

The challenges of oncogerontology

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Oncogerontology is a term that describes an interdisciplinary discipline dealing with the broadly understood relationship between oncology and human aging. The problems that pose a challenge for oncogerontology include, among others, the deteriorating cancer epidemiological situation, as well as the impact of the COVID pandemic on this situation, age restriction of screening tests in the elderly and the inequalities for older patients in accessing medical services and their participation in clinical trials. Data from the National Cancer Registry show an increase in the incidence and mortality of malignancies, especially in the elderly population. The epidemiological situation of cancer in Poland has been negatively affected by the COVID pandemic. New EU recommendations increase the number and quality of screening tests in the elderly. This group of patients has limited access to some oncological services and clinical trials. Artificial intelligence is an opportunity to improve diagnostics, therapy and oncology care in older patients.

Key words: cancer epidemiology, COVID pandemic, screening tests, clinical trials, artificial intelligence

Introduction

Oncogerontology is a new term that describes an interdisciplinary discipline dealing with the broadly understood relationships between oncology and human aging. Geriatric oncology is not a synonym for this term, but an integral part of oncogerontology. Problems related to geriatric oncology have been described in an excellent way in the recent series of publications by Kenig and co-authors in *Nowotwory. Journal of Oncology* started in 2019 [1].

The problems that pose a challenge for oncogerontology include, among others, the deteriorating epidemiological situation regarding malignant neoplasms in the elderly, as well as the impact of the COVID pandemic on this situation, age restrictions in screening tests for the elderly and inequalities for older patients in accessing medical services and their participation in clinical trials.

Epidemiology of cancer in the elderly

From a demographic point of view, the elderly population is divided into a third age group: 65–79 years and a fourth age group at 80 years and older [2]. Generally, the main cause of death in Poland among people over 65 years of age are: cardiovascular diseases (46%), followed by malignant tumours (23%), but in the third age group, cancer is almost as common a cause of death as cardiovascular diseases (35% versus 36%). By contrast, in the fourth age group, deaths from cardiovascular diseases predominate with cancer-related deaths accounting for 14% of all causes of death [2].

There are two interesting trends in cancer epidemiology in Poland. Since 2016, prostate cancer has been the most common cause of incidence of malignant tumours in men instead of lung cancer; in women for about 10 years, lung cancer has been the main cause of cancer mortality instead of breast

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cancer. Data from the National Cancer Registry show an increase in the incidence and mortality of malignancies, including the elderly population [3]. Data from the International Agency for Research on Cancer show that cancer mortality in Poland will increase in the coming years. Compared to 2018, in 2025 the increase in mortality from breast cancer and cervical cancer is estimated to be 8.3% and 6.7%, respectively. In the same period, the estimated increase in mortality from colorectal cancer is 11.9% in women and 17.1% in men [4].

Santucci et al. noted the growing difference in malignant cancer mortality between Western and Eastern Europe, to the detriment of Eastern Europe. This epidemiological gap is mainly caused by differences in lifestyle patterns – mainly smoking and alcohol abuse in Eastern Europe [5].

Since the development of cancer in adults takes several years, the effectiveness of health education on cancer in older people is limited from an epidemiological point of view. This education should be implemented as early as possible.

Epidemiology of cancer and COVID

The epidemiological situation of cancer in Poland has been negatively affected by the COVID pandemic, as presented in several publications.

Patt and co-authors showed that the COVID pandemic not only reduced the number of cancer cases detected, but also delayed the implementation of treatment [6]. In addition, the work of Koczkodaj et al. points out that COVID-19 has been a long-term factor that has negatively affected the epidemiology of malignant tumors, especially breast cancer, cervical cancer and colon cancer and the screening of these diseases [7]. Despite the end of the lock-down, the proportion of patients in screening tests is still lower than before the outbreak of the pandemic.

Similar conclusions emerge from the work of Olszewski et al. [8]. The authors used the infodemiology technique (Google Trends) to collect data on the interest in screening during the COVID-19 pandemic. During the first months of the pandemic, the interest in performing screening tests by the respondents decreased, which could lead to increased cancer incidence and mortality. After six months, the interest in these tests returned to pre-pandemic states.

Screening procedures

In view of the increase in cancer incidence and mortality, particularly among older people, the question arises whether the upper age limit for early detection of selected tumour diseases for which screening is carried out should be extended. However, the main goal of cancer prevention is to prevent deaths. Early detection of older people is advantageous if life expectancy is more than 5 years. When formulating guidelines, it is recommended to analyse life expectancy, the degree of efficiency and the coexistence of other diseases.

Recently published European Union screening recommendations emphasize increasing the number and quality of screening tests as the COVID-19 pandemic has had a negative impact on prevention, detection and diagnosis. By focusing on early-stage cancer detection, the proposed recommendation aims to increase the number of screening tests to cover more target groups and more types of cancer. The new recommendations also extend organized population screening for cancer to include cancers of the lung, prostate and, under certain circumstances, the stomach [9].

The recommendations aim to increase the number of screening tests for breast, colorectal and cervical cancer in order to meet the target set in the European Action Plan for the Control of Cancer of 90% of eligible respondents to have such screenings carried out by 2025. In addition, targeted screening should be extended to other types of cancer, in particular prostate, lung and stomach cancer [9].

