ABSTRACTS

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ABSTRACTS OF THE CONFERENCE «ASSESSMENT OF QUALITY OF LIFE IN CANCER PATIENTS COVERED IN EXPERIMENTAL AND CLINICAL ONCOLOGY PUBLICATIONS: CHALLENGES AND OPPORTUNITIES», October 3-4 2024, Kyiv

EVALUATION OF mRNA AND PROTEIN PROFILES OF IL-6 AND IL-10 AS BLOOD BIOMARKERS FOR BREAST CANCER PROGNOSIS

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Aim: According to the World Health Organization, more than 2.3 million cases of breast cancer (BC) are registered every year, making it the most common type of cancer among the female population. Therefore, it is important to identify new markers that, independently or in combination with other known indicators, could reveal additional mechanisms of tumor growth and become the basis for evaluating the key factors of the progression of the tumor process. The purpose of this work was to investigate the expression profile of serum IL-6 and IL-10 on clinical material and to substantiate the expediency of its use to assess the aggressiveness of the BC course. **Methods:** The study included the results of clinical examination and treatment of 60 women who received inpatient treatment at the Kyiv City Clinical Oncology Center during 2013—2016 and gave informed consent for the use of clinical data for scientific purposes. Real time PCR was used to study mRNA expression. Levels of IL-6 and IL-10 proteins were assessed using ELISA method. Statistical processing of the obtained results was performed using the Statistica 6.0 program of the company "Statistica Inc." (USA) taking into account the nature of the distribution of the received data. **Results:** We determined that the expression levels of IL-6 and IL-10 mRNAs in blood serum were 1.43 and 1.5 times higher in patients with distant metastases, compared to patients without the ones. It was shown that the development of the metastatic process in the bones in BC patients was associated with an increase in the protein level of IL-6 in the blood serum by 1.5 times ($p < 0.05$) and a decrease of IL-10 by 1.8 times ($p < 0.05$), compared to patients without metastatic bone lesions. **Conclusion:** Evaluation of mRNA and protein profiles of IL-6 and IL-10 as blood biomarkers of BC course established that a significant imbalance of mentioned cytokines in the serum of BC patients was associated with formation of distant metastases. **Funding:** Research program of the NAS of Ukraine "The Role of Bone Remodeling Markers in the Formation of Malignancy Degree of the Most Common Hormone-Dependent Tumors" (0118U005468).

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TUMOR MICROENVIRONMENT ASSOCIATED miR-106a-5p EXPRESSION FEATURES IN PATIENTS WITH PROSTATE CANCER

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Background: Prostate cancer (PCa) demonstrates diverse clinical outcomes, and its high prevalence underscores the urgent need for reliable prognostic markers for clinical application. In this context, increasing attention is being directed toward the tumor microenvironment (TME) as a critical factor in the progression of malignant tumors. It has been established that miRNAs play a significant role in modulating the TME. In our previous studies, we identified a group of TME-associated miRNAs, including miR-7-5p, miR-19a-3p, miR-23b-3p, miR-30a-3p, miR-30e-3p, and miR-106a-5p, in PCa patients. **Aim:** To evaluate the prognostic significance of TME-associated miRNA-106a-5p expression in the tumor tissue of PCa patients. **Materials and Methods:** The levels of miRNAs in the tumor tissues of 40 PCa patients who were treated in the National Cancer Institute (Kyiv, Ukraine) in 2015—2021 were assessed using qRT PCR. **Results:** The analysis of the study results revealed a heterogeneous expression pattern of miRNA-106a-5p in PCa patients. The mean expression level was 0.31 ± 0.09, with individual values ranging from 0.01 to 2.92. Notably, the expression levels of this miRNA were significantly higher in patients without metastases in the regional lymph nodes. The tumor expression of miRNA-106a-5p was significantly higher ($p < 0.05$) in patients with Gleason score ≤ 7 compared to those with Gleason score > 7. However, no association was found between miRNA-106a-5p expression levels and either the TNM classification category T or serum PSA levels. **Conclusions:** The obtained data indicate that low expression of miR-106a-5p is associated with a poor prognosis in PCa patients, highlighting the need for further research into its potential use as a marker for predicting disease progression. **Funding:** This work was funded by the research program of the NAS of Ukraine "Study of the Reactive Microenvironment as a Factor in the Progression of Prostate Cancer" (0122U002081).

REDOX STATE OF BLOOD AND MENOPAUSAL STATUS OF BREAST CANCER PATIENTS WITH OBESITY

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Introduction: Obesity increases the risk of developing malignant tumors and worsens the course of the disease. Personalized approaches to the treatment of overweight cancer patients will improve the effectiveness of therapy and the quality of life of patients. Data on the association between the risk of breast cancer (BC) and overweight indicate a dependence on menopausal status. In obesity, adipose tissue is characterized by mitochondrial dysfunction, which leads to increased oxidative stress and changes in the redox status of organs and tissues, which contributes to tumor progression. **Aim:** To investigate the levels of ceruloplasmin (CP), transferrin (TF), NO-hemoglobin (NO-Hb), superoxide radical (SR) generation rate, and total activity of matrix metalloproteinases-2 and -9 (gelatinases) in the blood of obese BC patients depending on menopausal status. **Object and Methods:** Blood samples of 70 women with BC were studied. The methods used were EPR spectrometry, polyacrylamide gel zymography, general clinical and statistical methods. **Results:** It was found that changes in blood redox status in obesity are associated with the menopausal status of BC patients. Thus, in premenopausal patients, SR generation rates in the blood at normal weight and obesity did not differ, while in postmenopausal patients, there was a significant difference ($p < 0.05$) (1.5 times) between them. There was no relationship between the total activity of gelatinases and the presence of overweight in premenopausal patients, while in postmenopausal patients, a direct positive correlation between this indicator and body mass index (BMI) was found ($k = 0.58$; $p < 0.05$). The difference between the levels of CP and TF in obesity and normal weight in patients of reproductive age was not significant ($p > 0.05$), while in postmenopausal patients, the blood CP content was 1.8 times higher and TF content was 2.3 times lower in the presence of obesity compared to overweight. Also, for postmenopausal patients, in contrast to premenopausal patients, there was a high correlation of NO-Hb with BMI ($k = 0.63$; $p < 0.05$). **Conclusions:** It is known that estrogen metabolites additionally disrupt the balance in the redox state of adipose tissue, thereby contributing to the deepening of systemic oxidative stress. It is likely that in the post-reproductive age, obesity is a significant prooxidant factor that creates the basis for the unfavorable course of BC. The results obtained indicate the prospects of searching for and studying factors that determine the paradoxical effect of obesity on the course of BC as promising prognostic markers for personalized approaches in anticancer therapy and improving the quality of life of patients.

DIAGNOSTIC AND PROGNOSTIC VALUE OF SLAMF1/CD150 EXPRESSION IN HEMATOLOGICAL MALIGNANCY

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The SLAMF1/CD150 receptor is a founder of signaling lymphocyte activation molecule (SLAM) family of cell-surface receptors that is widely expressed on the normal cells of hematopoietic system with upregulated level on activated T and B cells. CD150 is not only a silence marker, since could be involved in cell fate regulation as costimulatory and adhesion molecule. In contrast to normal immune cells counterparts, many studies have shown that CD150 is aberrantly expressed on the surface of malignant hematopoietic cells indicating on its possible diagnostic or prognostic value. CD150 cell surface expression is restricted to cutaneous T-cell lymphomas, few types of B-cell non-Hodgkin's lymphoma, near half of cases of chronic lymphocytic leukemia (CLL), Hodgkin's lymphoma (HL), and multiple myeloma (MM). Our studies found that CD150 is expressed and colocalized with CD180 in nearly half of CLL cases on the cell surface of malignant B cells while in the rest of CLL cases these receptors were found exclusively in the cytoplasmic compartment. Both CD150 and CD180 expression is associated with *IGHV* mutated status and favorable clinical outcome of CLL patients, however we postulate that only simultaneous expression and ligation of these receptors on malignant CLL B cells may result in inhibition of pro-survival Akt and MAPK signaling pathways that underlie restriction of neoplastic CLL B cells propagation. Moreover, CD150 is an active player in pathogenesis of HL and CLL due to its involvement in the regulation of not only tumor cell biology but also maintaining tumor microenvironment. We have found that CD150 is a marker of $CD45^{-}$, $CD38^{+}$, $CD138^{+}$ bone marrow malignant plasma cells of patients with MM. CD150 expression at the high level is a unique feature of M3 acute myeloid leukemia (AML) subtype and may serves as an additional phenotype marker for the identification of blast cells with impaired maturation at the promyelocyte stage. For the first time CD150 was detected on the malignant cells in patients with marginal zone lymphoma in the stage of leukemia where its expression correlates with CD19, CD20 and CD79b. Thus, accumulation of our data allows to assume that differential CD150 expression could be used for improving diagnostics of MM, AML, marginal zone lymphoma and CLL prognosis. Moreover, CD150 may be a target for antibody-based or measles virus oncolytic therapy in hematological malignancies where it is an active player of tumor cell maintenance.

TRANSFORMATION OF SOCIAL QUALITY OF HEALTHCARE DURING WARTIME

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Introduction: The war has a devastating impact on the social quality of healthcare, significantly undermining societal stability. Military actions cause a change in the social quality of healthcare, in particular through the destruction of infrastructure and the limitation of access to necessary services, which, in turn, can become an additional trigger of social and economic instability. **The purpose of the study** was to determine the projections of the impact of the war on the social quality of healthcare in Ukraine. **Object and Methods:** Based on the social quality model, pressure factors causing shifts in the architecture of social quality in Ukraine's healthcare during the war have been identified. **Results:** The research revealed the main pressure factors that caused the transformation of the architecture of social quality in healthcare. Key factors included the reduced availability of medical services due to the destruction of healthcare facilities, as well as the health workforce migration, an increase in the number of people with disabilities due to the war, and a reduced fiscal space for healthcare. However, a comparative analysis of the density of the health workforce in Ukraine and other countries affected by warfare revealed significant advantages for the Ukrainian case. Ukraine has maintained an extensive network of healthcare facilities, which contributes to the support of social quality during wartime. Despite the narrowing of fiscal space in Ukraine due to decreased budget revenues, the government continues to finance primary, secondary, and highly specialized healthcare as a crucial investment in human capital, even amidst ongoing warfare. To improve social quality and alleviate the burden on the budget system, it is essential to adopt new conceptual approaches to healthcare development. One of them is the concept of personalized medicine, which aims not only to enhance quality of life but also to reduce healthcare expenditure through early detection, accurate assessment, and increased efficiency in medical services. An important part of the conceptual approach to the post-war development of healthcare should be the monitoring of social quality of healthcare, which should become an integral component of the post-war architecture of economic and social recovery. This monitoring will apply a specific set of Indicators Dashboard aimed at evaluating progress in developing high-performance, financially sustainable, and people-centered healthcare. **Conclusions:** For the long-term societal development, a crucial aspect will be the post-war reconstruction of all components of social quality architecture of healthcare in Ukraine, which should be constructed on the basis of an analysis of the transformative shifts that occurred during the war. Considerable attention should be paid to the development of personalized medicine in post-war recovery. Moreover, this architecture

should bolster the resilience of the national healthcare and respond to the megatrends of societal development, including population aging and technological challenges for healthcare, such as digitalization and artificial intelligence.

