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Lung cancer: our blood, sweat and fears

Rak płuca — nasza krew, pot i obawy

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Lung cancer has been the most common cancer in the world for many years now. According to the estimations of the International Agency for Research on Cancer there were more than 1,8 million new cases of lung cancer in 2012 worldwide. This was equivalent to 12,9% of all new cancer episodes. Importantly, the Central and Eastern Europe was the most endangered region characterized by the highest estimated age-standardized incidence of lung cancer in men in the world (53.5 per 100 000). Although the incidence rate in women was considerable lower (10.4 per 100 000) even in comparison to other parts of Europe, Northern (23.7 per 100 000) or Western (20.0 per 100 000), the trend has been consistently and alarmingly growing in recent years [1]. Likewise, the mortality data closely mirrored the incidence rates in men and women, with 47.6 and 8.3 per 100 000 respectively. Unfortunately, Polish data have been very consistent with this pattern and unfailingly one of the highest in Europe with overall incidence of 38 per 100 000 and mortality of 33.4 per 100 000. Within the last decade (2002–2012) the standardized incidence rate in men dropped by 20% and increased by as much as 25.4% in women [2]. Accordingly, mortality rates in men fell by 22% and raised by 19% in women. Not surprisingly those alarming data reflect well the current trends in cigarette smoking in Poland. In the current issue Grądalska-Lampart et al. publish very interesting in-depth analysis of the lung cancer epidemiology in the south eastern Podkarpacie region of Poland between 2002 and 2012 [3]. While statistics for this province have been considered for years as one of the most favourable in the country, the authors clearly showed that the overall national trends were mirrored quite exactly. Within the decade, the overall number of lung cancer cases in men dropped by 22.4% and increased by 22.5% in women. This was followed by similar shift in deaths; −16.6% and +21.5%, respectively. Not surprisingly, the estimated risks for lung cancer diagnosis and lung cancer related death was the highest for the age group 65+. Yet, the considerable shift by as much as two decades in the incidence peak for women demonstrated in this paper, from 80–84 age group in 2002 down to 60–64 in 2012 should be considered alarming. Also, authors very consistently demonstrated the striking differences regarding both the incidence and mortality within the region. Surprisingly, there were no clear cut differences in incidence between rural and urban counties (poviat bieszczadzki vs Rzeszów: 27.3 vs 24.1 per 100 000) as well as rural and industrialized counties (bieszczadzki vs stalowowolski 27.3 vs 20.7 per 100 000). More importantly, there were considerable variations between urban areas within the region not only in terms of incidence but more importantly mortality (Tarnobrzeg vs.

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Rzeszów vs Przemyśl: 19.3 vs 20.4 vs 29.0 per 100 000). In this regard, Przemyśl claimed the top position for both incidence and mortality due to lung cancer in south eastern Poland between 2002–2012, 35.2 and 29.0 per 100 000 respectively. Unfortunately, while this paper provides solid epidemiological data, it is not, and rightfully so, the structural systematic analysis thoroughly investigating the socio-economic issues as well as the healthcare organization details that might have contributed to those somewhat surprising and definitely alarming data.

Meanwhile, it should be clearly stated that the overall survival rates for lung cancer did not improved significantly anywhere in the world. The latest data claim 5-years survival rate at 16,8% for UK (years 2004–2010), 15.61% for Germany and 14.25% for Poland (years 2000–2007) [4, 5]. The tremendous efforts have been made in recent years to increase early identification of lung cancer patients as well as to improve the effectiveness of currently applied and novel therapeutic algorithms. The early diagnostic programs employing the low-dose CT screening have been introduced in many countries including Poland [6, 7]. While, the feasibility of screening programs directed at high-risk groups have been demonstrated, the strategy is still challenged by number of problems like high false positive rates or over-diagnosis of indolent disease [7, 8]. Recently published results of the European NELSON trial presented the new very promising approach using the three-dimensional assessment of the lung nodule for the CT screening [9]. However, the same authors clearly emphasized the urgent need to define and standardize the key screening parameters [10].

In parallel, many attempts have been made in the past decade to translate the latest achievements of molecular biology into the clinical practice. Although very promising none of the molecular signatures, free circulating DNA or circulating cancer cells have been as yet approved as the early diagnostic or prognostic biomarker for the clinical use [11, 12].

Quite opposite, the molecular diagnostics has been very rapidly evolving as the useful and reliable tool for the assessment of predictive biomarkers in oncology. At the moment, it provides information indispensable for the decision-making process on the optimal therapeutic approach in non-small lung cancer patients. The tissue evaluation in search for the EGFR gene mutations, ALK and ROS-1 gene rearrangements is currently considered the requisite part of diagnostic algorithm recommended by international and Polish guidelines [13, 14]. The Polish position paper published in 2014 very clearly states the need to include the molecular testing into the routine clinical practice [14]. The methodological recommendations announced soon after, provide Polish medical community with the complete information regarding the diagnostic process, i.e. material handling, essential molecular methods as well as the key technical and legal requirements for the laboratory performing the diagnostics [15]. Importantly, the guidelines describe the suggested diagnostic algorithm specifying in detail the recommended time-frame for respective steps as outlined in Table 1. In the current times of austerity for Polish healthcare system, the algorithm and in particular the time constraints might seem unrealistic. However, our daily practice at the National Institute of Tuberculosis and Lung Diseases in Warsaw keeps on proving that its implementation although difficult is quite feasible, as long as all involved parties: doctors, pathologists and molecular biologists are keen to cooperate. Modern standards of diagnostics and therapy necessitate the reliable and efficient decision-making process, ideally providing lung cancer patients with the earliest possible diagnosis and the optimal treatment. It would not be possible to improve the current statistics for the 5 years survival rate of lung cancer patients without determination to implement new and sometimes difficult protocols into the clinical routine.

