UDC: 616.006-08-053.9
DOI: 10.52532/2663-4864-2025-1-75-415

USE OF COMPREHENSIVE GERIATRIC ASSESSMENT IN ONCOLOGY: A LITERATURE REVIEW

N.K. MYRZALIYEV[1,2], S.T. OLZHAYEV[1], B.Zh. ADJIBAYEV[1,3], A.B. ABZHALELOV[1], S.N. JOLDASSOV[1]

[1]Almaty Regional Multidisciplinary Clinic, Almaty, the Republic of Kazakhstan; ;
[2]Satbayev University, Almaty, the Republic of Kazakhstan;
[3]Kazakh-Russian Medical University, Almaty, the Republic of Kazakhstan

ABSTRACT

Relevance: *Over 60% of patients who are first diagnosed with cancer are aged 65 and older. This article analyzes the impact of Comprehensive Geriatric Assessment (CGA) on cancer treatment outcomes in elderly patients.*

The study aimed to *analyze the relationship between Comprehensive Geriatric Assessment, frailty syndrome, and cancer treatment outcomes in elderly patients.*

Methods: *An analysis of publications from the last 10 years related to the subject of this review was conducted without using language filters.*

Results: *A relationship between frailty syndrome and survival, mortality, and other outcomes in oncogeriatric patients was established. An analysis of outcome assessment measures for patients with frailty syndrome was conducted. Combinations of CGA elements applicable for the evaluation of oncogeriatric patients were highlighted.*

Conclusion: *CGA proves to be beneficial in oncogeriatric practice. It is essential to carefully select CGA elements to optimize clinical practice and solve research tasks. Further research in this field makes an important contribution to the development of oncogeriatric medicine and improving the effectiveness of cancer treatment in elderly patients.*

Keywords: *frailty syndrome, oncology, geriatrics, comprehensive geriatric assessment, intensive care.*

Introduction: According to global mortality data for 2019, more than three-quarters of the 20.4 million premature deaths among people aged 30–70 years are due to non-communicable diseases. Of every 10 people who die prematurely from non-communicable diseases, 4 die from cardiovascular diseases, and 3 die from cancer [1]. This is due to both population aging and demographic growth and increasing exposure to risk factors, key among which are tobacco, alcohol, obesity, and air pollution [2].

For example, traffic-related air pollution (TRAP) increases the risk of breast cancer and contributes to overall air carcinogenicity. However, due to the small effect size (i.e., 1.5% increase in risk for every 10 μg/m^3 increase in nitrogen dioxide (NO2) exposure) and heterogeneity across studies using surrogate variables for TRAP exposure other than NO2, the certainty of the evidence for an association between TRAP exposure and breast cancer risk remains moderate [3].

It is well known that nitric oxide (NO) plays a key role in several stages of cancer, including angiogenesis, apoptosis, cell cycle, invasion and metastasis [4].

A borderline association (odds ratio (OR) =1.4; 95% confidence interval (CI): 1.0-1.9) has been reported between breast cancer risk and childhood proximity to a road with characteristics of high exposure to traffic-related pollutants: close proximity, presence of median strip/barrier, multiple lanes, and heavy traffic [5]. Pooled estimates showed that NO_2, elemental carbon (a form of atmospheric carbon), and $PM_{2.5}$ (particles less than 2.5 micrometers in diameter) were associated with mortality from cardiovascular disease, respiratory disease, and lung cancer, with a relative risk (RR) of 1.04 (95% CI: 1.01-1.07) [6]. A meta-analysis of 14 outdoor air pollution studies in North America and Europe showed a statistically significant 9% (95% CI: 4-14%) increase in the risk of lung cancer incidence or mortality for every 10 μg/m3 increase in $PM_{2.5}$ concentration; 9 studies of PM_{10} reported an 8% (95% CI: 0-17%) increase in risk per 10 μg/m^3 [7].

A meta-analysis of seven observational studies confirmed an association between $PM_{2.5\ exposure}$ (per 10 μg/m^3 increment) and an increased risk of colorectal cancer (CRC) (OR 1.42; 95% CI: 1.12-1.79; P=0.004). Moreover, a higher Air Pollutants Exposure Score (APES) score proposed by the working group was associated with an increased risk of CRC (OR 1.03; 95% CI: 1.01-1.06; P=0.016) and worse survival (OR 1.13; 95% CI: 1.03-1.23; P=0.010), especially among participants with insufficient physical activity and ever smoking [8].

According to WHO reports, life expectancy in 2019 was 72.6 years and is expected to be 77.1 years by 2050. Older people (65 years and older) are the fastest-growing age group in the world [9]. Based on the above, the older adults (60-74 years) and senile population (75-90 years) may be potentially vulnerable to developing can-

cer, which entails the need to expand the scope of geriatric care.

Comprehensive geriatric assessment (CGA) allows for predicting the risk of severe toxic reactions to chemotherapy in older adults [10]. Based on hearing impairments identified using CGA, it is possible to predict the high toxicity of chemotherapy in elderly patients [11]. Depression, anxiety, and cognitive impairment are more common in older adults, probably due to an underestimation of their initial symptoms and inconsistent adherence to treatment [12].

Thus, selecting CGA components for assessing the functional status of oncogeriatric patients is a relevant and insufficiently studied area. This review was conducted with an emphasis on the following aspects:

– prognostic value of the CGA in common oncological diseases in the Republic of Kazakhstan (RK);

– geriatric factors influencing survival prognosis;

– CGA and assessment of therapy toxicity;

– selection of elements of the CGA for use in oncogeriatric practice;

- oncogeriatric patients in the intensive care unit (ICU).

The study aimed to analyze the relationship between Comprehensive Geriatric Assessment, frailty syndrome, and cancer treatment outcomes in elderly patients.

Objectives of the study: systematization and analysis of modern data regarding the relationship between frailty syndrome on the one hand and overall survival and mortality on the other hand in elderly cancer patients, as well as determination of CGA variants applicable in this category of patients.

Materials and methods: The articles were searched using the study keywords in the Pubmed, Web of Science, Scopus, and RINTS databases. The review included articles no older than 10 years related to the subject of this review without using language filters. The analysis included 38 articles; the relevant data were summarized as a review.