REPRODUCTIVE HEALTH OF WOMEN ON THE FRONT LINE: CONSEQUENCES OF MILITARY STRESS

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Introduction: As of March 1**,** 2023, 60,538 women were serving in the Armed Forces of Ukraine. This number increased by 2.5 times from the beginning of the military conflict in 2014. Approximately 5,500 women are serving directly on the front lines. The stress and burdens associated with the war negatively impact women's health, increasing the incidence of diseases, which in the short term not only causes discomfort in performing military duties but also reduces productivity and quality of life. In the long term, this may pose a threat to reproductive potential. **Objectives and Methods:** To assess the symptoms of reproductive system disorders that have emerged in women serving in the military since February 24, 2022. Using online and in-person surveys, we surveyed 210 women aged 32.15 ± 3.7 years (21—42) who served in combat zones (n = 37), in the rear (n = 79), and in headquarters positions (n = 94). Statistical analysis of respondents' answers was performed. **Results:** The most common symptom since the start of the full-scale invasion on February 24, 2022, has been menstrual cycle disorders, which developed in 37.6% of women. 22.9% of women began complaining of chronic pelvic pain and painful menstruation. Excessive menstrual bleeding troubled 8.6% of the servicewomen. Among them, combined complaints were reported by 29.0%. It is also worth noting that body weight changed significantly for many respondents, with 45.7% reporting noticeable weight gain and 26.7% reporting weight loss. **Conclusions:** Menstrual cycle disorders and chronic pelvic pain are the leading symptoms of reproductive system disorders among Ukrainian servicewomen, highlighting the need for timely diagnostics, treatment, and prevention methods for conditions presenting with these symptoms.

PSYCHOLOGICAL TRAUMATIZATION AND QUALITY OF LIFE OF MEDICAL STAFF WORKING IN KHARKIV UNDER THE CONDITIONS OF THE WAR DURING 2022—2023

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Background: The State Organization "Grigoriev Institute for Medical Radiology and Oncology of the National Academy of Medical Sciences of Ukraine" is one of the leading cancer care institutions that provides services to the patients in Eastern Ukraine during the war. During the full-scale invasion, the workload on doctors increased by 25% due to internally displaced cancer patients. The increased level of mental load on oncologists who are working in Kharkiv under constant shelling induces distress and eventually leads to emotional burnout and mental and physical fatigue, which results in lower quality of medical services. **The purpose of the work** was to assess the level of psychological traumatization and quality of life of medical staff of cancer care departments working in the front-line region during the war in Ukraine. **Object and Methods:** 88 workers (41 doctors and 47 nurses) of the clinic of the institute were examined. We used the Distress Thermometer, the Resilience Scale, MBI, and SF-36. The study was dynamic: the participants' score was assessed over time. The first examination was performed in July of 2022, and the second one — in February of 2023. **Results:** It was found that the examined oncologists had moderate level of stress resistance (20.99 ± 2.65) despite the burdening factors of the war in Kharkiv region. 65.91% of the examined individuals had moderate level of stress resistance, and 32.95% had high level of stress resistance, which is an indicator of high professional skills and potential for overcoming stressful situations. Medical staff constantly received psychological support during this period. During the studied period, we established a decrease in the level of emotional distress by 23.09% ($p < 0.01$). In 2023, 94.32 % of medical workers had moderate and low levels of emotional distress. A significant decrease in the frequency of occurrence of such mental and physical problems as anxiety (53.66% *vs.* 78.05 % in 2022), fear (24.39 % *vs.* 58.54 %), depressive symptoms (12.20 % *vs.* 26.83 %), sleep disorders (26.83 % *vs.* 60.98 %), and eating disorders (7.32 % *vs.* 29.27 %) was observed. The scores on the Physical and Role Functioning, the Mental Health, and the Vitality scales tended to increase. **Conclusions:** The performed analysis of the obtained data allowed us to make a conclusion about the necessity of implementing a complex system of psychological support for medical staff of cancer care departments to improve the effectiveness of medical services provided and increase the overall quality of life of medical staff.

COMBINED APPROACH TO THE DIAGNOSIS OF HEMATOLOGICAL MALIGNANCIES IN UKRAINE: A SINGLE-CENTRE EXPERIENCE

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According to the data of the Bulletin of the National Cancer Registry of Ukraine, the cancer incidence in Ukraine increases steadily. Nevertheless, one may suspect that the incidence of hematoblstoses in Ukraine may be underrated. One of the reasons lies in the insufficient level of the diagnostic work-up resulting in the undercounting of the newly diagnosed patients with hematological malignancies. Moreover, several clinical entities such as myelodysplastic syndromes (MDS) and myeloproliferative neoplasms (MPN) were for a long time overlooked as malignancies as such.

In 1996—2021, the Oncohematology Department of IEPOR headed by Prof. D. Gluzman provided precise diagnostic work-up for more than 30 thousand patients all over Ukraine verifying more than 11.1 thousand oncohematological diagnoses (male/female ratio 5,959/5,151). The following diagnoses were made: acute lymphoid leukemia (557/473), non-Hodgkin lymphoma (826/756), plasma cell neoplasms (139/154), chronic lymphocytic leukemia (1,749/1,121), other lymphoproliferative diseases (524/373), acute myeloid leukemia (1,465/1,622), myelodysplastic syndromes (280/325), chronic myeloid leukemia (127/102), and other myeloproliferative neoplasms (292/225). The complex analysis of the morphological and cytochemical features and immunophenotypes of the pathological cells and their identification in both peripheral blood and bone marrow samples was provided based on innovative technologies. The main forms and cytological variants of hematological malignancies were diagnosed according to the FAB and WHO 2008 classifications and partially revised based on the archive samples according to the WHO 2017 classification. In particular, the effective diagnosis of such MPN forms as polycythemia vera, essential thrombocythemia, and primary myelofibrosis was provided. These diseases make up to 20% of the hematolymphoid tumors in the developed countries while in Ukraine their diagnosis is far from being satisfactory.

The annual number of MDS diagnoses grew rapidly, although such abrupt growth seems to be a consequence of the increased alertness to MDS. The overall number of adult patients with various MDS forms diagnosed at the Oncohematology Department of IEPOR in 1996—2021 totaled to 629, and the proportion of MDS in the total number of the cases of oncohematological pathology increased from 1.8% in 1996 to 6.2% in 2021. The trend of decreasing medium age of MDS patients at presentation could also be followed throughout all 25-year period of observation.

The developed novel immunoenzymatic technologies combined with morphological, cytochemical, and phenotypical analyses should be used for a refined diagnosis of hematolymphoid neoplasms and their practical implementation in the healthcare facilities of Ukraine. The precise laboratory diagnosis of the hematolymphoid neoplasms accounting for the criteria of the WHO classification will contribute to the effective treatment and improvement of the quality of life of patients with oncohematological diseases.

INFORMATION SYSTEM FOR PRELIMINARY DIAGNOSIS BASED ON MEDICAL QUESTIONNAIRES

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Trends in modern medicine are associated with the achievements of 4P medicine. The concept of the new area of medicine is focused on the individual health and is based on the preclinical detection of diseases. The main features of the new concept are diagnostic methods of examination based on information technology. Information technologies provide tools for the development of express diagnostics in various fields of medicine. The patient's quality of life (QoL) is considered a primary indicator for comparing different methods of patient's management and determining optimal treatment programs in terms of their effectiveness and cost. The main tools of assessing QoL for today are questionnaires. The **aim** of the work was to develop appropriate hardware and software for automated QoL assessment. We used a specialized device developed at the Institute of Cybernetics with special application software based on a mobile tablet computer called a medical information communicator. These software tools are intended to be combined into an information system designed to work with various medical questionnaires. A software tool for assessing the QoL based on MOS SF-36 questionnaire was developed. The mobile application is designed to detect abnormalities in the menstrual cycle, including changes in the regularity and frequency of menstruation, duration of bleeding, amount of blood loss, and pain, which may be symptoms of various gynecological diseases. It is based on a questionnaire which was developed in the State Scientific Institution "Center for Innovative Medical Technologies of the National Academy of Sciences of Ukraine". **Conclusions**: Original software tools for assessing the QoL have been developed as well as an information system for preliminary diagnostics based on medical questionnaires. It includes new algorithms and software for a medical information communicator with questionnaires for assessing the QoL and identifying deviations from the normal menstrual cycle. This makes it possible to assess the patient's health status remotely and reduce the time required to process the survey data.

QUALITY OF LIFE OF PATIENTS WITH KIDNEY CANCER DEPENDING ON SURGERY TYPE

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Introduction: Quality of life (QoL) is observed as one of the key points in evaluating efficacy of different surgical types. Accounting the growth of life expectancy, this parameter has an increasing clinical role. **Aim**: To evaluate the QoL of patients with kidney cancer depending on the surgery type. **Materials and Methods:** We performed a retrospective cohort study of 1378 patients with localized RCC surgically treated in 2008—2020. Further analysis was done based on 511 selected cases (T1-T2 N0 M0). Partial nephrectomy (PN) cohort consisted of 422 (82.5%) patients, radical nephrectomy (RN) — of 89 (17.4%). To assess the QoL both before surgery and 3, 6, 9, and 12 months after it, we used the SF-36 questionnaire (Medical Outcomes Study 36-Item Short-Form Health Survey). **Results**: Cohorts were comparable by age, sex, ECOG, BMI, Hgb level, eGFR, and serum creatinine; patients were with chronic kidney disease and concomitant pathologies. There was found a statistical difference in terms of local stage ($x^2 = 98$; $p < 0.01$), tumor size (39.5 mm *vs.* 63 mm (Mann — Whitney; $p < 0.01$)), and functioning parenchyma volume M ± SD (95% CI) 86.4 ± 11.6 (85.3—87.5)% *vs.* 61.5 ± 19.2 (57.2—65.7)% (Mann — Whitney; $p < 0.01$) in favor of partial nephrectomy. The median follow-up was 28.9 months (3 to 131 months). Groups were comparable by the QoL data prior to surgery. Control QoL evaluation was done 1 year after surgery in 347 (67.9%) patients (56 cases were lost for follow-up; 104 patients did not undergo the QoL assessment and 4 died). Data showed the prevalence of PN in 5 sections: PF — 75 [65; 85] after nephrectomy *vs.* 80 [70; 90] after PN ($p < 0.005$); GH — 65 [57; 72] *vs.* 70 [65; 80] ($p < 0.001$), VT — 65 [55; 70] *vs.* 70 [60; 75] ($p < 0.005$), MH — 76 [60; 80] *vs* 80 [68; 88] ($p < 0.005$), and RE — 66.7 [66.7; 100] *vs.* 100 [66.7; 100] ($p < 0.05$) accordingly. **Conclusion:** Partial nephrectomy has a prevalence over radical nephrectomy in terms of the QoL mainly due to psychological health parameters ($p < 0.01$). Nevertheless, there was no difference in pain intensity, social functioning, and physical-role functioning.

