Lung cancer in the elderly – increasing epidemiological problem of 21st century

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Abstract

Lung cancer is the second most common malignant neoplasm after prostate and breast cancers. It is the most frequent cause of death related to neoplasms. The elderly people over 65, are the most numerous population suffering from lung cancer. Risk of incidence and death increases with aging process. In majority of patients, diagnose is established in highly advanced neoplastic process. More than 80% of all types of lung cancers make non-small cell lung cancer (NSCLC) and less than 20% – small cell lung cancer (SCLC). The choice of the managment must be individually considered and should be based on the stage of cancer clinical advance, clinical and functional status, concomitant diseases, nutritional status, cognitive functions. The patients age is not a contradiction for the introducement of the treatment. Surgical treatment is a method by choice at the early stages of NSCLC. Radical radiotherapy should be introduced in the elderly disqualified from the operation. Single-agent chemotherapy seems to be benficial for the elderly with advanced NSCLC in good general condition, mainly due to less toxicity and satisfactory the survival rate. In the cases of SCLC polychemotherapy with prophylactic brain radiation is the first-line managment. Unfortunately, the effectivity of the therapy is occupied by its toxicity. Still frequent occurrence and late diagnosis of lung cancer, high mortality, low efficiency of chemo- and radiotherapy causes the necessity of newer research for more effective screening methods, more effective and safer lung cancer treatment schemes for the elderly.

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Received 13.01.2005 Accepted 07.02.2005

Key words: lung cancer, elderly, epidemiology, characteristics, treatment problems.

Introduction

Both in developing and developed countries the aging tendency of communities is noticeable. Nowadys the number of people over 65 is increasing, whereas the birth rate is decreasing. In population of the elderly the frequency of the occurrence of cancer is the highest. It stands for 61% and 56% for the men and women respectively [1]. Among those patients, the overage of cancer appearence is 69 in men and 67 in women [2]. Cancers occur almost 7 times more often in elderly men and about 4 times more often in elderly women in comparison with younger individuals [1].

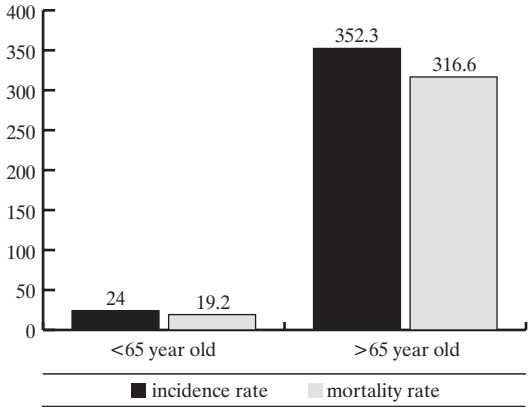
Epidemiology of lung cancer

Lung cancer is the most frequent cause of death related to neoplasms [2]. In Poland, about 20000 people, including 15000 of men die of this cancer every year. Annually, about 163000 deaths of cancer are documented in The U.S.A., including 92000 of men and 66000 of women [3]. The risk of death increases with aging and is about 16.5 times higher in the elderly than in younger patients [4] (*Fig. 1*).

There can be also observed the strong dependence between tobacco smoking and the risk of death. The risk of death from lung cancer is 33 times higher in smokers than in non-smokers [5]. The 5-year survival rate stands for 8-13% [5]. However, only 7% of patients achieve 10-year survival period, which confirms the high mortality rate of this type of cancer [6]. The survival rate is related not only to the age of the patient, but also to cancer biology, its histological type and clinical advance stage as well [5].