Results:

The prognosis for common oncological diseases in the Republic of Kazakhstan.

Approximately 40% of patients with CRC in developed countries are at least 75 years old [13]. The meta-analysis by S. Chen et al. (2022) included relevant cohort studies with a more than 1-year follow-up involving 35,546 patients, of whom 4,100 (11.5%) had frailty syndrome. The results showed that overall survival in patients with frailty syndrome was worse than those without frailty syndrome at baseline (OR 2.21; 95% CI: 1.43-3.41; P<0.001). Further meta-analysis with two data sets showed that frailty was also associated with worse cancer-specific survival (HR 4.60; 95% CI: 2.75–7.67; P<0.001) and recurrence-free survival (HR 1.72; 95% CI: 1.30–2.28; P<0.001) [14].

A retrospective study by S. Lee et al. (2023) examined the results of 1066 patients over 65 years of age who underwent gastric resection for gastric cancer between 2014 and 2018. All patients were divided into 2 groups: those over 80 years old – a group of elderly patients (12.8%) and those aged 65 to 79 – a group of "young" elderly people. With a median follow-up of 49.1 months, 5-year overall survival after surgery in the group of elderly patients was lower than in the group of "young" elderly (75.6% vs. 87.0%; P<0.001). However, 5-year disease-specific survival was comparable between the groups (90.1% vs. 92.2%; P=0.324). The American Society of Anesthesiologists (ASA) physical status classification, oncologic stage, and surgical tactics were independent predictors of overall survival [15].

E. Abdelfatah et al. (2023) analyzed data from 411 patients operated on for colorectal adenocarcinoma between 2011 and 2020. The mean age was 75.1 years. The mean Risk Analysis Index (RAI-A) score was 37, and 29.9% of patients had CSA. Such patients had a significantly higher rate of overall complications (30.1% vs. 14.6%; p<0.001), as well as higher rates of postoperative hospitalization for more than 30 days, the incidence of postoperative delirium, and discharge to rehabilitation. No differences in CSA were observed regarding overall, CRC-specific, or progression-free survival [16].

According to a systematic review by MR Moreno-Carmona et al. (2024), frailty syndrome in elderly patients with colon cancer is a risk factor for postoperative complications and mortality in the short (30 days), medium (3-6 months) and long-term (1 year); OR 3.67 (95% CI: 1.538.79), OR 8.73 (95% CI: 4.03-18.94) and OR 3.99 (95% CI: 2.12-7.52), respectively. Frailty syndrome also had an impact on survival with an adjusted hazard ratio (AHR) of 2.99 (95% CI: 1.70-5.2), as well as on overall and major postoperative complications with ORs of 2.34 (95% CI: 1.75-3.15) and 2.43 (95% CI: 1.72-3.43), respectively [17].

Some authors define older patients in geriatric oncology as "old" when their clinical status influences their decision-making [18]. The incidence of lung cancer increases sharply at the age of 45-49 years and peaks in the 85-89 age group for men and in the 80-84 age group for women. The average age at diagnosis in the United States is 70 years, and 68% of patients are diagnosed after age 65 [19], with challenges arising in diagnosing and treating these diseases in older adults given factors such as comorbidities, functional limitations, and difficulty taking medications [20].

The impact of frailty syndrome has also been shown for primary lung cancer. In a study of 1667 patients with primary lung cancer, 297 (17.8%) patients had frailty syndrome status according to the frailty index based on laboratory test (FI-LAB) at the time of diagnosis. The all-cause mortality rate was 61.1% (1018/1667), with a higher overall risk of death in patients with frailty syndrome, a relative risk of 1.616 (95% CI: 1.349-1.936), and a median follow-up of 650 days [21].

In a cohort study of patients with non-small cell lung cancer treated with radiotherapy, frailty syndrome was associated with lower 3-year overall survival (37.3% vs. 74.7%; p=0.003) and 3-year cumulative non-cancer death rate (36.7% vs 12.5%; p=0.02) [22].

Breast cancer remains the most common cancer in women worldwide, being the leading cause of death, while mortality rates depending on age are quite contradictory [23]. Thus, according to the reporting data of the American Cancer Society (ACS), from 2012 to 2016, the incidence rate of breast cancer increased slightly by 0.3% per year, mainly due to an increase in localization and hormone positivity. In contrast, mortality from breast cancer decreased by 40% from 1989 to 2017, with a decline rate of 1.3-1.9% [24].

The results of a French study including patients over 70 years of age with breast cancer showed that age remains a risk factor for heterogeneity in oncological practice, which requires the disclosure of specific recommendations, with geriatric covariates being the main components in the decision-making process [25].

S. Wang et al. (2022) examined 4645 publications on the prevalence of frailty syndrome among patients with breast cancer: the meta-analysis included data from 24 studies involving 13510 people. The prevalence of frailty syndrome among patients with breast cancer in individual studies ranged from 5 to 71%. The prevalence of frailty syndrome was 43% (95% CI: 36-50%; p<0.05). Subgroup analysis showed that the therapeutic method, frailty syndrome scales, age, regions, years of publication, and study quality were associated with the prevalence of frailty syndrome among patients with breast cancer and that frailty syndrome may also be characteristic of "younger" age patients and has prognostic value [26].

A retrospective cohort study by CH Yan et al. (2021) of patients with breast cancer aged ≥65 years assessed the association between pre-diagnosis frailty syndrome and the risk of breast cancer-specific and all-cause mortality in older women. Fewer women with frailty syndrome than "robust" women underwent breast-conserving surgery (52.8% vs. 61.5%) and radiation therapy (43.5% vs. 51.8%). In a multivariate analysis of the study data, the degree of asthenia was not associated with breast cancer-specific mortality (patients with frailty syndrome vs. robust patients, Relative OR 1.47; 95% CI: 0.97-2.24). However, women with BC and frailty syndrome had a higher risk of all-cause mortality than "strong" women with BC (OR 2.32, 95% CI: 1.84-2.92) [27].

Geriatric factors influencing survival prognosis.

In a prospective analysis from 2003 to 2012, JX Moore et al. (2020) examined the impact of frailty syndrome on the association between cancer survival and sepsis incidence: cancer survivors had a more than 2-fold increased risk of sepsis, and frailty syndrome rates accounted for less than 1% of this difference [28].