CLINICAL ASPECTS OF IMPLEMENTING METFORMIN INTO SYSTEMIC PREOPERATIVE TREATMENT OF BREAST CANCER

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Introduction: Quality of life (QoL), in particular during neoadjuvant chemotherapy (NACT), is a surrogate endpoint in many studies. Modern treatment regimens for breast cancer (BC) are numerous and influential, but the side effects associated with various treatment methods and their impact on the QoL differ. Thus, treatment strategies' optimal stratification and ranking should focus on individual risk profiles and the patient's QoL. The primary symptoms affecting QoL are crucial physical symptoms such as diarrhea, nausea, general weakness, allergic reactions, neuropathy, and stomatitis. Metformin has shown its advantage in increasing the rate of complete morphological response to 43.7% (HR = 0.4366, 95% CI = 0.6654—0.2077, $p < 0.0001$). However, the toxicity profile is still being studied due to the surrogacy of the study's control points. **The aim:** To investigate the prevalence of symptoms associated with worsening overall tolerability and determine their dependence on adding metformin to NACT. **Materials and Methods:** The study included 127 patients undergoing NACT who filled out a QoL assessment form and indicated symptoms associated with the treatment. The statistical method for analysis was the Mann — Whitney U-test for comparing groups and Friedman's test for determining overall tolerability without considering study groups. **Results:** Diarrhea was significantly identified only during the 1st course of treatment, defined as the first contact with metformin (U statistic = 2084, $p < 0.05$) and according to the CTC-AE 5th edition was of grade 1 in 39% (n = 50), grade 2 in 5.4% (n = 7), and grade 3 in 1.5% (n = 2), which was also evident when determining the odds (OD 3.1354, 95% CI: 1.2409—7.9223, $p < 0.05$). The correlation between the dosages of metformin was 0.21 ($p = 0.01$). Starting from the second course of treatment, no significance between the groups was found ($p > 0.05$). In the analysis of the symptoms of nausea, there was no statistically significant difference between the groups ($p > 0.05$). Also, no significant differences were found between the groups of patients taking metformin and those not taking it in the development of peripheral polyneuropathy ($p > 0.05$), deterioration of condition according to the ECOG scale ($p > 0.05$), development of stomatitis ($p > 0.05$), and neutropenia ($p > 0.05$). Friedman's analysis revealed statistical variability between treatment courses for all the symptoms above ($p < 0.001$), which has clinical significance in their management. **Conclusions:** Considering the already proven advantages of adding metformin to NACT, special attention should be paid to the symptoms of diarrhea, and patients should be informed about the risks of its development and management methods. Metformin increases the toxicity profile of standard adverse events but does not lead to deterioration in the QoL.

EXPERIENCE OF THE «PRYKARPATSKY CLINICAL ONCOLOGY CENTER» IN IMPROVING THE PATIENTS' QUALITY OF LIFE

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Introduction: Health-related quality of life (QoL) is an important tool that allows us to evaluate the results of treatment of patients, rehabilitation programs, and medico-social adaptation of patients, complementing traditional methods both at the individual and group levels. The study of the QoL in medicine has a wide range of applications, including standardization of treatment methods, individual monitoring of the condition of patients, evaluation of treatment results, and effectiveness of preventive programs. Oncology rehabilitation is important to support both the physical and emotional health of patients, as cancer treatment can be very intense and exhausting. **Methods**: The work of rehabilitation care for cancer patients at the Prykarpatsky Clinical Oncology Center began in 2016. The information from the first 9 months of 2016 and 2024 was used for the comparative analysis. **Results**: The first group (2016) of rehabilitation support workers totaled 3, including 2 psychologists and 1 nurse. The total number of the second group of employees (2024) is 11, among them 2 psychologists, 2 ergotherapists, 1 assistant ergotherapist, 2 physical rehabilitation doctors, 1 speech therapist, 1 chaplain, and 2 nurses. In comparison, the number of rehabilitation workers at the Prykarpatsky Clinical Oncology Center has increased significantly, which ensures high efficiency of patients' care. The next aspect for consideration was the dynamics of patients' admission from 2016 to 2024 (the first 9 months of the year). Patients were provided with psychological and physical assistance, which was noticeably increasing each year. In 2016, rehabilitation was provided to 78 patients, of whom physical rehabilitation was provided to 48 patients and psychological rehabilitation to 30. By comparison, in 2024, the total number of patients was 124, of whom physical rehabilitation was provided to 53 patients and psychological rehabilitation to 71. According to the report for 9 months of 2024, 696 patients participated in physical therapy classes, while 542 patients received therapeutic massage procedures. **Conclusions:** Summarizing the results, the number of employees increased by 3.6 times from 2016 to 2024, which indicated an increase in the efficiency of providing care to patients. The number of patients who received rehabilitation within 9 months of 2024 doubled compared to 2016. In 2024, 696 physical therapy procedures and 542 massages were provided to patients, emphasizing the variety of physical rehabilitation methods. The procedures are adapted according to the diagnosis, the stage of the disease, and the condition of the patients, which increases the quality of rehabilitation care. In general, the data indicated a growing demand for rehabilitation services for cancer patients, as well as the efforts of specialists to improve the QoL of patients.

A NEW STAGE IN THE STUDY OF HISTOGENESIS OF LUNG CANCER

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Introduction: Lung cancer (LC) is a big problem all over the world: it has a high morbidity (2.1 million cases) and mortality (1.7 million) rates every year. LC is diagnosed in 60—70% of patients in III—IV stages. Non-small cell (squamous and glandular) types of LC occur most often in clinical practice. One of the urgent issues in oncopulmonology is the definition of the histogenesis of LC, since the results of diagnosis and the effectiveness of treatment depend on its solution. **Aim**: To clarify the histogenesis of non-small cell LC. **Object and Methods:** Cytological and histological preparations from 120 patients with LC were examined using Pappenheim, Papanicolaou, hematoxylin and eosin staining methods, silver staining by W. Howell and D. Black, and immunohistochemical reactions with monoclonal antibodies (Ki-67, PCNA) to determine the level of cell proliferation depending on the direction of their growth. **Results:** It was established that LC, regardless of the histological type, has a characteristic structure. It grows in the alveoli, starting from the basement membrane toward its center, where, as a rule, necrosis develops with the cancer cells that fall off from the solid cancer layer during the tumor growth. The very structure of the alveoli with clear membranes between them, in which vessels with available erythrocytes are often traced, shows the growth of a tumor in the alveoli. Immunohistochemical studies revealed a positive reaction of basal cells and the absence of such a reaction in cancer elements approaching the center. Similar features of the development of epithelial tumors are a generally recognized phenomenon in oncomorphology, as tumors grow rapidly and. as a result, there is a lack of blood supply, which causes cell death and the development of necrosis. **Conclusion:** It was established that squamous and glandular (non-small cell) types of LC develop from cells of the alveolar epithelium and have a single source of development. The results of our research are a priority and have no analogues in the specialized literature. The revealed data explain the reason for the late diagnosis of LC (there are 300—400 million alveoli in the human body) and high mortality, and substantiate the new direction of development of morphological diagnostics in oncopulmonology and the search for new ways of treatment.

LIFE OF PATIENT REQUIRING PALLIATIVE AID — STRUGGLE WITH MYTHS

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The palliative aid should not be regarded exclusively as the aid to a patient with the terminal stage of the disease. The palliative aid should be provided to the patient with life-threatening and/or incurable diseases starting from the moment of diagnosis and is a part of the treatment process. Unfortunately, currently in Ukraine, less than 1% of cancer patients is covered by the palliative aid. Children with cancer do not receive such aid at all. This results in the deterioration of the quality of life of the patients and their families. Reporting the bad news to the patients and their relatives is a great problem for the physicians. The patient is not informed that the possibilities for his or her curative treatment have been exhausted and only palliative aid can be provided. Death is still a taboo subject in our country. The myth that the news on the impossibility of treatment and an incurable diagnosis will kill the patient does not allow for the patients to plan their last days, to wrap things up, to make a will, and to fulfil the desires.

The road map for the palliative patient is lacking. The doctors are not aware of mobile palliative facilities and stationary departments of the palliative aid. When the curative treatment is exhausted, the patients are left without further medical aid and are forced to seek for the aid on their own.

The problem of the availability of analgesics including opioids is still urgent. There is an opinion that opioids accelerate death or result in drug addiction.

All the above practices are contrary to the Ukrainian legislation in force and based on the specific beliefs of the doctors that unfortunately are dominating. These wrong beliefs, which are systemic now, should be changed.

TELEMEDICINE TECHNOLOGIES IN ENSURING THE QUALITY OF LIFE OF CANCER PATIENTS

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Introduction: Although telemedicine technology is not a new method for providing various medical services to cancer patients, such as diagnosis, consultation, treatment, and home care, it has opened new opportunities to improve the quality of medical care. It mainly achieves this by reducing the burden on healthcare systems and facilitating global strategies like social distancing and quarantine requirements. These factors have prompted cancer patients to use telemedicine technologies instead of visiting medical centers in person. The use of telemedicine offers several advantages. For instance, it can reduce waiting times compared to traditional in-person visits to medical centers. Video-supported visits provide an opportunity to see patients in their real-life context, allowing healthcare providers to observe their interaction with the environment. New technologies also enable the involvement of family members or other individuals who can provide additional information. However, despite these advantages and the positive attitudes of users, concerns remain about the lack of personal contact and the inability to conduct physical medical examinations. Telemedicine has also introduced new challenges in decision-making processes (diagnosis, assessment of the condition's severity, forecasting, treatment method selection, etc.). Recently, artificial intelligence has helped address these risks by determining when a virtual visit is inappropriate due to a high risk of misdiagnosis. However, special attention must be paid to legal and ethical considerations, such as accuracy, informed consent, privacy issues, data security, regulatory frameworks, product liability, explainability, and transparency. It is important to note that persistent physical side effects and psychosocial issues can significantly impair the quality of life (QoL) of cancer patients. Both patients and physicians are increasingly turning to telemedicine to address the diverse support needs that arise throughout the cancer care journey. **Aim**: To conceptualize the features of telemedicine technologies that support patients with late-stage cancer and to investigate their effectiveness in terms of the QoL and psychosocial well-being. **Results**: Today, the potential role of telemedicine in home care protocols to assist the growing number of patients with advanced cancer through an early palliative care program is widely recognized. Telemonitoring systems are implemented to promote more effective patient care by reducing emergency department and hospital admissions, while also alleviating symptoms of distress, anxiety, and depression in patients and their caregivers. Telemonitoring primarily uses medical devices to record parameters related to a patient's health or treatment progress. Once captured, the data is transferred to a cloud platform, where it is reviewed by a physician who can intervene in real-time if clinically significant abnormalities are reported by the system. The use of telemedicine is particularly important for patients facing progressive forms of cancer, including those in end-of-life care. The characterization of the use and benefits of digital healthcare and telemedicine interventions for these populations is critical, as many patients with terminal cancer and their families prefer palliative care provided at home rather than in a medical facility. While bereavement support has traditionally been part of comprehensive palliative care, it has also been integrated into several digital health and telemedicine palliative care programs. **Conclusions:** The positive results of using telemedi-

cine technologies to ensure the QoL for cancer patients are observed in both patient and provider satisfaction, as well as in clinical aspects. There are significant opportunities to expand the use of telemedicine technologies, particularly for cancer patients. Telemedicine contributes to the improvement of the QoL and psychosocial well-being. Ongoing development and evaluation of such innovations should target patients requiring long-term support for late-stage cancer. Future research should focus on determining optimal strategies for implementing telemedicine for cancer patient follow-up, taking into account both clinical and remote efficacy of various services and technologies. Continued development and evaluation of these innovations should prioritize patients requiring long-term support for late-stage cancer.