Table 1. Diagnostic algorithm for non-small lung cancer diagnostic samples as suggested by the current guidelines [15]

PULMONOLOGIST/ONCOLOGIST Diagnostic sample simultaneously referred to the morphological and molecular evaluation*
PATOLOGIST: Diagnosis of non-small cell lung cancer characterized by the non-squamous cell or NOS (not otherwise specified) morphology Estimation of cancer cells relative number (%) in the sample reffered to molecular analysis
within 3 working days**
MOLECULAR BIOLOGIST: EGFR gene exons 18–21 assessment for the activating/ /resistance mutations. If negative evaluation for ALK gene rearrangement
within 3–5 working days (no longer than 10)

*Futher molecular diagnostic for pathologist's discretion conditional on tumor morphology

**To prepare material for molecular analyses

Conflict of interest

The author declares no conflict of interest.

References:

1. GLOBOCAN 2012. International Agency for Research on Cancer; http://globocan.iarc.fr/ (09.02.2015).
2. Baza danych Krajowego Rejestru Nowotworów. http://onkologia.org.pl/raporty/
3. Grądalska-Lampart M, Karczmarek-Borowska B, Radziszewska AU. Lung cancer in Podkarpackie region in the years 2002–2011. Pneumonol. Alergol. Pol. 2015; 83: 109–119.
4. Cancer of the Lung and Bronchus SEER Stat Fact Sheets. http://seer.cancer.gov/statfacts/html/lungb.html (09.02.2015)
5. EUROCARE-5. Survival of cancer patients in Europe. http://www.eurocare.it/ (09.02.2015).
6. Kołaczyk K, Walecka A, Grodzki T, Alchimowicz J, Smereczyński A, Kiedrowicz R. The assessment of the role of baseline low-dose CT scan in patients at high risk of lung cancer. Pol J Radiol 2014; 79: 210–218.
7. Nahorecki A, Chabowski M, Kuźniar T. et al. Low-dose computer tomography as a screening tool for lung cancer in a high risk population. Adv Exp Med Biol 2015 (Epub ahead of print).
8. Roszkowski K, Komentarz do artykułu T. Grodzkiego et al. Program wczesnego wykrywania nowotworów płuc za pomocą tomografii komputerowej — wstępne doświadczenia Szczecina. Pneumonol Alergol Pol 2009; 77: 571–572.
9. Horeweg N, van Rosmalen J, Heuvelmans M.A. et al. Lung cancer probability in patients with CT-detected pulmonary nodules: a prespecified analysis of data from the NELSON trial of low-dose CT screening. Lancet Oncol 2014; 15: 1332–1341.
10. Horeweg N, Scholten ET, de Jong P.A. et al. Detection of lung cancer though low-dose CT screening (NELSON): a prespecified analysis of screening test performance and interval cancers. Lancet Oncol 2014; 15: 1342–1350.
11. Skroński M, Szpechciński A, Chorostowska-Wynimko J. Współczesne metody wykrywania mutacji genu EGFR jako czynnika predykcyjnego dla terapii ukierunkowanej molekularnie chorych na niedrobnokomórkowego raka płuca — czy istnieje złoty standard diagnostyczny? Pneumonol Alergol Pol 2014; 82: 311–322.
12. Gesthalter YB, Vick J, Steiling K, Spira A. Translating the transcriptome into tools for the earlydetection and prevention of lung cancer. Thorax 2015; 0: 1–6. doi:10.1136/thoraxjnl-2014-206605.
13. Lindeman NI, Cagle PT, Beasley MB. et al. Molecular Testing Guideline for Selection of Lung Cancer Patients for EGFR and ALK Tyrosine Kinase Inhibitors: Guideline from the College of American Pathologists, International Association for the Study of Lung Cancer, and Association for Molecular Pathology. J Thorac Oncol 2013; 8: 823–859.
14. Jassem J, Biernat W, Bryl M. et al. Rola systemowych metod leczenia u chorych na niedrobnokomórkowego raka płuca i złośliwego międzybłoniaka opłucnej: uaktualnione zalecenia ekspertów. Pneumonol Alergol Pol 2014; 82: 133–149.
15. Krawczyk P, Chorostowska-Wynimko J, Dziadziuszko R. et al. Methodological recommendations for the diagnostics of EGFR gene mutations and ALK gene rearrangement in the selection of non-small-cell lung cancer patients to molecularly targeted therapies. Pneumonol Alerg Pol 2014; 82: 437–444.