JC Brown et al. (2015) assessed the associations between pre-asthenia, asthenia, and mortality among 416 older adult cancer survivors (mean age 72.2 years). Mortality varied by degree of asthenia, with a median survival of 13.9 years among "robust" survivors (53.6% of total), 9.5 years among pre-asthenic (37.3% of total), and 2.5 years among survivors with frailty syndrome (9.1% of total). Preasthenia and frailty syndrome increase the risk of premature mortality in older adults who have survived cancer [29].

In the study by Bensken WP et al. (2022) for the period from 2012 to 2016, the association between mortality and primary breast cancer, colorectal cancer, lung cancer, or prostate cancer was examined in older people (n=29140). Patients with lung cancer had the highest levels of multiple comorbid conditions, multimorbidity, and frailty syndrome. After adjustment for age, sex (only for colorectal and lung cancer), and stage, a positive association was found between all these indicators and a higher risk of death. In breast cancer patients with 5 or more comorbidities, the ROR was 1.63 (95% CI: 1.38-1.93), and in those with moderate asthenia, the ROR was 3.38 (95% CI: 2.12–5.41), with the prognosis for lung cancer being worse than for breast, prostate, or CRC cancer [30].

Comorbidities measured by the Charlson Comorbidity Index (p=0.001) and Lawton-Brodie score (p=0.011); anastomotic failure (p=0.024); lymph node involvement (p=0.005); distant metastasis (p<0.001); high TNM stage (p=0.004) and anastomotic defect (p=0.013) were significant predictors of poor prognosis. Multivariate analysis of long-term survival, adjusting for age, asthenia, comorbidities, and TNM stage, showed that comorbidities (RH 1.30; 95% CI: 1.10-1.54) and TNM stage (RH 2.06; 95% CI: 1.16-3.67) were the only independent risk factors for survival at 5 years. Frailty syndrome is associated with poor short-term postoperative outcomes but does not affect long-term survival in elderly patients with colorectal cancer. In turn, comorbidities and tumor stage are predictors of long-term survival [31].

In a prospective study, E. Boutin et al. (2018) assessed the association between obesity and adverse events in older women, depending on their frailty syndrome status. The risk of death over 5 years of follow-up among asthenic women (frailty syndrome determined by the Fried method), compared with "non-frail" women with normal weight, decreased with increasing body mass index (BMI) after adjusting for age, cardiovascular drugs, hospitalization in the last 12 months, and functional status [32].

Some authors describe the "survival paradox of obese cancer patients": this study included 433 patients with a mean age of 81.2±6.0 years; 51% were women. Of all patients, 44.3% had gastrointestinal cancer, 18% had breast cancer, 14.5% had lung cancer, and 45% had metastases, while 20.3% had obesity at outcome. Obesity was independently and inversely associated with 6-month mor-

tality only in patients with metastatic lesions (Relative Risk Factor 0.17; 95% CI: 0.03–0.92) [33].

CGA and assessment of therapy toxicity.

Numerous studies have shown that adherence rates to oral chemotherapy among cancer patients range from 46% to 100% in the general population and depend on age, patient sample, drug type, follow-up period, and adherence assessment and calculation measure [7, 30, 34]. In older adults, non-adherence is facilitated by various factors. Sleep disturbances (40%) and cognitive impairment, which are present in approximately 25-47% of older cancer patients, and hearing loss in 25% of older cancer patients, contribute to the problem [35]. Older patients often have difficulty with transportation, leading to missed appointments or non-compliance with prescriptions [36].

In the study by A. Hurria et al. (2016), factors influencing chemotherapy toxicity were studied, a model was formed, and a toxicity scale was proposed. The average age of the study sample (n=250) was 73 years (from 65 to 94 years, standard deviation 5.8). The risk of toxicity increased with an increase in the risk index (36.7% – low, 62.4% – medium, 70.2% – high risk; P<0.001), while it was noted that there was no relationship between the Karnofsky index and chemotherapy toxicity (P=0.25) and the index did not work [10].

This scale allows for determining the risk of developing toxicity of stages 3–5 according to the classification of common terminology criteria for adverse events (CTCAE) [37] and determining which group of patients requires greater monitoring for adverse events.

Selection of elements of the CGA for use in oncogeriatric practice.

The choice of a set of tests for conducting the CGA in the context of practice and solving research problems also represents a challenge for physicians and researchers [38]. The frequency of frailty syndrome ranged from 23 to 97%, depending on the number of included CGA domains. J. Kenig et al. (2015) identified the CGA components that had prognostic value in a small sample of patients [39]:

1. Activities of Daily Living (ADL);
2. Instrumental Activities of Daily Living (IADL);
3. The Blessed Orientation-Memory-Concentration Test (BOMC);
4. The Clock Drawing Test (CDT-test);
5. The Folstein Mini-Mental State Examination (MMSE);
6. The Charlson Comorbidity Scale (CCS);
7. The Cumulative Illness Rating Scale for Geriatrics (CIRS-G);
8. The Geriatric Depression Scale (GDS);
9. The Timed Up and Go (TUG);
10. The Mini Nutritional Assessment (MNA);
11 Eastern Cooperative Oncology Group performance status (ECOG-PS);
12. Preoperative assessment of physical status according to ASA.

The authors identified the following combinations of tests that had prognostic value: (1) Basic set + MNA + TUG + CCS + polypharmacy (>4 or >5 drugs/day); (2) Basic set + MNA + TUG + CCS + polypharmacy (>4 or >5 drugs/day) + SSS, (3) Basic set + MNA + TUG + CIRS-G + polypharmacy (>5 drugs/day), (4) Basic set + MNA + TUG + CIRS-G + polypharmacy (>4 or >5 drugs/day) + SSS, (5) PACE (with Satariano index 2+).

The core set included ADL/IADL, GDS-15, and BOMC/CDT following the definition formulated by the International Society of Geriatric Oncology (SIOG), which states that at least the CGA for older patients with cancer should include assessment of functional status, mood, and cognitive function.

Overall, these CGA test sets are consistent with the studies described above that used these clinical tests and scales despite the heterogeneity in the choice of method for determining CSA.

Oncogeriatric patients in ICU settings.

