54% of cases, and squamous cell cancer in 46%.

80.6% of all studied patients had metastases at the date of diagnosis. The most common metastases are in regional lymph nodes and in other parts of the lung (pulmonary-pulmonary metastases).

In 78% of the patients studied, late diagnosis of the process resulted from late starting symptoms; 27% are due to a longer diagnostic process and 19.3% are due to late search for medical help. For these reasons, only 19.3% of patients are appropriate for surgical treatment.

Discussion. The results of a study of 150 patients with histologically proven lung cancer show that the number of men diagnosed is almost twice that of women; the highest number of patients is between 40 and 60 years of age. In terms of risk factors, smoking is the main one – more than 2/3 of the patients ($n = 115$) are active smokers, 88.6% of them have used cigarettes for more than 10 years, and

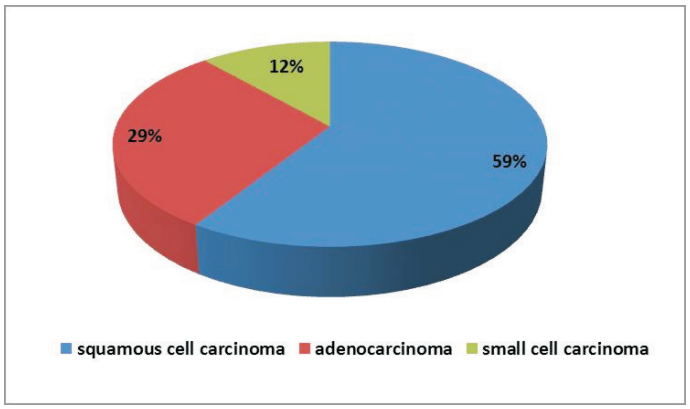


Fig. 4. Distribution of smoker patients (n = 115) by morphological type of lung cancer

59% smoke more than 20 cigarettes daily.

Of the nonsmoking patients, 48.6% are passive smokers. The distribution by morphological type of lung cancer in smokers indicates that the ratio of squamous type of cancer (59%) is the highest, followed by adenocarcinoma (29.5%), and small cellular cancer (11.3%). In contrast, according to the reference data, the highest percentage is in smokers with proven squamous cell carcinoma and the lowest in adenocarcinoma [6,7].

The study confirms that smoking is one of the major risk factors for the development of lung cancer. The majority of patients studied, have smoked more than 10 years and consumed more than 20 cigarettes a day, which confirms the findings that both the amount of cigarettes smoked and the duration of smoking are important.

The late diagnosis is due to the late manifestation of the symptoms of the disease. In a small percentage of the patients studied (19.3%) surgical treatment is possible.

Conclusions.

1. In smokers with established lung cancer, the percentage of squamous cell carcinoma is the highest (59%), followed by adenocarcinoma (54%), and small cell carcinoma (46%).

2. Non-smokers have the highest percentage of proven adenocarcinoma (54%), followed by squamous cell carcinoma (46%).

3. Lung cancer is more common in men and in the age group of 40–60 years.

4. The highest percentage is of patients with smoking experience over 10 years and more than 20 cigarettes smoked daily (89%).

5. Only 19.3% of patients are referred for radical surgical treatment.

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