More than 80% of all types of lung cancer make non-small cell lung cancer (NSCLC) and less than 20% – small cell lung

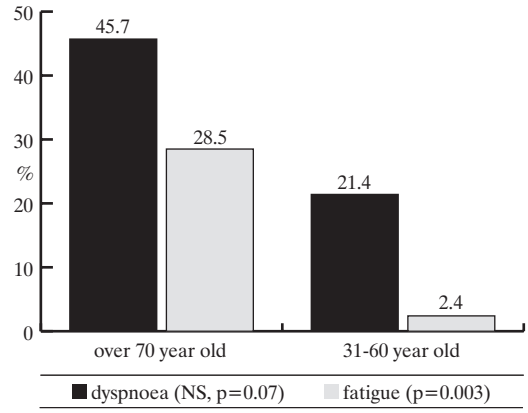
Figure 1. **Incidence and mortality rate of lung cancer (1996-2000)***



Rates are per 100 000 and are age-adjusted to the 2000 U.S. standard population by 5-year age groups (after SEER Cancer Statistics Review 1975-2000)

* Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK. SEER Cancer Statistics Review, 1975-2000; National Cancer Institute, Bethesda 2003 [4]

Figure 2. **Clinical manifestations present in NSCLC patients on the admission – own observations***



* Czwojda K, Batura-Gabryel H, Młynarczyk W. Rak niedrobnokomórkowy płuca w wieku starszym. Gerontologia Polska, 2000; 8(3): 31-5 [9]

cancer (SCLC). Unfortunately, in about 75% of patients, the diagnose is established at 3rd or 4th clinical advance stage according to the AJCC criteria, which stands for a highly advanced neoplastic process [6].

Lung cancer is the second most common malignant neoplasm after prostate and breast cancers [2]. Annually about 170 000 of new cases of lung cancer, including 90 000 in men and 80 000 in women are diagnosed in The U.S.A. [3]. In Poland, in 2000, the sick rate of lung cancer was about 21 500 [7]. It is predicted that in 2010 – 34 000 of people (i.e. 26 000 men and 8 000 women) will fall ill of lung cancer in our country. Tobacco smoking habit is responsible for such a high lung cancer incidence. Other risk factors are: carcinogens, genetic factors, nutritional habits, poor social status, selected pulmonary diseases like chronic obstructive pulmonary disease (COPD), tuberculosis, asbestosis, silicosis, disseminated pulmonary fibrosis. Hormone replacement therapy (HRT) seems to be an additional risk factor in women. The risk of lung cancer in female tobacco smokers is 13 times higher and in female tobacco smokers undergoing HRT treatment it is 32.4 times higher than in non-smoking women [8]. The elderly are the most numerous population suffering from lung cancer [6]. More than 50% of patients with lung cancer are over the age of 65 and over 30% are over 70 [2]. In individuals over 65 years, the risk of lung cancer occurrence is 14.7 times higher than in younger patients (*Fig. 1*) [4]. Lung cancer diagnosis and treatment in elderly patients is a very important epidemiological problem of 21st century.

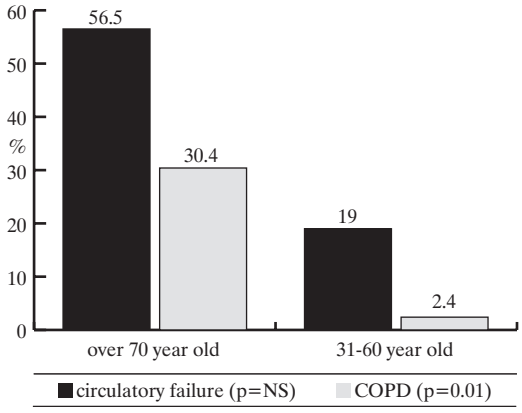
The individual assessment of elderly patients

Recently a calendar age was the basic factor taken into consideration on qualifying the patient for a treatment. Decisions about the type of managment were based on that factor. The commonplace approach to the problem of lung cancer in elderly was the main cause of it [9]. Last clinical trials changed this situation. It is proved that the biology of neoplastic cells doesn't depend on the age. It has been concluded there is no dependence between the time of appearence of metastases and the patients's age [9]. Since elderly patients constitute a very differentiated population in respect of health, the biological, not calendar age is important for planning their treatment [2,6]. In order to obtain a proper estimation of the biological age, we need to perform an individual and detailed assessment of the clinical and performance status. Clinical assessment is particulary necessary before chemotherapy. The activity of hepatic enzymes responsible for drugs metabolism decreases by 30% and the glomerular filtration rate falls by 1 ml a minute every year in people over 40 [10]. The functional status shows the elderly patients ability to independent performance of daily tasks at home and in the community [6]. Particular scales are used to assess it (e.g. ECOG or Katz-ADL).