A multicentre retrospective cohort study of adult patients admitted to the ICU between 2018 and 2022 (158 Australian ICUs, aged ≥16 years) examined the association between frailty syndrome and survival time after elective cancer surgery. For elective surgical patients, frailty syndrome was associated with lower survival (RHR 1.72, 95% CI: 1.59-1.86) and mortality at baseline up to 10 months of follow-up (RHR 1.39; 95% CI: 1.03-1.86), but this association then plateaued, and its predictive power further diminished over time up to 4 years (RHR 1.96; 95% CI: 0.73-5.28). Frailty syndrome has been associated with worse outcomes following ICU admission after elective cancer surgery, particularly in the short term [40].

For patients admitted to the ICU (166 Australian ICUs; age ≥16 years) with metastatic cancer in the study by Alamgeer et al. (2023), overall survival at 4 years was lower in asthenic patients compared with "robust" patients (29.5% vs. 10.9%; p<0.0001). Frailty syndrome was associated with shorter 4-year survival (adjusted Relative Risk 1.52; 95% CI: 1.43-1.60), and this effect was observed across all cancer subtypes. Frailty syndrome was associated with shorter survival times in patients aged <65 years (RHR 1.66; 95% CI: 1.51-1.83) and aged ≥65 years (RHR 1.40; 95% CI: 1.38-1.56), but its effect was stronger in patients aged <65 years (p<0.0001). Thus, in patients with metastatic cancer admitted to the ICU, frailty syndrome was associated with worse long-term survival [41].

A. Subramaniam et al. (2022) in their multicenter study (16 ICUs; 7001 patients; mean age 63.7 (49.1-74.0) years; mean APACHE II score – 14; 3266 patients (46.7%) were on mechanical ventilation; hospital mortality – 9.5% (n=642); annual mortality – 14.4%) compared the results of the Clinical Frailty Scales (GFS) and the Hospital Frailty Risk Score (HFRS) in critically ill patients to predict long-term survival up to one year after ICU admission. The result was that both scales have prognostic value in assess-

ing survival up to 1 year after admission to the ICU, but the GFS scale was still a better predictor of 1-year survival than the HFRS [42].

There is no doubt that traditional preoperative examination is insufficient for older adults. Therefore, widespread implementation of a comprehensive assessment of the initial geriatric status [43], particularly in cancer patients, will improve approaches to making surgical decisions and help develop optimal anesthetic safety strategies [44]. Thus, according to S. Sigaut et al. (2021), the Confusion Assessment Method (CAM) in the surgical department and the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) are proposed for assessing postoperative delirium among operated patients aged 70 years and older [45]. The following clinical tests are recommended as part of the CGA to ensure the management of surgical patients with an oncogeriatric profile [45-47]:

1. CAM-ICU;

2. Checklist For screening delirium V ICU (Intensive Care Delirium Screening Checklist, ICDSC).

In studies requiring an assessment of the impact of CGA on patients' hospital stay, the following endpoints related to patients' stay in the ICU are proposed [48-50]:

1. hours spent on artificial ventilation;

2. duration of hospitalization;

3. presence of perioperative complications;

4. cost of inpatient treatment.

It is also worth noting that the Clavien-Dindo classification of morbidity/surgical complications [51] is widely used to assess outcomes in oncogeriatric patients admitted to the ICU.

Discussion: Key data from meta-analyses and systematic reviews over the last ten years are considered, which show that the use of CGA can improve the prognosis and quality of life of elderly patients with cancer. It was also revealed that age, comorbidities, asthenia, and other geriatric aspects are associated with worsening survival and increasing mortality among cancer patients. An analysis of outcome measures in patients with frailty syndrome was conducted. Combinations of CGA elements that are applicable for assessing oncogeriatric patients are identified.

Research highlights the need to incorporate geriatric aspects into oncology practice to improve the prognosis of treatment outcomes in elderly patients. This approach ensures therapy personalization, considering each patient's health characteristics and needs.

Conclusion: This article examines the relationship between CGA and cancer treatment outcomes. Current methods of CGA application in oncogeriatrics are discussed. This identifies future research directions in oncogeriatrics and highlights the impact of CGA on ICU patient management.

Continuing research in this area is important for developing oncogeriatric medicine and improving the effectiveness of treating elderly patients with cancer. Particular attention should be paid to integrating the obtained data into clinical practice to optimize the care of cancer patients in intensive care settings.

References:

1. World Health Organization. Global Health Estimates 2020: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2019 [Internet]. World Health Organization; 2020. Date access: 14.03.2025. Address access: https://who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-leading-causes-of-death

2. Bawden A. Global Cancer Cases to Rise by More than 75% by 2050, WHO Predicts // The Guardian. – 1 Feb. 2024. https://www.theguardian.com/society/2024/feb/01/global-cancer-cases-to-rise-by-more-than-75-by-2050-who-predicts

3. Praud D., Deygas F., Amadou A., Bouilly M., Turati F., Bravi F., Xu T., Grassot L., Coudon T., Fervers B. Traffic-Related Air Pollution and Breast Cancer Risk: A Systematic Review and Meta-Analysis of Observational Studies // Cancers (Basel). – 2023. – Vol. 15(3). – Art no. 927. https://doi.org/10.3390/cancers15030927

4. Hu Y., Xiang J., Su L., Tang X. The regulation of nitric oxide in tumor progression and therapy // J. Int. Med. Res. – 2020. – Vol. 48(2). – Art. no. 300060520905985. https://doi.org/10.1177/0300060520905985

5. Shmuel S., White AJ, Sandler DP Residential exposure to vehicular traffic-related air pollution during childhood and breast cancer risk // Environ. Res. – 2017. – Vol. 159. – P. 257-263. https://doi.org/10.1016/j.envres.2017.08.015

6. Boogaard H., Patton AP, Atkinson RW, Brook JR, Chang HH, Crouse DL, Fussell JC, Hoek G., Hoffmann B., Kappeler R., Kutlar Joss M., Ondras M., Sagiv SK, Samoli E., Shaikh R., Smargiassi A., Szpiro AA, Van Vliet EDS, Vienneau D., Weuve J., Lurmann FW, Forastiere F. Long-term exposure to traffic-related air pollution and selected health outcomes: A systematic review and meta-analysis // Environ. Int. – 2022. – Vol. 164. – Art. no. 107262. https://doi.org/10.1016/j.envint.2022.107262