ART THERAPY AS AN ELEMENT OF IMPROVING THE QUALITY OF LIFE OF CANCER PATIENTS DURING ANTI-TUMOR TREATMENT IN WAR

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After the diagnosis is made, a cancer patient goes through a long period of acceptance and awareness, which certainly leaves an imprint on his psycho-emotional state. The emergence of another unexpected negative factor, like the war in Ukraine and the COVID-19 pandemic, multiplies the degree of depression, panic, despair, denial of the fact of the disease, and sometimes refusal of treatment. **Goal and tasks:** To assess the effectiveness of art therapy in complex antitumor treatment in patients with locally advanced or metastatic HER2-negative hormone-dependent breast cancer (HDBC), stimulation of their skills for unlimited creativity and an emotional outburst of negative energy. **Materials and Methods:** 125 patients with HDBC: 87 patients (69.6%) with metastatic cancer (of whom, skeletal bone lesions — 59 (67.8%), lungs — 20 (22.9%), orbit — 1 (1.1%), liver — 2 (5.9%), ovaries — 2 (2.3%), peritoneal carcinoma — 4 (4.6%), and ascites — 2 (2.3%). 38 (30.4%) patients had locally advanced cancer. We studied the effectiveness of anticancer therapy (letrozole 2.5 mg per day daily + palbociclib 125 mg per day from 1 to 21 days daily) against the background of art therapy (pictures "by numbers"). Patients independently chose drawings, colors, images, canvas sizes, and timeframes for completing the work, as well as pronounced their choice. **Results:** Complex antitumor treatment (letrozole + palbociclib) against the background of art therapy made it possible to achieve an objective effect in 112 patients: 44 patients (35.2%) — complete response, 52 (41.6%) — partial response, 17 (13.6%) —stabilization of the process; progression of the process was registered in 12 patients (9.6%). Comparative analysis showed that 74 patients (59.2%) chose drawings of flowers, 19 (15.2%) — landscapes, 10 (8.0%) — animals, and 20 (16.0%) — others. The majority of patients (61.6%) chose a drawing in dark colors as their first work, and the subsequent ones were done in bright colors, which indicated an improvement in the psycho-emotional status and quality of life of patients against the background of art therapy and was associated with the disappearance of despondency and uncontrollable fear.

CHALLENGES FOR THE FAMILIES IN TREATMENT OF THEIR CANCER-AFFECTED CHILDREN

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The KRAB Charity Foundation is a member of the Confederation of Childhood Cancer Parent Organizations. The research programs aimed at studying the remote consequences of cancer treatment have been under way in many countries. Adverse events of treatment affect the quality of life (QoL) of both patients and their families. It is well understood that the QoL of children with cancer should be assessed taking into account the QoL of their families.

The KRAB Charity Foundation of Aid to Cancer-Affected Children has been functioning since 2005. It was set up by the parents of children who were treated for cancer. We provide different kinds of aid to the patients and their families during the treatment course and after discharge from the hospital. Our activities also cover the palliative management, rehabilitation, and resocialization of the patients and their families. Our site contains stories of the children who we care about currently. The aim of these stories is to alert the parents to the changes in the health state of their children, to inform about the challenges when the parents refer for medical aid. We organize the annual meetings "Winners in the Life" to exchange the experience of families caring for children with cancer. A timely medical aid adds chances for cancer cure. Nevertheless, there are systemic challenges that should be overcome, which include the correct diagnosing, selection of the appropriate hospital, the process of treatment, and the life in the course of treatment and follow-up.

An important challenge is the selection of a clinic for treatment. Nevertheless, the unawareness of the regional oncologists about the state of affairs in different hospitals misleads the parents and denies their choice. We have got a lot of good feedback from the parents describing the quality of treatment in the Western Ukrainian Specialized Children's

Medical Center and the Oncological Department of the National Specialized Children's Hospital Okhmatdyt. This information is important since the quality of treatment of pediatric cancer patients requires knowledge of the peculiar features of cancer in these patients and a multidisciplinary approach.

Due to wartime, some children with cancer continued their treatment in European clinics. And several facts are surprising. The treatment protocols were reconsidered for all the patients since a clinic takes the responsibility for the treatment. Several drugs were withdrawn since they were not in current use, etc.

In 1988, the European Association for Children in Hospital (EACH) adopted the Charter of the Rights of Sick Children. The major principles of the Charter relate to the rights of the child in general as stipulated in the UN Convention on the Rights of the Child. EACH calls upon all governments, policy makers, staff in hospitals and in all other healthcare facilities, as well as general practitioners, to respect the needs and rights of all children and their families as stipulated in the Charter.

In the ideal society, all mechanisms should be strictly regulated responding to the arising problems. As to the medical care of cancer patients, not only the treatment as such but also care for the QoL of the patients and their families should be of prime concern. Unfortunately, the reality is far from this ideal being affected by the human factor and the lack of the correct communication. A system approach is urgently needed.

DETERMINING LIVER TOXICITY IN THE MODIFICATION OF STANDARD REGIMENS WITH METFORMIN IN PREOPERATIVE TREATMENT OF BREAST CANCER

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Introduction: A meticulous assessment of biochemical indicators of the liver profile, early detection of treatment toxicity, and evaluation of the safety profile for subsequent treatment are among the primary tasks of an oncologist. This leads to treatment delays in 5—20% of cases, and the risk of developing toxicity may not depend on the dosage of cytostatics. Since the determination of metformin-induced hepatotoxicity in oncological studies can only serve as a surrogate endpoint, there is currently no data on this adverse effect. **Objective:** To conduct a statistical analysis of the biochemical changes according to CTC-AE version 5 and determine the reliability of liver toxicity development potentially associated with the addition of metformin. **Materials and Methods:** The study included 117 breast cancer patients who received neoadjuvant treatment with or without the addition of metformin. Blood parameter monitoring was carried out before each treatment cycle. The statistical analysis included determining the Spearman correlation and odds ratio. **Results:** The patients were divided into groups of 86 in the experimental group (using metformin) and 30 in the control group (without using metformin). The average age in the experimental group was 50.9 years (95% CI = 48.34—53.5) and in the control group 52.3 years (95% CI = 46.92—57.68). A statistically significant difference between the groups in terms of liver function measurements (alanine aminotransferase (ALT), aspartate aminotransferase (AST), and total bilirubin) was only observed for the ALT indicator during the 7th (OD = 9.06, 95% CI = 1.1035—74.4942, $p < 0.05$) and 8th treatment courses (OD=8.5, 95% CI=1.0306—70.1040, $p < 0.05$). A correlation was found for total bilirubin during the 2nd treatment course —0.21 ($p < 0.05$), for ALT during the 4th course 0.23 ($p < 0.05$), and for ALT and AST during the 7th course 0.26 and 0.24 respectively ($p < 0.05$), and during the 8th course 0.22 and 0.31 respectively ($p < 0.05$). Grade 2 toxicity was registered in 4 cases of the experimental group during the 2nd, 4th, 6th, and 7th treatment courses, which did not affect the delay of treatment. All other cases for both groups were classified as grade 1 according to the abovementioned criteria. **Conclusions:** This study was conducted to determine the impact of metformin on the development of liver toxicity in patients with breast cancer who were receiving neoadjuvant treatment. Still, the presence of grade 2 toxicity in the experimental group, which did not lead to treatment delay, indicated the potential for correcting these side effects. The primary recommendation for clinical practice is the need for careful monitoring of liver parameters in patients receiving metformin as part of neoadjuvant breast cancer treatment, especially toward the completion of neoadjuvant therapy during the 7th and 8th courses of treatment.

DIAGNOSTIC VALUE OF SOME ONCOMARKERS IN THE TREATMENT OF PATIENTS WITH LARYNX CANCER

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Introduction: Among the well-known methods of predicting the course of malignant neoplasms and choosing the appropriate treatment, determining the role of several indicators characterizing tumor biology (oncomarkers) is important for scientific and practical oncology. **Aim**: To improve the diagnostic capabilities of determining the prognosis of patients

with laryngeal cancer. **Object and Methods:** 46 patients with laryngeal cancer were treated in the period 2019—2023. They were divided by stage T as follows: "T0" — 1 p; T1 — 3 p; T2 — 15 p; T-3 — 23 p; T4 — 4 p. In the presence of metastases: N0 — 36 p; N1 — 7 p; N2 — 3 p. 21 patients received surgical treatment, and 25 patients received conservative treatment. The expression of tumor markers P53, Ki-67, caspase-3, and matrix metalloproteinase 9 (MMP9) in tumor sections was determined using immunohistochemical (IHC) method. The level of expression of IHC markers was determined by photo-digital morphometry. To assess the prognostic ability of research methods, biomarkers, and models, ROC analysis (Receiver Operating Characteristic) was performed with the calculation of standard operating characteristics such as sensitivity, specificity, and area under the ROC curve (AUC). **Results:** Our research revealed that the expression of p53 protein and Ki-67 proliferation index (above 55%) correlated with the prognosis of metastases in patients with laryngeal cancer. The analysis of the results showed that the qualitative assessment of the prognostic values of markers Ki-67, p53, and caspase-3 was unsatisfactory for predicting the development of tumor relapses after treatment. The data of multifactorial analysis demonstrated the highest value of expression of Ki-67 and p53 in the prognosis of the development of metastases. The prognostic role of MMP9 was the best among the tumor markers for predicting recurrence of laryngeal cancer. The overall one-year survival rate of our laryngeal cancer patients was 98% and relapse-free — 72%. The three-year survival rate was as follows: total — 84% and relapse-free — 63%. **Conclusions:** The studies have established the role of tumor markers p53, caspase-3, MMP9, and Ki-67 for predicting metastases and relapses of laryngeal cancer during treatment. To determine the prognosis of relapses, the expression of MMP9 was the most indicative, while the prediction of metastasis correlated with the expression of protein p53 and proliferation index Ki-67. The obtained data have scientific and practical value for oncology.