It is also important to take co-existing diseases into consideration. They significantly influence the course of treatment, frequency of toxicities appearence and the survival rate. Sometimes comorbidity can be more dangerous for the patient's life than neoplastic disease [6]. It often happens in case of a circulatory failure, which is very common in elderly people. Some of symptoms of comorbid medical conditions are similar to symptoms of lung cancer, which may delay giving the right diagnosis. Sometimes inflammatory symptoms from the respiratory tract are too long treated with antibiotics, often without making lungs X-ray. The first line phycisians should be alert, especially when meeting an elderly patient who happens to be tobacco smoker exposed to other related risk factors of lung cancer [5].

Nutritional status and a cognition ability of elderly patients is worth assessing before planning the treatment [6]. Both poor

Figure 3. **Presence of co-existing diseases at the moment of the NSCLC diagnosis – own observations***



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nutritional status and dementia are adverse prognostic factors [6]. Weight loss of 5% and more increases the risk of death [6]. Impairment of cognitive functions, especially related to vascular pathology of The Central Nervous System, which very often exists in the elderly, may be the cause of problems with communication. Patients complain about a broad range of symptoms from different organs. It can delay the diagnosis of cancer. Sometimes elderly patients hide their ailments in fear of hospitalization or examination [9]. It is necessary to remember about drug usage by elderly patients. Possibility of interactions between them and cytostatic treatment should be considered. Some drugs may intensify toxic effects [6].

At The Pulmonology Department of Karol Marcinkowski University of Medical Sciences in Poznań we examined a group of 70 patients suffering from NSCLC at the age of 70 and older, and we compared them with another group of 42 patients aged from 31 to 60. Analysing histopatological diagnoses we didn't find statistically significant differences between those two groups. The most frequent type of NSCLC was *carcinoma planoepitheliale* (78.5% vs 64.2% respectively). Among clinical manifestations on the admission, fatigue was the most frequent statistically significant (p=0.003) syndrome in the elderly patients (*Fig. 2*). Differences close to statistical significance were found in paraneoplastic syndromes which dominated in younger patients.

In 65% of the elderly patients underlying diseases were diagnosed, which siginificantly distinguished this group (p=0.03). Circulatory system diseases (56.5%) and COPD (30.4%) dominated among those patients (*Fig. 3*).

At the moment of making the diagnosis, in both groups, 3rd and 4th stage of clinical neoplastic advance was established. In the elderly patients treatment was introduced in 54.3% of the cases, whereas in the group of younger patients in 90.5% (p=0.03). Radiotherapy was a common method of treatment in the elderly, chemotherapy and concurrent radiochemotherapy in younger patients. In both groups only few patients were treated using surgical methods. What influenced the treatment was: the stage of cancer clinical advance and the presence of concomitant diseases disqualifying patients from more aggressive schemes of treatment [9]. Results of our examination confirm the necessity of an individual approach to the elderly, suffering from lung cancer, during making decisions about their treatment. It is necessary due to specific symptoms and course of disease in the elderly.