7. Hamra GB, Guha N., Cohen A., Laden F., Raaschou-Nielsen O., Samet JM, Vineis P., Forastiere F., Saldiva P., Yorifuji T., Loomis D. Outdoor particulate matter exposure and lung cancer: a systematic review and meta-analysis // Environ. Health Perspective. – 2014. – Vol. 122(9). – P. 906-911. https://doi.org/10.1289/ehp/1408092

8. Jiang F., Zhao J., Sun J., Chen W., Zhao Y., Zhou S., Yuan S., Timofeeva M., Law PJ, Larsson SC, Chen D., Houlston RS, Dunlop MG, Theodoratou E., Li X. Impact of ambient air pollution on colorectal cancer risk and survival: insights from a prospective cohort and epigenetic Mendelian randomization study // EBioMedicine. – 2024. – Vol. 103. – Art. no. 105126. https://doi.org/10.1016/j.ebiom.2024.105126

9. United Nations. World Population Prospects 2019: Highlights | Naciones Unidas [Internet]. United Nations; 06/17/2019. Access date: 03/14/2025. Access address: www.un.org/es/desa/world-population-prospects-2019-highlights

10. Hurria A., Mohile S., Gajra A., Klepin H., Muss H., Chapman A., Feng T., Smith D., Sun CL, De Glas N., Cohen HJ, Katheria V., Doan C., Zavala L., Levi A., Akiba C., Tew WP Validation of a Prediction Tool for Chemotherapy Toxicity in Older Adults With Cancer // J. Clin. Oncol. – 2016. – Vol. 34(20). – P. 2366-2371. https://doi.org/10.1200/JCO.2015.65.4327

11. Loh KP, McHugh C., Mohile SG, Mustian K., Flannery M., Klepin H., Schnall R., Culakova E., Ramsdale E. Using Information Technology in the Assessment and Monitoring of Geriatric Oncology Patients // Curr. Oncol. Rep. – 2018. – Vol. 20(3). – P. 25. https://doi.org/10.1007/s11912-018-0672-3

12. Xu R., Zhou X., Cao S., Huang B., Wu C., Zhou X., Lu Y. Health Status of the Elderly and Its Influence on Their Activities of Daily Living in Shangrao, Jiangxi Province // Int J Environ Res Public Health. – 2019. – Vol. 16(10). – Art. no. 1771. https://doi.org/10.3390/ijerph16101771

13. Benitez Majano S., Di Girolamo C., Rachet B., Maringe C., Guren MG, Glimelius B., Iversen LH, Schnell EA, Lundqvist K., Christensen J., Morris M., Coleman MP, Walters S. Surgical treatment and survival from colorectal cancer in Denmark, England, Norway, and Sweden: a population-based study // Lancet Oncol. – 2019. – Vol. 20(1). – P. 74-87. https://doi.org/10.1016/S1470-2045(18)30646-6

14. Chen S., Ma T., Cui W., Li T., Liu D., Chen L., Zhang G., Zhang L., Fu Y. Frailty and long-term survival of patients with colorectal cancer: a meta-analysis // Aging Clin Exp Res. – 2022. – Vol. 34(7). – P. 1485-1494. https://doi.org/10.1007/s40520-021-02072-x

15. Lee S., Lee M., Kwan S., Kim S., Park KB, Kwon OK, Park JY Surgical outcomes and survival of patients over 80 years old who had curative resection for gastric cancer // Ann. Surg. Treat. Res. – 2023. – Vol. 105(6). – P. 376-384. https://doi.org/10.4174/astr.2023.105.6.376

16. Abdelfatah E., Ramos-Santillan V., Cherkassky L., Cianchetti K., Mann G. High Risk, High Reward: Frailty in Colorectal Cancer Surgery is Associated with Worse Postoperative Outcomes but Equivalent Long-Term Oncologic Outcomes // Ann. Surg. Oncol. – 2023. – Vol. 30(4). – P. 2035-2045. https://doi.org/10.1245/s10434-022-12970-7

17. Moreno-Carmona MR, Serra-Prat M., Riera SA, Estrada O., Ferro T., Querol R. Effect of frailty on postoperative complications, mortality, and survival in older patients with non-metastatic colon cancer: A systematic review and meta-analysis // J. Geriatr. Oncol. – 2024. – Vol. 15(2). – P. 101639. https://doi.org/10.1016/j.jgo.2023.101639

18. Williams GR, Mackenzie A., Magnuson A., Olin R., Chapman A., Mohile S., Allore H., Somerfield MR, Targia V., Extermann M., Cohen HJ, Hurria A., Holmes H. Comorbidity in older adults with cancer // J. Geriatr. Oncol. – 2016. – Vol. 7(4). – P. 249-257. https://doi.org/10.1016/j.jgo.2015.12.002

19. Bravo-Iñiguez C, Perez Martinez M, Armstrong KW, Jaklitsch MT. Surgical resection of lung cancer in the elderly // Thorac. Surg. Clin. – 2014. – Vol. 24(4). – P. 371-381. https://doi.org/10.1016/j.thorsurg.2014.07.001

20. Venuta F., Diso D., Onorati I., Anile M., Mantovani S., Rendina EA Lung cancer in elderly patients // J. Thorac. Dis. – 2016. – Vol. 8(Suppl 11). – P. S908-S914. https://doi.org/10.21037/jtd.2016.05.20

21. Wang K., She Q., Li M., Zhao H., Zhao W., Chen B., Wu J. Prognostic significance of frailty status in patients with primary lung cancer // BMC Geriatr. – 2023. – Vol. 23(1). – P. 46. https://doi.org/10.1186/s12877-023-03765-w

22. Franco I., Chen YH, Chipidza F., Agrawal V., Romano J., Baldini E., Chen A., Colson Y., Hou Y., Kozono D., Wee J., Mak R. Use of frailty to predict survival in elderly patients with early stage non-small-cell lung cancer treated with stereotactic body radiation therapy // J. Geriatr. Oncol. – 2018. – Vol. 9(2). – P. 130-137. https://doi.org/10.1016/j.jgo.2017.09.002