DESCRIPTIVE ANALYSIS OF THE USE OF ARTIFICIAL INTELLIGENCE IN ONCOLOGY

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Introduction: Artificial intelligence (AI) is becoming increasingly common in medicine, and significant research has been conducted in oncology, where AI can aid in the diagnosis, treatment, and management of patients. However, as its use expands, numerous errors arise, which can have serious consequences for patients. One major issue is bias in the data on which AI models are trained, which can lead to incorrect diagnosis or treatment recommendations. Additionally, ethical concerns are raised regarding the confidentiality of patients' medical data and the transparency of AI algorithms. **Aim**: To analyze the types of errors that occur when using AI in oncology and assess their impact on the accuracy of diagnosis and therapeutic decisions. **Results**: The application of AI in oncology includes the use of machine learning and deep learning algorithms capable of analyzing vast datasets and providing predictions and treatment recommendations. Modern AI models offer diagnostic accuracy ranging from 85% to 91%, depending on the type of disease and the data being processed. For example, in the case of melanoma, studies (Esteva et al., 2017) show that AI's diagnostic accuracy is 91%, which corresponds to or even exceeds the diagnostic performance of experienced dermatologists. Studies on lung and breast cancer show an increase in diagnostic accuracy up to 87%—89% due to the use of AI (Liu et al., 2020). Research by Khosravi et al. (2020) demonstrates that AI-assisted MRI diagnoses of prostate cancer achieve an accuracy rate of 90%, which is 10%—15% higher than that by traditional methods, significantly reducing the number of false-positive results and improving biopsy efficiency. AI is also used to process unstructured medical data, such as text-based patient reports and electronic medical records (EMRs), enhancing decision-making accuracy to up to 90% in complex clinical cases (Huynh et al., 2020). In telemedicine systems, large language models (LLMs) improve diagnostic accuracy by efficiently processing patient's textual data. Despite these significant advancements, AI implementation in clinical practice faces several challenges. Matheny et al. (2020) point out that the lack of uniform standards for medical data collection and processing remains a significant barrier to accurate and effective use of AI. Furthermore, integrating AI with EMRs continues to be technologically complex due to the absence of standardized data transfer protocols, complicating the accuracy of diagnostic predictions and therapeutic decisions. Lastly, the inconsistency of data from various medical institutions makes it difficult to standardize results and implement uniform AI-driven treatment approaches. **Conclusions**: AI is becoming an integral part of modern medical diagnostics and therapeutic solutions, especially in oncology. Its implementation can significantly enhance diagnostic accuracy and enable more personalized treatment approaches. The integration of multiomic approaches, combining various types of biomedical data (genetic, proteomic, and metabolomic), can improve predictive accuracy and facilitate more personalized treatment recommendations. One of the key challenges remains the lack of uniform standards for the collection, processing, and classification of medical data. The inconsistency of data formats across medical institutions hinders AI integration into clinical practice. To enhance diagnostic quality, it is necessary to develop standardized medical systems, which will reduce the occurrence of errors and improve diagnostic accuracy. The use of AI in medicine also raises important ethical issues, including patient data confidentiality, algorithmic biases, and fairness in access to technology. Establishing clear ethical norms and standards should be a priority for future research.

OSTEOPONTIN-REGULATED CHANGES IN THE MAST CELL POPULATION ARE ASSOCIATED WITH BREAST CANCER.

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Background: It has been proven that the development of BCa is largely determined by the characteristics of the tumor microenvironment (TME), which undergoes significant changes during the progression of the disease. One of the least studied components of the TME, the role of which is still debatable in BCa, is mast cells (MCs). **Materials and Methods:** The study was conducted on the postoperative material of 15 patients with fibroadenoma (FAd) and 78 patients with stage I—II BCa. Determination of MCs in the tissue of benign and malignant mammary gland neoplasms was performed by a histochemical method using toluidine blue. For evaluation of the functional activity of MCs degranulation index calculation was used. Determination of osteopontin (OP) expression in tumor tissue was performed by the immunohistochemical method. **Results:** The obtained data show that the density of MCs infiltration and their functional activity are associated with indicators of BCa malignancy, such as tumor size (1.9 times higher for T1 category compared to T2, $p = 0.037$), lymph node involvement (45.1% increase, $p = 0.017$), tumor grade (lower MCs infiltration in G3 tumors, $p = 0.049$), molecular subtype, proliferative activity (5.7-fold increase in infiltration for Ki-67 > 14%, $p = 0.002$), and HER2/neu-expression status (35.5% higher in HER2/neu-positive tumors, $p = 0.031$). High expression of OP in the stromal component of BCa is associated with an increase in the MCs population in patients with metastatic lesions in regional lymph nodes (3.32-fold increase in stromal MCs, $p = 0.014$) and poorly differentiated tumors (2.86-fold decrease in stroma, $p = 0.017$). Additionally, this matricellular protein is involved in regulating MCs in luminal B and basal molecular subtypes. The level of OP expression in the parenchymal component of BCa is linked to the number of infiltrating MCs in the presence of metastatic lymph node involvement (2.48-fold increase in intratumoral MCs, $p = 0.023$). The high OP expression, regardless of its localization in tumor tissue, is associated with increased MCs degranulation levels by 54.38% ($p = 0.033$) in the parenchyma and 101% ($p = 0.042$) in the stroma. **Conclusions:** The identified relationship of OP expression level with the topology and functional activity of MCs in BCa tissue, depending on the clinical status of patients, indicates the perspective of their use for predicting the aggressiveness of the tumor process. **Funding:** Research programs "Stress-induced Tumor Microenvironment Factors as Risk Drivers of Breast Cancer Progression" (0124U000078) and "The Role of Markers of Bone Tissue Remodeling in the Formation of the Degree of Malignancy of the Most Common Hormone-Dependent Neoplasms" (0118U005468) financed by the National Academy of Sciences of Ukraine.

COLLAGENASE EXPRESSION FEATURES IN MCF-7 BREAST CANCER CELLS WITH DIFFERENT SENSITIVITY TO THE THERAPY

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Background: Despite the emergence of an increasing number of studies on the role of matrix metalloproteinases (MMPs) in the development and progression of breast cancer (BCa), there is a paucity of literature data on the connection between members of this family of endopeptidases and the processes of drug resistance. At the same time, there are isolated shreds of evidence proving the direct involvement of collagenases in the processes of tumor response to therapeutic effects, but their exact role in these processes has not yet been established. **Materials and Methods:** The human breast adenocarcinoma MCF-7/S cell line and its variants resistant to doxorubicin hydrochloride (MCF-7/DOX; IC50 = 16.10 mg/L) or cis-diammineplatinum(II) dichloride (MCF-7/CP; IC50 = 3.6 mg/L) were cultured in complete Dulbecco's modified Eagle's medium (DMEM; Sigma-Aldrich, St. Louis, MO, USA) containing 10% embryonal calf serum (Sigma-Aldrich) and 40 μg/mL gentamycin at 37 °C in 5% CO_2 atmosphere. The expression levels of MMP1, MMP8, and MMP13 in cancer cells were studied using the immunocytochemical method. **Results:** It was found that the MCF-7/S cell line (222.38 ± 7.4 H-score points) was characterized by 48.75% ($p < 0.001$) and 82.35% ($p < 0.001$) higher MMP-1 expression rates compared to the lines resistant to doxorubicin (149.5 ± 4.6 H-score points) and cisplatin (121.95 ± 5.5 H-score points), respectively. The highest levels of MMP-8 expression were recorded in MCF-7/Dox cells (228.0 ± 8.2 H-score points). At the same time, the MCF-7/S (174.87 ± 6.1 H-score points) and MCF-7/CP (106.93 ± 3.9 H-score points) cells were characterized by lower expression values of this collagenase by 30% ($p < 0.001$) and 115% ($p < 0.001$), respectively. The value of the MMP-13 expression in MCF-7/CP cells was 252.5 ± 11.3 H-score points. By contrast, similar values in cells of the MCF-7/Dox line were lower by 36.48% ($p < 0.001$) and amounted to 185.0 ± 5.8 H-score points. **Conclusions**: We have described the expression profile of collagenases in BCa cell lines with dif-

ferent sensitivity to therapeutic agents. The obtained results can become the basis for further studies of the molecular and biological role of MMPs in the formation of drug resistance during the progression of BCa. **Funding:** This study was supported by the research programs "Stress-Induced Tumor Microenvironment Factors as Risk Drivers of Breast Cancer Progression" (0124U000078), "Features of Expression and Methylation Status of Stromal Microenvironment Remodeling Genes in Breast Cancer Tissue" (0123U102991).

ENSURING THE QUALITY OF LIFE FOR CANCER PATIENTS: INDICATORS OF CONDITIONALITY AND CRITERIA OF UNCONDITIONALITY

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Quality of life (QoL) is an important endpoint in medical and health research. It is useful for identifying patient problems, managing, and evaluating the effects of interventions, and thus is crucial for improving the quality of care. QoL studies encompass various patient groups and employ different design formats, which is also true in oncology research. Based on the current assessment of the methodological and conceptual clarity of QoL research, it can be concluded that most studies in health and medicine face conceptual and methodological problems. The most significant issue is the difficulty in integratively assessing features that are mostly expressed in a qualitative form.

The World Health Organization (WHO) proposes to assess QoL using the following parameters: Physical: energy, fatigue, physical discomfort, sleep, and rest; Psychological: self-esteem, concentration, positive emotions, negative experiences, thinking; Degree of Independence: daily activity, ability to work, dependence on medications and treatment; Social Life: daily activities, social connections, friendships, social significance, professionalism; Environment: housing and living conditions, safety, leisure, access to information, ecology (climate, pollution, population density); Spirituality and Personal Beliefs (WHOQOL Group, 1995).

Similar challenges are encountered in the comprehensive assessment of health-related quality of life (HRQoL), which combines indicators of the impact of medical interventions on human health. In addition to traditional indicators of mortality and morbidity**,** it includes parameters such as physiology, social life, cognitive functions, emotions, sleep and rest, energy and vitality, perception of health, and overall life satisfaction.

Numerous questionnaires are available, such as SF-36, EQ-5D, and WHOQOL-BREF for adults and Kidscreen, CHQ, and PedsQL for children. Many of these tools have been criticized for lacking conceptual clarity and clear definitions. Surprisingly, only 13% of articles provide a definition of the QoL concept, although it seems obvious what the authors mean by QoL and how it relates to other concepts. The reason for choosing a particular tool is not always indicated.

Therefore, there is still no consensus on the definition or proper measurement of QoL. Numerous conceptual problems exist, and several analyses of the main concept of QoL have been published. Conceptual and methodological debates continue regarding what should be measured.

The purpose of this study was to conceptualize QoL assessments with the ultimate goal of making the concept of QoL as a criterion-based concept. Three key constructs are considered:

a) **Definition of QoL in terms of life satisfaction**: The proposed assessments suggest that defining QoL in terms of life satisfaction is most appropriate, as this definition successfully addresses most known concepts.

b) **Importance of physical function**: Physical function is one of the most important constructs in the assessment of HRQoL.

c) **Need for a new philosophy of health**: There is a need to create a new philosophy of health.

We propose a definition of human health as "ensuring the quasi-stationarity of physiological, biological, mental, social, intellectual, and moral characteristics of a person under non-extreme environmental influences." This definition can also be used to assess the QoL of cancer patients. This definition requires a clearer understanding of stationarity and quasi-stationarity. Stationarity is understood as the property of a process whose characteristics do not change over time — that is, processes that do not depend on a specific time of observation are considered stationary. Accordingly, a quasi-stationary process is one that approaches a stationary process. This term is usually used in cases where the characteristic time for establishing equilibrium in a biosystem is much shorter than the characteristic time over which the system parameters remain in equilibrium (Mintser O.P., Novyk A.M., 2024).