Lung cancer treatment in elderly patients

In the early stages of clinical advance of NSCLC a surgical operation is an adviseable method of treatment [6,11]. The age of the patient is not a contraindication against the operation [11,12]. If there is a possibility of total tumor excision, the survival rate is at the same level among elderly and younger patients. It was documented that lobectomy and even pneumonectomy is well tolerated by the elderly [13]. Frequent presence of respiratory and circulatory changes related to aging process and pathological changes, was an essential obstruction to the surgical treatment. Smoking, presence of COPD and circulatory system diseases increases the risk of postoperative morbidity and mortality. The most frequent cause of renouncement from surgical treatment is a poor condition of the patient and presence of concomitant diseases. Therefore, when planning surgical treatment in the elderly, it is necessary to assess their general clinical status, presence of the accompanying diseases and pulmonary status as well [13]. The neoplastic stage assessment is also necessary. Both an appropriate choice of surgical treatment and specialistic postoperative care in this group of patients are necessary [6]. Recently the progress in video-assisted thoracic surgery (VATS) techniques caused this kind of treatment to have become the alternative to standard thoracotomy in the elderly. The greatest VATS advantage is the shortening of recovery period and reduction of the number of postoperative complications [14]. At the early stage of NSCLC the radical radiotherapy is an option for the elderly patients who were disqualified from the surgical treatment [6,15,16]. Recovery is the aim of the radiotherapy [2]. Unfortunately, the results of radiotherapeutic treatment are worse than those of surgical treatment, which is confirmed by shorter survival period rate [6]. It was established that the age of the patient does not have a negative influence either on a process of the treatment or an early and late adverse effects of the radiotherapy [6]. Malnutrition is a factor which worsens the survival rate and increases the risk of postoperative death, due to secondary severe respiratory infections [17]. In the cases of local advanced cancer in the elderly, longer postoperative survival was achieved on applying concurrent radiochemotherapy. Hovewer, this sort of post-treatment toxicity indicates that radiotherapy as the only way of treatment seems to be more beneficial for the patient from this group [6]. In the advanced NSCLC radiotherapy is introduced as a paliative managment [6] with the symptoms of the NSCLC like thoracic pain, superior caval vein syndrome, haemoptysis. Chemotherapy is reserved for the advanced stages

of NSCLC and is introduced as mono- and polytherapy. It was proved that among the elderly with satisfactory functional performance, polychemotherapy is well-tolerated [10]. The adverse effects may occur more frequently in this group of patients, especially when cisplatin was introduced [6,10]. Introducing carboplatin instead of cisplatin reduced toxicity of the therapy [6]. Vinorelbine or gemcitabine single-agent chemotherapy seems to be very beneficial for the elderly [6,10,18]. Vinorelbine monochemotherapy in comparison with the best paliative care is related to the longer survival rate and improved quality of life [2,10]. Single-agent chemotherapy seems to have the same efficiency as a combination chemiotherapy and less toxicity, but it requires additional study [6]. On account of toxicity of cytostatic treatment, which occur as severe myelosuppression and infections, it is necessary to carefully qualify patients to this treatment, focusing on their performance status and presence of co-existing diseases [10]. Hematopoietic growth factors are recommended to decrease the risk of neutropenia [6].

In contrast to NSCLC, in SCLC the treatment by choice is chemotherapy with additonal thorax radiation [6,19]. In a small number of patients this results in complete recovery [6]. Retrospective surveys revealed that in the elderly lower doses of drugs are introduced, in comparison to younger patients, hovewer, effects of the treatment are similar [19]. In the elderly, the most common scheme of therapy is 2-drug chemotherapy with carboplatin and etoposide. The most frequent adverse effect of the therapy is myelosuppression. It is necessary to discuss introducing hematopoietic growth factors during therapy [6]. After achieving complete disease remission, prophylatic brain radiation is advised. Before applying this, it is necessary to assess cognitive functions. An increased number of adverse effects after brain radiation in patients with cognitive impairment was documented [6].

Conclusions

Poor outcomes of lung cancer treatment in the elderly (as in younger patients) are the result of late disease diagnosing and also much seldom applying of antineoplastic treatment due to advanced age of this population. In the past, the disqualifying criterion for surgical treatment was age over 65. Refusal of patients management only because of the age is harmful and deprives them of the chance for a longer life and of higher quality of it. The choice of the treatment in elderly must be individually considered and should be based on the stage of cancer clinical advance, clinical and functional status, concomitant diseases, nutritional status and administered drugs. The proposed management should combine predictive therapeutic benefits with less possible adverse effects. Frequent occurrence and late diagnosis of lung cancer, high mortality, low efficiency of chemo- and radiotherapy causes the necessity of newer research for more effective screening methods, more effective and safer lung cancer treatment schemes for the elderly.

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