23. Cancer Statistics Review, 1975-2015 – Previous Version - SEER Cancer Statistics Review [Internet]. SEER. – 2015. Access date: 14.03.2025. Access address: https://seer.cancer.gov/csr/1975_2015/

24. DeSantis CE, Ma J., Gaudet MM, Newman LA, Miller KD, Goding Sauer A., Jemal A., Siegel RL Breast cancer statistics, 2019 // CA Cancer J. Clin. – 2019. – Vol. 69(6). – P. 438-451. https://doi.org/10.3322/caac.21583

25. Falandry C., Krakowski I., Curé H., Carola E., Soubeyran P., Guérin O., Gaudin H., Freyer G. Impact of geriatric assessment for the therapeutic decision-making of breast cancer: results of a French survey. AFSOS and SOFOG collaborative work // Breast Cancer Res. Treat. – 2018. – Vol. 168(2). – P. 433-441. https://doi.org/10.1007/s10549-017-4607-8

26. Wang S., Yang T., Qiang W., Shen A., Zhao Z., Yang H., Liu X. The prevalence of frailty among breast cancer patients: a systematic review and meta-analysis. Support Care Cancer. – 2022. – Vol. 30(4). – P. 2993-3006. https://doi.org/10.1007/s00520-021-06641-8

27. Yan CH, Coleman C., Nabulsi NA, Chiu BC, Ko NY, Hoskins K., Calip GS Associations between frailty and cancer-specific mortality among older women with breast cancer // Breast Cancer Res. Treat. – 2021. – Vol. 189(3). – P. 769-779. https://doi.org/10.1007/s10549-021-06323-3

28. Moore JX, Akinyemiju T, Bartolucci A, Wang HE, Waterbor J, Griffin R. Mediating effects of Frailty Indicators on the Risk of Sepsis After Cancer. J Intensive Care Med. – 2020. – Vol. 35(7). – P. 708-719. https://doi.org/10.1177/0885066618779941

29. Brown JC, Harhay MO, Harhay MN The Prognostic Importance of Frailty in Cancer Survivors // J. Am. Geriatr. Soc. – 2015. – Vol. 63(12). – P. 2538-2543. https://doi.org/10.1111/jgs.13819

30. Bensken WP, Schiltz NK, Warner DF, Kim DH, Wei MY, Quiñones AR, Ho VP, Kelley AS, Owusu C., Kent EE, Koroukian SM Comparing the association between multiple chronic conditions, multimorbidity, frailty, and survival among older patients with cancer // J. Geriatr. Oncol. – 2022. – Vol. 13(8). – P. 1244-1252. https://doi.org/10.1016/j.jgo.2022.06.011

31. Artiles-Armas M., Roque-Castellano C., Fariña-Castro R., Conde-Martel A., Acosta-Mérida MA, Marchena-Gómez J. Impact of frailty on 5-year survival in patients older than 70 years undergoing colorectal surgery for cancer // World J. Surg. Oncol. – 2021. – Vol. 19(1). – P. 106. https://doi.org/10.1186/s12957-021-02221-6

32. Boutin E., Natella PA, Schott AM, Bastuji-Garin S., David JP, Paillaud E., Rolland Y., Canouï-Poitrine F. Interrelations between body mass index, frailty, and clinical adverse events in older community-dwelling women: The EPIDOS cohort study. Clin. Nutr. – 2018. – Vol. 37(5). – P. 1638-1644. https://doi.org/10.1016/j.clnu.2017.07.023

33. Pamoukdjian F., Aparicio T., Canoui-Poitrine F., Duchemann B., Lévy V., Wind P., Ganne N., Sebbane G., Zelek L., Paillaud E. Obesity survival cancer paradox in patients: Results from the Physical Frailty in older adult cancer patients (PF-EC) study // Clin. Nutr. – 2019. – Vol. 38(6). – P. 2806-2812. https://doi.org/10.1016/j.clnu.2018.12.011

34. Greer JA, Amoyal N, Nisotel L, Fishbein JN, MacDonald J, Stagl J, Lennes I, Temel JS, Safren SA, Pirl WF A Systematic Review of Adherence to Oral Antineoplastic Therapies. Oncologist. – 2016. – Vol. 21(3). – P. 354-376. https://doi.org/10.1634/theoncologist.2015-0405

35. Loh KP, Pandya C., Zittel J., Kadambi S., Flannery M., Reizine N., Magnuson A., Braganza G., Mustian K., Dale W., Duberstein P., Mohile SG Associations of sleep disturbance with physical function and cognition in older adults with cancer // Support Care Cancer. – 2017. – Vol. 25(10). – P. 3161-3169. https://doi.org/10.1007/s00520-017-3724-6

36. Pandya C., Magnuson A., Flannery M., Zittel J., Duberstein P., Loh KP, Ramsdale E., Gilmore N., Dale W., Mohile SG Association Between Symptom Burden and Physical Function in Older Patients with Cancer // J. Am. Geriatr. Soc. – 2019. – Vol. 67(5). – P. 998-1004. https://doi.org/10.1111/jgs.15864

37. CTCAE 6.0 Solicitation of Changes [Internet]. 2020. Access date: 03/14/2025. Access address: https://ctep.cancer.gov/protocolDevelopment/electronic_applications/docs/CTCAE_v6_Solicitation_Brief_Overview.pdf

38. Huisman MG, Kok M., de Bock GH, van Leeuwen BL Delivering tailored surgery to older cancer patients: Preoperative geriatric assessment domains and screening tools - A systematic review of systematic reviews // Eur. J. Surg. Oncol. – 2017. – Vol. 43(1). – P. 1-14. https://doi.org/10.1016/j.ejso.2016.06.003

39. Kenig J., Olszewska U., Zychiewicz B., Barczynski M., Mituś-Kenig M. Cumulative deficit model of geriatric assessment to predict the postoperative outcomes of older patients with solid abdominal cancer // J. Geriatr. Oncol. – 2015. – Vol. 6(5). – P. 370-379. https://doi.org/10.1016/j.jgo.2015.03.004

40. Ling RR, Ueno R., Alamgeer M., Sundararajan K., Sundar R., Bailey M., Pilcher D., Subramaniam A. FRailty in Australian patients admitted to Intensive care unit after eLective CANCER-related SURGery: a retrospective multicentre cohort study (FRAIL-CANCER-SURG study) // Br. J. Anaesth. – 2024. – Vol. 132(4). – P. 695-706. https://doi.org/10.1016/j.bja.2024.01.020