Conclusions

1. Urgent social problem: The definition, assessment, and management of personal health should be regarded today as among the most important social problems requiring urgent solutions.
2. New concept for health assessment: We propose a new concept for defining and assessing individual and population health, based on the stationarity and dispersion characteristics of the body's state under non-extreme environmental influences. For assessing QoL, this concept provides a quantitative tool for reliable evaluation of the correctness of the chosen path to health recovery.
3. Application in cancer patient monitoring: The proposed integrated assessment of the patient's condition can be widely used in monitoring studies of the health of cancer patients. In this approach, the parameters and lev-

els of assessment, evaluation scales, classification categories, and priorities are not strictly fixed. This flexibility allows for modifying classifications using new criteria and additional expert information and for creating new classification models of the functional state of the body. The evaluation algorithm allows for using heterogeneous information regarding the possible ranges of weighting coefficients (imprecise information); incorporating non-numerical information on the comparative weight of individual indicators expressed by judgments such as "more," "less," or "the same"; and extensively using incomplete information when the values of some weighting coefficients are not within the planned ranges.

CONDITIONS FOR REDUCING SCOPE OF SURGICAL INTERVENTION IN PATIENTS WITH BREAST CANCER AFTER NEOADJUVANT CHEMOTHERAPY

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Introduction: Neoadjuvant treatment of patients with breast cancer allows achieving complete clinical pathomorphosis of the tumor. The standard for determining a complete morphological response is the removal of the tumor bed. Surgery in the presence of a complete morphological response is diagnostic. Targeted biopsy may be used as an alternative strategy. **Objective:** To reduce the scope of surgical intervention in patients with breast cancer after neoadjuvant chemotherapy by determining conditions for selecting targeted biopsy instead of surgery. **Materials and Methods**: Biopsy of the marked area of the breast before surgery and postoperative breast specimen with markers. The study included 67 patients aged 32 to 74 years with breast cancer cT1—cT3 after neoadjuvant chemotherapy. The tumor bed was marked in patients before the start of neoadjuvant chemotherapy. Targeted biopsy of the marked areas with assessment of pathomorphological response was performed intraoperatively. Subsequently, standard surgical intervention was performed. **Results:** The groups of patients were statistically comparable ($p > 0.05$). Marked areas were found in 100% of cases preoperatively by ultrasound, intraoperatively markers were not found only in 1 case. During follow-up examinations, a complete clinical response was noted in 21 cases, and a partial clinical response in 46 cases. Targeted biopsy of the marked tumor bed was performed, and 10 tissue columns were taken in each case. A complete pathomorphological response in biopsy material and removed specimen was achieved in 18 patients (26.9%). Partial pathomorphological response according to the RCB system (I—II) was achieved in 44 patients (65.7%). In 5 patients (7.5%), no significant pathomorphological response to treatment was detected (RCB III). **Conclusions:** The algorithm of examination and marking of the tumor with intraoperative biopsy, upon further analysis and confirmation of oncological safety, will allow avoiding the standard volume of surgical intervention for patients with a complete morphological response.

ROLE OF RADIATION THERAPY IN PALLIATIVE CARE FOR PATIENTS WITH PROSTATE CANCER

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Introduction: Prostate cancer often metastasizes to bone tissue, making the bones the main site of spread. It is estimated that 85%—100% of patients with this type of cancer who die have bone metastases. The main complications are pain (35%—45%), pathological fractures (14%—22%), and spinal cord compression (3%—7%). Radiation therapy with different fractionation modes has proven to be effective in relieving symptoms in bone metastases of prostate cancer. **Objective**: To investigate the effectiveness of stereotactic radiotherapy (SBRT) in comparison with classical dose fractionation for the treatment of bone metastases in prostate cancer. **Object and Methods:** We analyzed the results of international studies and the experience of Ukrainian medical institutions in treatment of patients with bone metastases in prostate cancer. **Results**: Evaluation of the effectiveness of SBRT on the spine is complicated by the limitations of traditional criteria such as RECIST 1.1. Pseudo-progression detected after SBRT (14%—37%) may mask true progression, which requires regular MRI monitoring (each 2—3 months during the first year). SBRT for primary spinal metastases demonstrates high local control (80-95%), with significant control after one year (90.3%) and two years (82.4%), which exceeds the results of conventional therapy. Patients with radioresistant tumors have a one-year control rate of 83%. SBRT provides local control in 66%—90% of cases and reduces pain in 65%—81% of patients. Re-irradiation is safe, with a fracture rate of 12% and myelopathy of 1.2%. Pain relief lasts months; complete pain relief is reported in 46%—92% of the patients after SBRT. Optimal dose fractionation for pain relief was not established, but patients treated with SBRT had better outcomes at 3 and 6 months, with a risk

of compression fracture of 8.7% at 3 months. More than 40% of patients with severe pain before treatment were pain-free at 11.5 months, and their quality of life (QoL) remained stable. The incidence of compression fractures after SBRT was 11%—39%, which is higher than that of conventional therapy. Radiation myelopathy is a rare complication (0.4%). **Conclusions:** Stereotactic body radiation therapy (SBRT) is an effective method for the treatment of bone metastases in prostate cancer, providing high control (80%—95%) and pain relief. High-quality monitoring with MRI is essential for treatment evaluation. Compression fractures remain a possible complication, but their risk is reduced with optimal fractionation. The QoL of patients remains high, which confirms the prospects of SBRT compared to conventional therapy.

AUTOMATIC RISK PREDICTION BASED ON A COMPLEX SET OF MEDICAL REPORTS

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Introduction: The application of artificial intelligence (AI) methods in medicine should be viewed in the context of their integration into the current medical practices and technologies. The automation of known diagnostic methods has limited value, as the final decision is still made by the physician. However, AI can be used as a source of additional information that is not provided by current diagnostic methods, serving as an auxiliary tool in medical research, which holds significant potential for widespread implementation. One area of AI application is predicting the progression of diseases and evaluating the risk of sudden changes based on a large number of factors that cannot be analyzed or systematized logically without considerable simplifications. Our research focused on predicting myocardial infarction (MI), but we believe the developed approach can also be effectively applied to predict the aggressiveness of oncological diseases. The **aim** of the study was to develop a method for creating predictive models based on a comprehensive analysis of the wide array of known patient information and utilizing AI and machine learning techniques on large databases from medical institutions. **Object and Methods:** The object of this research is the predictive potential of a collection of medical textual data about the patient, including examination results, medical conclusions, and methods of their use. For the study, we used a depersonalized fragment of the "Esculap" database, provided by the V.M. Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine, as part of the collaboration with the State Institution "Center of Innovative Health Technologies" of the State Management of Affairs (SI CITH SMA). The fragment includes medical records from outpatient visits over ten years, specifically focusing on patients with cardiovascular conditions (ICD code I), including those with myocardial infarction (MI, ICD codes I21-I24). The fragment also contains data on cancer patients; however, the initial task was to develop a model for predicting MI, considering the focus of the medical institution. The research hypothesis is that medical reports contain detailed, unified information regarding all aspects of a patient's health status — history, current and past diagnoses across all clinical profiles, lists of prescribed medications, diagnostic and therapeutic procedures, etc. AI methods allow processing this diverse information in its original complexity, similar to human intuition. This approach is distinct from the stepwise logic of physicians, which relies on a small set of key facts at each stage. Thus, AI possesses the advantage of "ordered and formalized intuition" capable of providing assessments as precise numerical values (relative or absolute risk) and/or in the form of predetermined risk categories (moderate, medium, elevated, high, acute, etc.).

The use of machine learning on the "Esculap" database is complicated by the fact that physicians do not always assign ICD codes, making the construction of a training set the most critical step, directly impacting the accuracy of the predictive model.

To create training set, the patients were divided into two groups: those with MI and those without it (although some may have had MI in reality). For each patient, a vector of unique words was created in the form of key-value dictionaries, where the key is the word, and the value is its frequency of occurrence. To handle variations in word forms, the Levenshtein algorithm was applied. The dictionary was cleaned of frequent words (function words and particles) and rarely used words (some of which were typographical errors). By selecting words that appeared in patients after MI, we managed to filter out suspicious patients from the group without MI who may have experienced MI but did not have the corresponding code in the database. By combining word vectors of patients without MI up to the onset of MI with the word vectors of those without MI**,** we obtained a base set of attributes for machine learning. Dimensionality reduction techniques were applied to this space of attributes, resulting in a final general sample with 4731-word attributes and over 17,000 patients.

The naive Bayesian method with modifications, which allows working with a large number of independent attributes, was used for machine learning. The model is a table based on the training set: in the first column — word-attribute, followed by four probabilistic estimates: frequencies of the word's presence and absence in patients with and without MI.

When the model is applied to the combined text of a patient's medical reports, an individual likelihood ratio is calculated for classification into the group of patients with future MI versus those without MI, providing an overall classification (for statistical evaluation of model quality). If the ratio exceeds one, it indicates a high risk of MI; otherwise, it indicates a low risk. For more detailed analysis, the likelihood ratio is converted into MI risk and a qualitative MI risk assessment.

This approach is highly versatile and can be applied to a wide range of risk prediction tasks. We plan to extend this approach to predict mortality from cancer in general and within specific time intervals.

Results: The developed model was tested on a balanced random test set consisting of 900 patients without expected MI and 893 patients with expected MI. The model demonstrated high efficiency, correctly predicting MI in 714 individuals (80.0%) and the absence of MI in 734 individuals (81.6%). The area under the ROC curve of 0.898 indicates the overall high reliability of the method. The developed program is currently undergoing evaluation at SI CITH SMA for potential implementation. **Conclusion:** The use of risk prediction based on a collection of medical reports showed high effectiveness in the case of MI, justifying its experimental implementation into clinical practice as an additional diagnostic tool. Due to its versatility, this approach can be adapted for various individual risk predictions, including those related to cancer progression, such as life expectancy, cancer aggressiveness, and recurrence. The use of AI as an additional diagnostic tool for assessing the risks of unpredictable events opens new opportunities to improve the effectiveness of medical care.

BONY SPREAD OBLITERATION (METASTATIC BONE LESIONS): QUALITY OF LIFE BEFORE AND AFTER SURGERY

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Introduction: Bony spread obliteration or metastatic bone lesions, as a rule**,** are accompanied by long-term pain and hypercalcemia, lead to the development of bone fractures, and are an unfavorable prognostic factor. Surgical intervention in the case of bony spread or metastatic bone lesions is aimed at improving the patient's quality of life (QoL), the possibility of restoring the function of the affected limb in the shortest possible time and contributing to the continuation of specific treatment. **Aim:** To study and analyze the effectiveness of surgical treatment of metastatic bone lesions and its impact on patient's QoL. **Object and Methods:** Prospective research (for 12 years) of 65 patients with diagnosis of bony spread or metastatic bone lesions. The average patients' age was 52.4 ± 1.3 years, there were 43 women (66.2%) and 22 men (33.8%). The following methods of surgical interventions were applied: resection of the articular part or bone segment and endoprosthesis, metal-osteosynthesis with bone plates, rods, amputations and exarticulations of the limb. Auto-allografts and bone cement were used to replace the bone defect. Questionnaires were applied during hospitalization and follow-up examinations of patients throughout the entire observation period. Patients' QoL before and after surgical treatment was assessed according to an EORTC QLQ — C30 Core Questionnaire. **Results:** Duration of pain at the site of the bony spread or metastatic bone lesion before surgery on average was from 1 to 5 months. Intensive pain at the site of metastatic bone lesions in 53 (81.5%) patients was the reason for the visit to the doctor. To reduce pain, 84.6% of patients took painkillers and anti-inflammatory drugs, and 15.4% did not need painkillers. In the process of monitoring the patients' suffering from bony spread or metastatic bone lesions after surgical intervention, tumor recurrence was found in 18.5% of patients and postoperative complications — in 7.7% of patients. When determining the QoL of patients suffering from bony spread or metastatic bone lesions before and after surgical treatment, according to the EORTC QLQ-C 30 Core Questionnaire, an improvement was reflected in the QoL increase from 28.4 points to 72.2 points. **Conclusion:** The use of various surgical treatment methods for patients suffering from bony spread or metastatic bone lesions increases the QoL of this category of patients and is the primary efficiency indicator of performed treatment.

