

Aim of the study: In the paper clinical cases of individuals diagnosed with lung cancer below the age of 40 years have been analyzed.

Material and methods: The analysis included: sex, age, clinical symptoms found before and at the moment of diagnosis, character of changes visible in radiological imaging, time that passed from the first symptoms to reporting to a doctor and to establishing a diagnosis, type of diagnostic method used in establishing the final diagnosis, histopathologic type of cancer, degree of cancer progression.

Results: The results have been compared with a peer group who had been diagnosed 20 years earlier. Currently 7% of patients were diagnosed at the age of 25 or younger, whereas in the previous cohort patients in this age constituted 2%. The predominant pathological type was adenocarcinoma (currently 33%, previously 4%) in contrast to the earlier group in which 57% of patients had small cell lung cancer (57%). The incidence is equally distributed between both sexes, although there is an evident increase in female lung cancer cases. In the majority of patients the clinical presentation is a peripheral mass on chest X-ray. 20% of patients present pleural effusion on diagnosis. Patients reported the following complaints: breathlessness, chest pain, weight loss and fatigue. The majority of cases were diagnosed in advanced stages on the basis of a bronchoscopy acquired specimen. Time course from symptoms to diagnosis tends to be shorter than 20 years ago.

Key words: lung carcinoma, young patients, sex, diagnosis.

Lung cancer in patients under the age of 40 years

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Introduction

Lung cancer is one of the most common cancers in the world. This disease occurs mostly in men over 50 years old, most often at the age of 60–75 years. It is diagnosed in young patients very rarely. In Poland, in a group of 14 703 men, 50 patients were under 40, and in a group of 5900 women, 45 had the disease [1]. In the Department of Lung Diseases in Zabrze, in the years 1963–1978, patients under 40 with diagnosed lung cancer constituted 5% of all the patients with this disease. As compared to the older patients, small cell lung cancer (SCLC) predominated among young patients and it constituted 57% of all cancers in this age group. The diagnosis of this disease in young patients was usually established in an advanced form of the disease [2].

The aim of this study is to perform an analysis of patients with lung cancer aged under 40 years and changes that occurred in the course of the disease 25 years after the previous examination including histopathology, clinical symptoms, radiological and bronchoscopic changes, degree of progression and delays in diagnosis.

Material and methods

Forty-two cases of patients with lung cancer (23 men and 19 women) aged under 40, hospitalized in the years 2003–2008 in the Department of Lung Diseases in Zabrze, Wrocław and in Lublin, were analyzed. The analysis included:

- sex, age,
- clinical symptoms found before and at the moment of diagnosis,
- character of changes visible in radiological imaging,
- time that passed from the first symptoms to reporting to a doctor and to establishing a diagnosis,
- type of diagnostic method used in establishing the final diagnosis,
- histopathologic type of cancer,
- degree of cancer progression.

Results

The disease was diagnosed in 23 men and 19 women. Mean age of the patients was 34 years; patients aged 35–39 constituted 71% (30 patients). Lung cancer was diagnosed in 3 patients at the age of 20–24 years (7%). Histological type was determined in 29 patients (69%). The most common histological type was adenocarcinoma, which made up 48% of all cancers of a defined histological type. The disease was diagnosed in most patients, 89%, in the advanced clinical stage (III, IV, ED).

The data are presented in Table 1.

Among all patients, 92% smoked cigarettes, 58% were men, 42% women. The most common symptoms reported by patients were progressing weak-

Table 1. Patients' age versus histological type and stage

Age	Gender		Total		Type of NSCLC				Stage				SCLC	
	M	W	amount	%	LCC	SCC	AC	not defined	I	II	III	IV	LD	ED
20–24	1	2	3	7	0	0	1	2	2	0	1	0	0	0
25–29	3	1	4	10	0	1	1	1	0	0	3	0	1	0
30–34	2	3	5	12	0	0	2	1	1	0	0	2	1	1
35–39	17	13	30	71	1	3	10	9	2	0	6	15	2	5
Total	23	19	42	100	1	4	14	13	5	0	10	17	4	6