Recommendations:

- expand the target group of breast cancer screening to women aged 45–74 (compared to the current age group 50–69),
- indicate that cervical cancer screening should be performed for human papillomavirus (HPV) in women aged 30–65 years at least every 5 years, taking into account HPV vaccination status,
- call for colon cancer screening in people aged 50–74 using the stool immunochemical method to determine any follow-up tests in the form of endoscopy/colonoscopy.

Based on the latest findings and methods, the recommendations extend structured screening to include three additional types of cancer:

- lung cancer in current heavy smokers and ex-smokers aged 50–75 years,
- prostate cancer test in men up to 70 years using a prostate antigen test and magnetic resonance imaging (MRI) as a follow-up examination,
- screening for the presence of *Helicobacter pylori* and monitoring of premalignant gastric lesions in sites with high a incidence of gastric cancer and mortality.

The recommendations pay particular attention to equal access to early detection, to the needs of certain socio-economic groups, people with disabilities and people living in rural or remote areas, in order to make the idea of cancer prevention a reality across the EU [9].

Inequality in accessing medical services for the elderly

Another challenge for oncogerontology is unequal access for older patients compared to the younger group as regards oncological procedures and participation in clinical trials. Elderly oncological patients have limited access to oncological services:

- diagnostics,

- treatment,
- screening,
- clinical tests.

This situation results from the sometimes prevailing belief that elderly patients may not tolerate some diagnostic and therapeutic procedures. This is reflected in the conscious resignation from some diagnostic procedures burdened with increased risk or choosing a sub-standard treatment procedure in oncology, especially in the systemic treatment of neoplasms: using less aggressive and less effective chemotherapy programs, and in multi-drug regimens, reducing the dose of drugs for fear of the occurrence of side effects of these medications, ultimately leading to a deterioration in treatment outcomes and, in particular, patient survival.

The situation of suboptimal diagnostics and therapy of cancer patients is best illustrated by the work of Malik et al., who showed that breast cancer patients over 71 years of age received not only limited diagnosis, but also sub-optimal oncological treatment. The authors showed that 51% of patients (383 patients), aged 71 and above, did not receive sufficient perioperative treatment (chemotherapy, radiotherapy or hormone therapy). In this group of patients, fewer axillary lymph node biopsies and mastectomies were performed [10].

The participation of older patients in clinical trials is also limited, which is puzzling, as patients aged 70 years and above account for 42% of the total cancer population, but they are under-represented in clinical trials, as their total share is only 24%. In a French study published in 2016, Le Saux et al. compared two periods: 2001–2004 and 2011–2014. The share of elderly cancer patients in France was only 19.3% (366 studies) in the first period and in the second period it significantly increased to 46.7% (718 studies) [11].

One of the latest studies published in 2022 on the participation of older people in 11 early-stage studies supervised by the French National Cancer Institute, found that patients aged 70 years and older were underrepresented in clinical trials from 2015 to 2016 compared to patients under 70 years of age (17.7% vs. 82.3%, respectively). Interestingly, patients aged 70 years and older were willing to participate in clinical trials, but did not receive such a suggestion [12].

There are three groups of factors that determine the unequal access of older people to clinical trials:

- research protocol: its structure, especially the criteria for inclusion of the patient into the study,
- patient motivation and their comorbidities,
- motivation and financial aspects of the sponsor.

The clinical trial protocols so far preferred randomized trials. However, it turns out that randomized trials are not the preferred method of answering research questions in the elderly, and alternative options should be used in this age group: prospective cohort studies or retrospective assessment from national registries [13].

Changes to the design of the trial report should include:

- a change in study endpoints: instead of assessing: response rate (RR), overall survival (OS) and progression-free survival (PFS) other parameters such as: quality of life, treatment toxicity, maintenance of functional independence, and disease-specific survival should be assessed [14],
 - loosening the inclusion / exclusion criteria,
 - decentralization of clinical trials by using: telemedicine, telephone consent, video contact, virtual treatment assessment,
 - preparation of information about the research program in a manner adapted to the patient's age: larger letters, properly prepared audiovisual materials for the visually impaired and hearing impaired people [15],
 - participation by a geriatric trained nurse in the research team.
- Many studies indicate that older patients:
- want to participate in clinical trials, even if the final result is negative or indifferent [16],
 - they are not actively looking for research in which they could participate, because nobody informs them about this possibility and they don't know how to do it themselves [17],
 - they are less likely to participate in studies in which the therapeutic arm has significant side effects that may potentially be detrimental to their quality of life [18].

Artificial intelligence

A new challenge in oncogerontology is artificial intelligence. The reasons for the use of artificial intelligence in the oncology of older people include: high mortality rates, concomitant diseases and their negative impact on quality of life, limited access to medical services, especially for those living in agricultural areas, the need for long-term care of older people.

Despite many problems associated with the use of artificial intelligence (AI) in medicine, particularly in oncology, AI will facilitate imaging and histopathological diagnostics. AI enables not only imaging and histopathological diagnostics, but also their integration with other data such as molecular and biochemical markers. Moreover, AI helps in predicting the results of treatment: response to treatment, toxicity and mortality.

Conclusions

1. Health education about cancer should be carried out at an early stage of education in order to reduce the risk of cancer among older people.
2. Elderly patients should have access to oncology services and participation in clinical trials like younger patients.
3. Artificial intelligence is an opportunity to improve diagnostics, therapy and oncology care in older people.

From the editor

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