TARGETED BIOPSY OF AXILLARY LYMPH NODES IN PATIENTS WITH BREAST CANCER

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Introduction: The treatment strategies for patients with breast cancer are increasingly giving grounds for de-escalation of surgical aggression when performing axillary lymph node dissection in patients with N1 status. The removal of lymph nodes in the armpit is transitioning from therapeutic operations to staging ones. **Aim:** To improve the surgical treatment of breast cancer patients with N1 status after neoadjuvant chemotherapy through targeted biopsy of axillary lymph nodes. **Object and Methods:** Marked lymph nodes and separately isolated lymph nodes of I—III orders were analyzed. The study included 71 patients aged 28—78 with breast cancer cN1f and cT1-T3 after neoadjuvant chemotherapy. Patients underwent targeted axillary biopsy with urgent pathomorphological examination and assessment of pathomorphological response to neoadjuvant chemotherapy. **Results:** Patients were

distributed according to the stage of oncological process and the degree of response to neoadjuvant treatment, and all groups were statistically comparable ($p > 0.05$). Marked axillary lymph nodes were visualized preoperatively by ultrasound in 68 cases, which constituted 95.77%. Intraoperatively, markers were found in 100% of cases. Patients underwent the search for sentinel lymph nodes using ICG techniques. On average, 3 fluorescent axillary lymph nodes were visualized. Sentinel lymph nodes coincided with marked ones in 91.6% of cases. During additional axillary lymphadenectomy, metastatic involvement in lymph nodes was present only in 3 cases. Patients who had a complete morphological response to treatment in target lymph nodes did not have additional metastatic burden upon analysis of material from additional lymph node dissection. **Conclusions:** The technique of targeted axillary dissection has a high level of technical success and a low level of false-negative results in patients. Further research is needed to determine the optimal technique, standardization of selection criteria, and confirmation of oncological safety of long-term treatment outcomes.

PATIENT-REPORTED OUTCOMES IN CLINICAL ONCOLOGICAL OTOLARYNGOLOGY

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Introduction: Recently, in clinical medicine, there has appeared an increased attention to the standardization of patient-reported outcomes (PRO). Modern tools allow one to identify the general condition of the patient and a wide range of symptoms. They make it possible to determine the severity of indicators and monitor the treatment of patients. The increasing number of studies in oncological otolaryngology requires a specific PRO. The questionnaire for the PRO must be valid, reliable, and sensitive. The process of creating a questionnaire for PRO follows the algorithm for developing standard tools in this series according to the recommendations of the FDA and EMEA. Most often, the general questionnaire EORTC QLQ-C 35 and SF-36 are used for ENT malignancies. **Aim:** To develop a new questionnaire for patients with oncological pathology of the upper respiratory tract. **Object and Methods**: The UF-40 quality of life questionnaire for cancer patients was developed in the department of ENT oncology. Pilot testing was conducted in 110 patients. **Results**. We took into account the specifics of complaints and the course of the disease in patients with upper respiratory tract cancer. The creation of the questionnaire included the development of a list of questions to describe the condition of a patient with upper respiratory tract cancer. The complaints of patients with this pathology were carefully studied. The complaints that were diagnostically valuable and data related to the patient's treatment were identified. In the process of creating the questionnaire, the number of questions and the scale of their evaluation were taken into account. The evaluation period was taken into account depending on the patient's treatment method. A general type of questionnaire was developed. PRO were collected after the patient self-selected one of the answers to all questions. Based on the results of patient interviews, changes were made to the list of questions. A preliminary version of the questionnaire was created. Its pilot testing was conducted. Further work is underway to calculate the data obtained from the questionnaire.

QUALITY OF LIFE OF PATIENTS WITH MUSCLE-INVASIVE BLADDER CANCER AFTER CYSTECTOMY

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Introduction: The radical cystectomy remains the "gold standard" for the treatment of muscle-invasive bladder cancer. However, the method of urine diversion is of great importance in the further quality of life (QoL) of this contingent of patients. The determination of this indicator is one of the important criteria for the effectiveness of treatment in oncology along with survival and functional outcomes. **Our objective** was to assess the impact of urine diversion on the QoL of patients with muscle-invasive bladder cancer after cystectomy. **Materials and Methods:** The work is based on a 15-year experience of treating patients with bladder cancer and contains an analysis of the results of examination and treatment of 954 patients who underwent cystectomy with various types of urine diversion. Continent urine diversion, such as ileocystoneoplasty, was performed in 227 (23.8%); percutaneous: Bricker's operation — in 389 (40.8%), modified ureterocutaneostomy — in 264 (27.7%); transrectal: Mainz-Pouch II — in 63 (6.6%), ileosigmoid reservoir — in 11 (1.1%) cases. To assess the QoL both before surgery and 3, 6, 9, and 12 months after it, we used the SF-36 questionnaire (Medical Outcomes Study 36-Item

Short-Form Health Survey), which is currently widely distributed worldwide and is regarded as the main questionnaire for the assessment of health-related QoL. **Results:** In the preoperative period, all patients with muscle-invasive bladder cancer had a decrease in indicators on almost all scales, caused by the limitations in daily activities and a decrease in their quality due to pain syndrome and reduced general health and emotional state due to the presence of an oncological process. To a lesser extent, it was associated with the limitation of social contacts as a result of deterioration of physical health and mental well-being. In patients after radical cystectomy, 9—12 months after the operation, a significant improvement in indicators was observed on all scales, in comparison with both the preoperative indicators and 3 and 6 months after the operation. The highest increase was noted on the scales of role functioning due to the physical condition and the scale of pain intensity. The indicators of general health, vitality, and mental state improved significantly. The best indicators of the QoL were observed in patients who underwent ileocystoneoplasty after cystectomy, slightly lower — after transrectal and even more lower — after percutaneous diversion of urine, which once again indicated a lower QoL in patients with the presence of an external stoma. **Conclusion:** The inclusion of the QoL indicator in research is an important element that improves its quality characteristics. The assessment of the QoL of patients with muscle-invasive bladder cancer correlates to a greater extent with the survival rate, and the results of treatment are better after cystectomy with continental urinary diversion than after transrectal, and even more so, percutaneous urinary diversion.

USE OF ARTIFICIAL INTELLIGENCE FOR ASSESSMENT OF KNOWLEDGE OF ONCOLOGY INTERNS

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Introduction: The training of oncology interns is one of the key tasks in medical education today. Given the complexity of oncological diseases and the rapid development of new treatment methods, the importance of training competent specialists is greater than ever. The transdisciplinary nature of knowledge further complicates this task, making it not only complex but also multi-dimensional. It requires consideration of not just the volume of knowledge but also the ability to apply it effectively in practice. An additional challenge lies in ensuring the quality of life for patients during the course of monitoring their conditions. The modern capabilities of computer technologies, particularly artificial intelligence (AI), offer new opportunities to enhance the effectiveness of education. Traditional methods of teaching and knowledge assessment rely on standardized tests and practical tasks. However, AI enables more dynamic and individualized approaches to these processes. Assessing the knowledge of oncology interns is a multifaceted task. It is necessary to evaluate not only their theoretical knowledge but also their practical skills. These include diagnosing diseases, developing individualized treatment plans, making decisions in emergency situations, and maintaining emotional rapport with patients. Furthermore, oncology knowledge must be continuously updated. Thus, the assessment process must be flexible and frequently updated, further complicating the task. **Aim** of the study was to propose a multi-tiered, comprehensive system for assessing the knowledge and competencies of oncology interns, utilizing the capabilities of AI. **Results:** A database of questions has been proposed, which comprehensively describe the training and work of interns. The use of AI for knowledge assessment can significantly improve the process of knowledge transfer in the following areas: individualized assessment (adaptive testing), natural language processing (NLP) for the simulation of educational case studies involving patients, analysis of knowledge gaps through AI, and the creation of personalized educational trajectories. AI can analyze each intern's current level of knowledge and offer tasks that match the difficulty level. This allows for quicker identification of weaknesses and makes the training process more personalized. The quantitative trajectory of mastering the subject matter can serve as a key factor. AI systems utilizing NLP can simulate clinical scenarios in which interns must make decisions regarding diagnosis, staging, and treatment. Their responses are analyzed for clinical accuracy, decision-making speed, and adherence to best practices. Additionally, AI systems equipped with speech recognition technology can evaluate how interns communicate complex oncology information to patients or colleagues, assessing clarity, empathy, and accuracy when discussing treatment options, prognosis, and patient care. Based on the intern's current knowledge, AI can generate individualized learning plans, recommending literature, clinical cases, or specialized training modules. Continuous monitoring allows AI to dynamically adjust the training program as the intern's knowledge and clinical skills evolve, making education more effective and personalized. AI also has the potential to predict the future performance of interns by analyzing their current knowledge levels, clinical skills, and development trends. This helps instructors monitor interns' progress and identify those who may require additional support. Predictive models can also assess an intern's readiness for more complex clinical responsibilities or specializations, thereby enhancing the training of future medical professionals. **Conclusions:** AI can help identify specific subjects or interdisciplinary areas where interns lack knowledge, such as new cancer treatments or the latest research, enabling targeted educational interventions. The use of AI and machine learning algorithms opens up new opportunities for developing a fundamentally novel mechanism for evaluating the training of oncology interns.

QUALITY OF LIFE OF GYNECOLOGICAL ONCOLOGY PATIENTS

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Background: In Ukraine, cancer is among the top 5 causes of death. In total, 140,000 new cases of oncological diseases are diagnosed in Ukraine every year, while the annual mortality rate exceeds 60,000. Quality of life (QoL) is the second determining criterion after the survival rate when choosing treatment tactics. **The aim of the work** was to evaluate the QoL of patients with endometrial cancer (EC), cervical cancer (CC), and ovarian cancer (OC). **Materials and Methods:** The results of the QoL assessment prior to and after the end of treatment of 182 patients with EC, CC, and OC were analyzed. The assessment of QoL was analyzed in gynecological oncology patients who received treatment in 2018—2023 at the Communal Non-Profit Enterprise "Prykarpatsky Clinical Oncology Center of the Ivano-Frankivsk Regional Council". The questionnaire EORTC—QLQ—C30 was used. **Results:** Three main indicators were analyzed: functional scale (FS), symptom scale (SS), and QoL. An average score was estimated for each indicator, using a 100-point scale for each of the parameters. The main complications after the end of treatment that affect the QoL were as follows: surgical (lymphorrhea, lymphostasis, bleeding in the p/o period, infectious complications, sexual dysfunction, swelling of the perineum and extremities); chemotherapeutic (allergic reactions, nausea and vomiting, constipation and diarrhea, hair loss, anemia, decreased appetite, rapid fatigue, effect on fertility); radiation-related (post-radiation catarrhal and membranous epitheliitis of the vagina, post-radiation cystitis, post-radiation colitis, post-radiation epidermitis, rectovaginal or vesicovaginal fistulas). According to the results of the QoL assessment before the treatment, it was established that the best indicators were found in the group of patients with CC, and the worst results — in the group with OC. When evaluating symptoms before the start of treatment, the lowest indicators were found in patients with CC, and the highest indicators in patients with OC. 6 months after the end of the treatment, an improvement in the assessment of the quality of treatment was found in all groups, although the trend of the highest indicators in the group of patients with CC and the lowest in patients with OC remained. A decrease in symptom scores after the end of treatment was also found in all patient groups. **Conclusions:** In the course of the study, it was found that patients with OC are the group with the lowest QoL indicators before the start of treatment, at the beginning of treatment, and after its completion during rehabilitation.