LCC – large cell carcinoma, SCC – squamous cell carcinoma, AC – adenocarcinoma, LD – limited disease, ED – extensive disease

Table 2. Clinical symptoms at diagnosis

	SCLC	NSCLC	Total
Dyspnea	5 (12%)	9 (21%)	14 (33%)
Recurrent pneumonia	0	2 (5%)	2 (5%)
Febrile	3 (7%)	7 (17%)	10 (24%)
Hemoptysis	3 (7%)	6 (14%)	9 (21%)
Weight loss (5 kg)	4 (10%)	9 (21%)	13 (31%)
Weakness	5 (12%)	11 (26%)	16 (38%)
Hoarseness	1 (2%)	1 (2%)	2 (5%)
Chest pain	3 (7%)	13 (31%)	16 (38%)
Metastasis related symptoms	0	7 (17%)	7 (17%)

Table 3. Radiologic abnormalities

	SCLC	NSCLC	Total
Segmental/lobar atelectasis	3 (7%)	5 (12%)	8 (19%)
Central mass	1 (2%)	8 (19%)	9 (21%)
Solitary pulmonary nodule	3 (7%)	11 (26%)	14 (33%)
Multiple peripheral shadows	3 (7%)	6 (14%)	9 (21%)
Hydrothorax	4 (10%)	5 (12%)	9 (21%)

Table 4. Abnormalities in bronchofiberscopy

	SCLC	NSCLC	Total
Bronchoscopy	10 (24%)	29 (69%)	39 (93%)
Dominating hypertrophic changes	6 (14%)	14 (33%)	20 (48%)
Dominating intraparietal changes	3 (7%)	7 (17%)	10 (24%)
No changes	1 (2%)	8 (19%)	9 (21%)

ness (38%), chest pain (38%) and dyspnea (33%). Very rare symptoms included hoarseness (5%) and recurring pneumonia (5%). In 31% of patients (13 patients) decrease of body mass was found. Mean mass loss was about 5 kg within one month. The results are presented in Table 2.

Mean time from the first symptoms of the disease to calling a doctor was about 3 weeks. In patients with finally diagnosed SCLC the time was shorter: 2 weeks. In cases of non-small cell lung cancer (NSCLC), the patients delayed the appointment to a doctor (average 4.5 weeks). The average

time that passed from clinical symptoms appearance to determining the diagnosis was 6 weeks (4 weeks in SCLC and 7.5 weeks in NSCLC). At that time, the patients were treated for bronchitis (8 patients, 19%), pneumonia (5 patients, 12%), tuberculosis (1 patient, 2%).

All patients underwent chest X ray. 86% had computed tomography of the chest. Peripheral shadow dominated in the radiological image (33%, 14 patients). As often as that, the presence of a tumor in the pulmonary hilus without atelectasis was found. Numerous peripheral shadows, and fluid in the pleural cavity occurred in 9 patients each. The character of radiological changes found in the study group is presented in Table 3.

Bronchoscopy was performed in 39 patients (93%). The presence of hypertrophic changes was found in 20 patients (48%), intraparietal changes in 10 (24%), while no pathologic changes were found in 9 (21%) (Table 4).

The diagnosis on the basis of sputum or bronchial swab cytology was determined in 38% of patients, on the basis of bronchial sample histopathology in 36% of patients.

The most common histological type of primary cancer was adenocarcinoma (14 patients, 33%). Squamous cell carcinoma was found in 4 patients (10%), SCLC in 10 (24%). The advanced stage of the disease was found in 78% of patients (extensive disease [ED] in SCLC and stage III and IV according to TNM, in NSCLC). The histopathology results in relation to gender and disease stage are presented in Table 5.

Discussion

Cases of pulmonary cancer in people under 40 years old constitute about 2–5% of all cases of pulmonary cancer [2–4].