41. Alamgeer M., Ling RR, Ueno R., Sundararajan K., Sundar R., Pilcher D., Subramaniam A. Frailty and long-term survival among patients in Australian intensive care units with metastatic cancer (FRAIL-CANCER study): a retrospective registry-based cohort study // Lancet Healthy Longev. – 2023. – Vol. 4(12). – P. e675-e684. https://doi.org/10.1016/S2666-7568(23)00209-X

42. Subramaniam A., Ueno R., Tiruvoipati R., Srikanth V., Bailey M., Pilcher D. Comparison of the predictive ability of clinical frailty scale and hospital frailty risk score to determine long-term survival in critically ill patients: a multicentre retrospective cohort study // Crit. Care. – 2022. – Vol. 26(1). – P. 121. https://doi.org/10.1186/s13054-022-03987-1

43. Schipa C., Luca E., Ripa M., Sollazzi L., Aceto P. Preoperative evaluation of the elderly patient // Saudi J. Anaesth. – 2023. – Vol. 17(4). – P. 482-490. https://doi.org/10.4103/sja.sja_613_23

44. Chesney TR, Daza JF, Wong CL Geriatric assessment and treatment decision-making in surgical oncology // Curr. Opin. Support Palliat. Care. – 2023. – Vol. 17(1). – P. 22-30. https://doi.org/10.1097/SPC.0000000000000635

45. Sigaut S., Couffignal C., Esposito-Farèse M., Degos V., Molliex S., Boddaert J., Raynaud-Simon A., Durand-Zaleski I., Marcault E., Jacota M., Dahmani S., Paugam-Burtz C., Weiss E. Melatonin for the prevention of postoperative delirium after lower limb fracture surgery in elderly patients (DELIRLESS): study protocol for a multicentre randomized controlled trial // BMJ Open. – 2021. – Vol. 11(12). – Art. no. e053908. https://doi.org/10.1136/bmjopen-2021-053908

46. Boettger S., Meyer R., Richter A., Fernandez SF, Rudiger A., Schubert M., Jenewein J., Nuñez DG Screening for delirium with the Intensive Care Delirium Screening Checklist (ICDSC): Symptom profile and utility of individual items in the identification of delirium dependent on the level of sedation // Palliat. Support Care. – 2019. – Vol. 17(1). – P. 74-81. https://doi.org/10.1017/S1478951518000202

47. Sieber M., Rudiger A., Schüpbach R., Krüger B., Schubert M., Bettex D. Outcome, demography and resource utilization in ICU Patients with delirium and malignancy // Sci. Rep. – 2021. – Vol. 11(1). – Art. no. 18756. https://doi.org/10.1038/s41598-021-98200-8

48. Shahrokni A., Vishnevsky BM, Jang B., Sarraf S., Alexander K., Kim SJ, Downey R., Afonso A., Korc-Grodzicki B. Geriatric Assessment, Not ASA Physical Status, Is Associated With 6-Month Postoperative Survival in Patients With Cancer Aged ≥75 Years // J. Natl. Compr. Canc. Netw. – 2019. – Vol. 17(6). – P. 687-694. https://doi.org/10.6004/jnccn.2018.7277

49. Tarazona-Santabalbina FJ, Llabata-Broseta J., Belenguer-Varea Á., Álvarez-Martínez D., Cuesta-Peredo D., Avellana-Zaragoza JA A daily multidisciplinary assessment of older adults undergoing elective colorectal cancer surgery is associated with reduced delirium and geriatric syndromes // J. Geriatr. Oncol. – 2019. – Vol. 10(2). – P. 298-303. https://doi.org/10.1016/j.jgo.2018.08.013

50. Giannotti C., Sambuceti S., Signori A., Ballestrero A., Murialdo R., Romairone E., Scabini S., Caffa I., Odetti P., Nencioni A., Monacelli F. Frailty assessment in elective gastrointestinal oncogeriatric surgery: Predictors of one-year mortality and functional status // J. Geriatr. Oncol. – 2019. – Vol. 10(5). – P. 716-723. https://doi.org/10.1016/j.jgo.2019.04.017

51. Katayama H., Kurokawa Y., Nakamura K., Ito H., Kanemitsu Y., Masuda N., Tsubosa Y., Satoh T., Yokomizo A., Fukuda H., Sasako M. Extended Clavien-Dindo classification of surgical complications: Japan Clinical Oncology Group postoperative complications criteria // Surg. Today. – 2016. – Vol. 46(6). – P. 668-685. https://doi.org/10.1007/s00595-015-1236-x

АҢДАТПА

ОНКОЛОГИЯДА КЕШЕНДІ ГЕРИАТРИЯЛЫҚ БАҒАЛАУДЫ ҚОЛДАНУ: ӘДЕБИЕТТЕРГЕ ШОЛУ

***Н.К. Мырзалиев*[1,2], *С.Т. Олжаев*[1], *Б.Ж. Аджибаев*[1,3], *А.Б. Абжалелов*[1], *С.Н. Джолдасов*[1]**

[1]«Алматы облыстық көпсалалы емханасы» ШЖҚ МК, Алматы қ., Қазақстан Республикасы;
[2]«Қ.И. Сәтбаев атындағы Қазақ ұлттық техникалық зерттеу университеті» КЕАҚ, Алматы, Қазақстан Республикасы;
[3]«Қазақ-Ресей медицина университеті» ЖОО, Алматы, Қазақстан Республикасы

Өзектілігі: *Қатерлі ісікке жаңадан шалдыққан науқастардың 60%-дан астамы 65 жастан асқандар. Бұл мақалада егде жастағы емделушілерде жан-жақты кешенді гериатриялық бағалаудың (кейін КГБ) онкологиялық ауруларды емдеу нәтижелеріне әсерін талдау ұсынылады.*

Зерттеу мақсаты *– КГБ, қарттық астения синдромы (кейін ҚАС) және егде жастағы науқастардағы қатерлі ісіктерді емдеу нәтижелері арасындағы байланысты талдау.*