INFLUENCE OF THE METABOLIC SYNDROME ON THE QUALITY AND LIFETIME OF PROSTATE CANCER PATIENTS

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The incidence of prostate cancer (PC) takes second place among male cancers in the world. PC is a heterogeneous disease, the main mechanism of which is the hormonal dependence of its development and progression with subsequent bone metastasis (BM). The presence of metabolic syndrome (MS) in patients creates a dysregulatory metabolic cluster, including insulin resistance, dyslipidemia, central obesity, and arterial hypertension, activating a cascade of irreversible processes, which has a driving effect on the quality of life (QoL) and lifetime of patients with PC. The **aim** was to determine the QoL, progression-free (PFS) and overall (OS) survivals of patients with localized PC with existing MS and **developing** BM after radical prostatectomy (RP). **Object and Methods:** A retrospective clinical study was done in 79 patients with localized PC. MS was diagnosed in 40 (50.6%) and absent in 39 (49.4%) patients. Patients with PC and existing MS were divided into 2 groups: 17 (21.5%) with a moderate risk (Grade group 2,3) and 23 (29.1%) with a high risk (Grade group 4,5), in contrast to patients without MS: 20 (25.3%) in Grade group 2,3 and 19 (24.1%) in Grade group 4,5. The 5-year PFS and OS from the moment of RP, as well as the QoL before the RP and at the time of progression with the development of BM, were determined for all patients of the studied groups. The QoL was determined using the QLQ-C30 questionnaire. **Results:** Among 79 study participants after RP, the development of BM was diagnosed in 35 (44.3%), and in 44 cases (55.7%), metastases were absent. Among 35 patients with developing BM, 27 patients (77.1%) had MS, and 8 cases (22.9%) were without MS. In cases of GG 2,3 and the presence of BM, the median PFS was 26 months in patients with MS and 30 months without MS. At that time, the median PFS in GG 4,5 patients with developing BM was 17 months in the presence of MS, and 19 months in the absence of MS. The median OS in GG 2,3 patients with developing BM was 44 months in the presence of MS and 47 months without MS. The Grade 4,5 group had a median OS of 35 months in patients with MS, and 46 months — without MS. The data of the study demonstrated a decrease in the general health status of patients before RP and at the time of developing BM with existing MS by 27.6% and without MS — by 5.5%. A statistically significant decrease in the QoL was noted in the following indicators: social status, fatigue, lack of appetite, and the presence of financial difficulties. **Conclusion:** The study has shown that the presence of MS causes a decrease in the QoL, PFS, and OS rates in patients with PC.

THORACOSCOPIC SURGERY AS AN IMPROVEMENT OF PATIENTS' QUALITY OF LIFE

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Introduction: About 15% of combat wounds are caused by thoracic injuries. Video-assisted and thoracoscopic methods for access to the chest cavity may become a priority for thoracic surgery. In most cases, the success of the surgical intervention depends on clear visualization and interpretation of the viability of the anatomical areas that have been damaged. **Aim:** To improve the results of treatment and the quality of life of the wounded with damage to the organs of the chest cavity through the implementation of modern diagnostic and surgical methods using minimally invasive technologies and tissue viability visualization systems. **Materials and Methods:** The study included 20 patients who received various injuries of the chest cavity and underwent inpatient treatment in the SI "NSCST named after O. Shalimov" from 2022 to 2023. The patients were divided into 2 groups: the study group included 10 wounded who underwent VATS surgical interventions, consisting of pleurectomy, lung decortication with visualization control of tissue viability ICG using "Verday" contrast 0.1 mg/kg of body weight, and further resection of the lung within the defined limits of viability. In the postoperative period, the following indicators were evaluated: the duration of artificial lung ventilation after surgical procedures, the duration of dependence on oxygen support, the presence of repeated VATS or thoracotomy, the presence of RDS, pneumonia, pneumothorax, or pleural empyema. **Results:** Dependence on oxygen support in the study group was observed within 5 ± 1 days, in the comparison group — 7 ± 1 days. In the study group, patients did not need repeated surgical interventions. At the same time, in the comparison group, 2 patients (20%) underwent repeated VATS interventions consisting of an additional pleurectomy, 1 patient (10%) underwent a thoracotomy and right lower lobe lobectomy, due to continued symptoms of pleural empyema, caused by destructive pneumonia. 3 patients (30%) required repeated surgical interventions in the comparison group ($p > 0.05$). The presence of RDS in the study group and the comparison group did not have a significant difference and amounted to 5 patients (50%) in the study group and 7 patients (70%) in the comparison group ($p > 0.05$). **Conclusions:** VATS can become the main method of access to the chest cavity in thoracic combat trauma of the chest cavity. The use of indocyanine green contrast technology during minimally invasive thoracic surgery may improve outcomes for wartime casualties.

SOCIAL AND LEGAL ASPECTS OF PATIENT'S QUALITY OF LIFE AT THE STAGE OF HEALTHCARE REFORM

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The Constitution of Ukraine guarantees everyone the right to healthcare, medical care, and medical insurance (Article 49). Nevertheless, recent research justifies the importance of guaranteeing the human right to an adequate standard of health-related quality of life (QoL), which is usually assessed by indicators of physical and mental health, including a comprehensive assessment of the burden of preventable diseases, injuries, and disabilities. The basic Law of Ukraine "Fundamentals of the Legislation of Ukraine on Healthcare" deals with the concept of quality of medical and rehabilitation care, which is certainly important, but it is not the only factor that affects the QoL in the broad sense. It is a positive development that in the active phase of healthcare reform, starting in 2022, the current legislation will include, along with the goals of extending life expectancy and improving QoL in the context of the development of the public health system and eHealth. At the same time, it is worth noting that this refers to the overall QoL of the population, but when it comes to a specific patient's personal health, the focus remains on the quality of healthcare services.

The Ukrainian legislation is just at the preparatory stage of establishing and taking into account patient's QoL criteria as a key to assessing the development of the healthcare sector. Nevertheless, the international legal framework has been actively developing for about 20 years. For example, the European Medicines Agency (EMA) has developed guidelines on the use of health-related QoL in the evaluation of medicinal products emphasizing the importance of including patient-reported outcomes in clinical trials to ensure that the therapeutic benefits of treatment are matched with the improvements in patient QoL. FDA has developed the guidelines for assessing human QoL in the clinical trials encouraging the inclusion of health-related QoL data to support the drug approval process.

At the state level in Ukraine, there are currently no comprehensive developments in this area, no potential indicators of patient QoL that could be used in the formation of state policy, determining further vectors of medical reform development, improving the standards of medical care, etc. They should be based on the analysis and evaluation of a number of criteria, including the diagnosis of chronic diseases; ability to perform daily tasks; frequency and intensity of pain;

overall emotional well-being; anxiety and depression; sense of control over life; quality of interpersonal relationships; availability and accessibility of social support; participation in social activities; financial stability; ability to work and job satisfaction; access to medical services and medicines; subjective assessment of one's own health and QoL. It is worth emphasizing the importance of factors of not only physical but also mental health, which are components of the QoL, especially in the context of the martial law in Ukraine.

An obstacle to the introduction of a comprehensive analysis of health-related QoL indicators is the lack of regulatory recommendations and detailed guidelines for assessing conditions and treatment methods. In this regard, there is a need for i) standardization of measurement, analysis, and evaluation; ii) strengthening cooperation between different institutions to unify approaches. In particular, strengthening cooperation with agencies such as the EMA and the FDA could lead to more comprehensive guidelines that are consistent across jurisdictions, improving the regulatory landscape for health-related QoL; iii) involvement of various stakeholders and other affected parties. An integrated approach involving healthcare professionals, patients, and legal experts in the development of the QoL measures and guidelines can ensure that different perspectives are taken into account, ultimately leading to better outcomes for patients.

To summarize, the legal regulation of health-related QoL is a complex interplay of regulatory guidelines, patient rights, and ethical considerations aimed at improving the overall well-being of people in the healthcare system.

ONCOGENETIC COUNSELING AS A COMPONENT OF PERSONALIZED MEDICINE TO PROVIDE THE PATIENTS' QUALITY OF LIFE

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The development of the algorithm for the medical genetic counseling is the first effective stage for the population screening of the Ukrainian population allowing for the delineation of the groups at the increased oncological risk as early as at the stage of the preclinical manifestation of cancer. The observation of these patients in dynamics facilitates the early diagnosis of malignant neoplasms for timely assignment of the therapy. The assessment of the risk of cancer as the multifactorial disease remains an open question in modern medicine. The complex clinical genealogic counseling may contribute for resolving this problem. These are the arguments in favor of the expediency of the development of the system for the medical genetic counseling aimed at cancer prevention.

The system of the medical genetic counseling that we have developed is based on the analysis of the genealogies of the patients in Kyiv region (526 patients with endometrial cancer, 93 — ovary cancer, 261 — breast cancer, 169 — colorectal cancer, and 105 — conditionally healthy persons). The system comprises the following stages: i) the analysis of the clinical-and-genealogical data on the state of health of the probands and their relatives; ii) the assessment of the numbers of the healthy persons and cancer cases among first- and second-degree relatives accounting for the type of cancer and the age at diagnosis; iii) the assessment of the personalized risk of cancer in the first- and second-degree relatives. The application of this algorithm in the patients with endometrial cancer in Kyiv region allowed us to assess the relative contribution of the genetic (endogenous) and the external (exogenous) components within the framework of the multifactorial model. The contribution of these two components amounted to 55.7% and 44.3%, respectively.

Based on the analysis of the relative frequences of cancer of specific localization in the proband's first- and second-degree relatives ($W1_i$ and $W2_j$, respectively) and the coefficients of the genotypic component of the dispersion for the first- and second-degree relatives (0.5 and 0.25, respectively), the criteria for the assessment of the genetic risk of cancer (Rc) were determined:

$$Rc = \sum_{i=1}^{n} (W1_i \times 0{,}5) + \sum_{j=1}^{k} (W2_j \times 0{,}25)$$

when Rc > 6.7% (for patients aged under 50) and Rc > 7.3% (for patients aged over 50), the risk is considered high.

The use of the technology of medical genetic counseling for the assessment of the individual genetic risk of cancer allows for a high efficacy of the measures envisaged in the setting of preventive and personalized medicine.