Mean age of the patients under 40 suffering from this disease in our material was 34 years and was similar to the mean age of the patients from the period of 1993–2001, while 25 years ago, mean age was three years older and was 37 years [2].

Formerly, lung cancer was found more often in men than in women (1957–1982: 58 men vs. 19 women; 1993–2001: 12 men vs. 5 women) [2, 5]. Presently the frequency of occurrence of lung cancer in patients under 40 years is similar in both sexes. This is consistent with the observations of other authors who, in the last years, have observed an increase of lung cancer incidence among young women [6]. It corresponds to the general increase of lung cancer incidence [1]. Most patients, over 92%, smoked cigarettes; however, the disease also affected non-smoking women. In the material of Ganz *et al.* about 93% of young people smoked [7].

Table 5. Lung cancer histological type versus gender and disease stage

Histological type	Gender				Total		Stage								
	Men		Women		n	%	I/LD		II/ED		III/–		IV/–		
	n	%	n	%			n	%	n	%	n	%	n	%	
NSCLC	LCC	1	2	0	0	1	2	0	0	0	0	0	0	1	2
	SCC	3	7	1	2	4	10	0	0	0	0	4	10	0	0
	AC	5	12	9	21	14	33	2	5	0	0	3	7	9	21
	Total	17	40	12	29	29	69	6	14	6	14	7	17	10	24
NOS	6	14	7	17	13	31	3	7	0	0	3	7	7	17	
SCLC	8	19	2	5	10	24	4	10	6	14	0	0	0	0	
Total	23	100	19	100	42	100	9	21	6	14	10	24	17	40	

LCC – large cell carcinoma, SCC – squamous cell carcinoma, AC – adenocarcinoma, LD – limited disease, ED – extensive disease

Twenty five years ago, the most common histological type was NSCLC. Squamous cell carcinoma was observed very rarely. It was found in one patient under 30 years old. This phenomenon was not observed before, which may suggest earlier exposure to cigarette smoke now than before. The predominant histological type among young people is adenocarcinoma. It was found in 33%, as often in men as in women. A similar increase in adenocarcinoma incidence, mainly in women, was also observed by other authors [3, 6, 8, 9].

Clinical symptoms in the analyzed time periods were similar among patients. Kuo *et al.* did not find any differences in clinical symptoms between younger groups and patients over 80 years old [3]. However, Bourke *et al.* observed occurrence of pain, fever and neurological symptoms in the young patients more often [9].

Chest radiograms show mainly peripheral changes in the form of individual or multiple nodules. Fluid in the pleural cavity occurred in 1/5 patients. Bourke *et al.* observed mainly changes in lower lobes [9].

The diagnosis of the disease presently, similarly to earlier years, was determined in the advanced disease stages [2, 9]. One of the main reasons for a late diagnosis of lung cancer in the patients under 40 was a wrong initial diagnosis. That misguided diagnosis rarely included tuberculosis, though there was fluid accumulation in the pleural cavity in the course of the disease.

As compared to the previous years, the delays in diagnosis shortened considerably and the disease was diagnosed in about 2 months. In the years 1957–1982, 51% of patients had lung cancer diagnosed more than 4 months after the first symptoms, and 31% from 1 to 3 months. In the years 1993–2001, these rates were 29% after 4 months, and 64% from 1 to 3 months.

This study is not an epidemiological, but a clinical work. The presented data do not necessarily reflect the epidemiological situation in selected regions of Poland.

In conclusions, adenocarcinoma is presently the predominant histological type among patients under 40 years old.

Increasing lung cancer incidence is observed among young women under 40 years old, and the frequency of lung cancer is similar in men and women in this age group.

The time that passes from the first symptoms of the disease to lung cancer diagnosis is shorter in comparison with

previous years. However, diagnosing early stage lung cancer is still very rare.

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The authors declare no conflict of interest.

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