Әдістері: *Соңғы 10 жылдағы осы шолу тақырыбына қатысты жарияланымдарға талдау тілдік сүзгілерді қолданбай жүргізілді.*

Нәтижелері: *Онкогериатриялық науқастарда ҚАС көрсеткіштері мен өмір сүру, өлім және басқа нәтижелер арасындағы байланыс анықталды. ҚАС бар науқастарда нәтиже шараларына талдау жасалды. Онкогериатриялық науқастарды бағалау үшін қолданылатын КГБ элементтерінің комбинациясы анықталды.*

Қорытынды: *КГБ онкогериатриялық тәжірибеде пайдасын көрсетеді. Клиникалық тәжірибені оңтайландыру және зерттеу мәселелерін шешу үшін КГБ элементтерін таңдауда мұқият болу керек. Бұл саладағы алдағы зерттеулер онкогериатриялық медицинаның дамуына және егде жастағы онкологиялық науқастарды емдеудің тиімділігін арттыруға маңызды үлес болып табылады.*

Түйінді сөздер: *қарттық астения синдромы, онкология, гериатрия, кешенді гериатриялық бағалау, қарқынды терапия.*

АННОТАЦИЯ

ИСПОЛЬЗОВАНИЕ КОМПЛЕКСНОЙ ГЕРИАТРИЧЕСКОЙ ОЦЕНКИ В ОНКОЛОГИИ: ОБЗОР ЛИТЕРАТУРЫ

Н.К. Мырзалиев[1,2], С.Т. Олжаев[1], Б.Ж. Аджибаев[1], А.Б. Абжалелов[1,3], С.Н. Джолдасов[1]

[1]КГП на ПХВ «Алматинская региональная многопрофильная клиника», Алматы, Республика Казахстан;
[2]НАО «Казахский национальный исследовательский технический университет имени К.И. Сатпаева», Алматы, Республика Казахстан;
[3]НУО «Казахстанско-Российский Медицинский Университет», Алматы, Республика Казахстан

Актуальность: *Более 60% пациентов, у которых впервые диагностировано онкозаболевание, находятся в возрасте 65 лет и старше. Данная статья представляет анализ влияния комплексной гериатрической оценки (КГО) на результаты лечения онкологических заболеваний у пожилых пациентов.*

Цель исследования *– анализ взаимосвязи между КГО, синдромом старческой астении (ССА) и результатами лечения онкологических заболеваний у пожилых пациентов.*

Методы: *Был проведен анализ публикаций за последние 10 лет, относящихся к тематике данного обзора, без применения фильтров по языку.*

Результаты: *Выявлена связь между показателями ССА и выживаемостью, смертностью и иными исходами у онкогериатрических пациентов. Проведен анализ мер оценок исходов у пациентов с ССА. Выделены комбинации элементов КГО, которые применимы для оценки онкогериатрических пациентов.*

Заключение: *КГО демонстрирует пользу в онкогериатрической практике. Необходимо тщательно подходить к отбору элементов КГО для оптимизации клинической практики и решения исследовательских задач. Дальнейшие исследования в этой области представляют важный вклад в развитие онкогериатрической медицины и повышение эффективности лечения пациентов с раком в пожилом возрасте.*

Ключевые слова: *синдром старческой астении (ССА), онкология, гериатрия, комплексная гериатрическая оценка (КГО), интенсивная терапия.*

Transparency of the study: *The authors take full responsibility for the content of this manuscript.*
Conflict of interest: *The authors declare no conflict of interest.*
Funding: *The study was funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (grant No. BR21881908 "Complex of environmental support for urban agglomeration"), one fragment was carried out within the framework of the project BR27310319 "Development of preventive and rehabilitation programs to improve the quality of life of the population in the post-COVID period" (PCF of the Ministry of Health of the Republic of Kazakhstan).*
Authors' input: *contribution to the concept – Myrzaliev N.K., Olzhaev S.T.; scientific design – Olzhaev S.T., Myrzaliev N.K., Adzhibaev B.Zh.; execution of the declared scientific research – Myrzaliev N.K., Adzhibaev B.Zh., Dzholdasov S.N., Abzholdasov A.B.; interpretation of the declared scientific research – Myrzaliev N.K., Olzhaev S.T.; creation of the scientific article – Myrzaliev N.K., Adzhibaev B.Zh., Abzholdasov A.B., Dzholdasov S.N.*
Authors' data:
Myrzaliyev N.K. (corresponding author) – Head of the Department of Anesthesiology and Resuscitation, "Almaty Regional Multidisciplinary Clinic"; Junior Researcher, K.I. Satpayev Kazakh National Research Technical University; Almaty, Republic of Kazakhstan, e-mail: nurkanat.myrzaliev@gmail.com, tel.: +77753947926, ORCID: 0009-0005-4381-5909;
Olzhayev S.T. – PhD, Director of "Almaty Regional Multidisciplinary Clinic", Almaty, Republic of Kazakhstan, tel.: +77017749999, e-mail: s.olzhayev20@gmail.com, ORCID: 0000-0002-3312-323X;
Adjibayev B.Zh. – PhD, Deputy Director for Treatment, "Almaty Regional Multidisciplinary Clinic"; Senior Lecturer, Department of Internal Medicine; National Educational Institution "Kazakh-Russian Medical University"; Almaty, Republic of Kazakhstan, tel.: +77011495856, e-mail: 87011495856@mail.ru, ORCID: 0000-0003-0756-0273;
Abzhalelov A.B. – Head of the Surgical Unit of the State Clinical Hospital on the Right of Economic Management "Almaty Regional Multidisciplinary Clinic", Almaty, Republic of Kazakhstan, tel.: +77779603476, e-mail: asiko84@bk.ru, ORCID: 0009-0003-7221-135X;
Joldassov S.N. – resident physician, Department of Anesthesiology and Resuscitation, KGP on the Right of Economic Management "Almaty Regional Multidisciplinary Clinic", Almaty, Republic of Kazakhstan, e-mail: rpg.96@mail.ru, tel.: +77088160713, ORCID: 0009-0000-2570-3659.

Address for correspondence: Myrzaliev N.K., Municipal State Hospital at the Almaty Regional Multidisciplinary Clinic, st. R. Baglanova 69A, Almaty 050010, Republic of Kazakhstan.