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Master's Thesis

SPECIFIC FEATURES OF SURGICAL TREATMENT OF PATIENTS WITH CANCER

Master of Science in Nursing

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ABSTRACT

Malignant tumors are the second leading cause of death worldwide, accounting for approximately 10 million deaths each year, or nearly one in every six deaths. The incidence of cancer increases sharply with age; in older people, malignancies are represented very widely, most likely due to the accumulation of risks for specific cancers that increase with age. The selection of treatment strategy for malignancies is performed on a collegiate basis, with involvement of surgical, chemotherapeutic and radiation modalities. The nursing personnel should guarantee an individualized approach to treatment of cancer patients. That's why the aim of the research was to conduct a study of specific features and modern options for surgical treatment of patients with cancers.

This study was a retrospective descriptive analysis of the medical cards of 510 patients diagnosed with cancer. For this purpose clinical examination and modern instrumental and laboratory methods of diagnostics were used. To compare the patients' outcomes with different treatment modalities and postsurgical care methods of statistical comparative analysis was used.

With the study findings it was proved that the correct and timely surgical treatment of cancer requires early and accurate diagnosis. Biopsy with hystological testing holds the leading role in acurate cancer diagnostics, followed by radiologic imaging and radioisotope diagnostics.

Surgical interventions are the most efficient method at early stages of malignant processes and are frequently combined with chemotherapy and radiation therapy. Although radical surgeries were more frequent among studed patients (57.4 %), reconstructive, palliative, and diagnostic interventions were also applied.

To improve the outcomes psychological support for the family members should be provided with nurses leading the process. This implies "working" with fears, changing the attitude to the disease, and, most importantly, refocusing the family's and the patient's attention from the disease to the everyday chores and activities of the family unit.

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INTRODUCTION

The relevance of the study. Cancers of different location [4, 5, 13, 28] (neoplasms or malignant tumors are other common names for cancer) represent a large group of diseases, which may start in almost any organ or tissue of the body [2, 33, 34], when abnormal cells proliferate uncontrollably, go beyond their usual boundaries, penetrate into adjacent parts of the body and/or spread to other organs. The latter process is referred to as metastasizing [11] and represents the leading cause of death from cancer [3, 4, 12, 15, 16].

Malignant tumors are the second leading cause of death worldwide, accounting for approximately 10 million deaths each year, or nearly one in every six deaths. [3, 4, 12, 15, 16].

Lung cancer [41], prostate cancer [43], colorectal cancer, stomach cancer and liver cancer are the most common types of cancer in males, while breast cancer [4, 33, 34], colorectal cancer, lung cancer [41] , cervical cancer and thyroid cancer are the most common malignancies in females.

Among all noncommunicable diseases, the burden of cancer continues to grow worldwide, putting enormous physical, emotional [10, 17] and financial pressure on individuals, families, communities and health systems [1].

The incidence of cancer increases sharply with age; in older people [1, 3, 4], malignancies are represented very widely, most likely due to the accumulation of risks for specific cancers that increase with age. Nevertheless, cancers occur in children as well [22, 23, 24, 25, 26, 31, 42, 47].

Many health systems in low- to middle-income countries are the least prepared to deal with this burden, and a large number of cancer patients around the world do not have access to timely high-quality diagnostics [5, 6, 43, 46] and treatment [13, 14, 30]. In countries with strong and highly effective health systems,

survival rates in many types of cancer are improving through affordable early detection, quality treatment and care for survivors [18, 37, 45].

The selection of treatment strategy is performed on a collegiate basis, with involvement of surgeons [19, 28, 36], chemotherapists and radiation therapists. The nursing personnel should guarantee an individualized approach to treatment of cancer patients [8, 9, 10, 29, 40, 41, 44].

As a rule, surgical removal of the tumor [20, 35, 38, 39, 47], is indicated when malignant tumor is confined to the organ, has distinctive borders and at least partially retains the structure and the function of the original tissue; in other words, when the cells have not lost capacity to differentiate and when the tumor is growing relatively slowly.

Overall, surgical intervention is the most efficient at early stages of the disease [2, 19]. Often, surgery is not the only method of treatment in many locations of cancer [4, 13, 32]; surgical treatment is frequently combined with chemotherapy and radiation therapy.

The specifics of surgical treatment for cancer include its multidirectional nature depending on the type and the location of the tumor. In specially equipped procedure rooms of Oncology and Medical Radiology facilities, many complex procedures are performed on tumors of head and neck, mammary gland [4, 33], lung [5, 41], esophagus, stomach, colon and rectum, urogenital organs [43], bones and soft tissues [32].

Video-assisted, plastic, reconstructive, organ-sparing and simultaneous operations with effective anesthesia are widely used in hospitals around the world. Doctors and nurses use the full potential of domestic and global oncological science and practice [7, 27, 36]. They perform surgical interventions in all locations using minimally invasive access (laparoscopy, thoracoscopy), organ-

sparing, combination, simultaneous (i.e. in patients with competing cardiovascular and tumorous disease), as well as plastic and reconstructive procedures.

Patients with cancer and their family should know that early detection [6, 43] and treatment of cancer and other tumors is the most effective and sought-after approach [14, 31]. The roles of nurses and physicians in achieving success in diagnosis and treatment of such patients, including with the use of modern surgical methods, are very important [28, 39, 47].

The aim of the study: to conduct a study of specific features and modern options for surgical treatment of patients with cancers.

Study objectives.

1. To study modern specific features of cancer management.
2. To study the risk factors for development of cancer and the potential ways to reduce the risk for malignant tumors.
3. To determine the components of early diagnosis of malignant tumors.
4. To define and investigate the specific features for the choice of treatment tactics and methods of surgical treatment in patients with cancer.
5. To define contraindications to surgical treatment of cancer.
6. To investigate the specific aspects of modern diagnostics of cancer.
7. To study certain hereditary tumor syndromes.
8. To investigate the specific aspects of psychological preparation of cancer patient to surgical treatment.

The object of research.Patients with cancer who have had surgical treatment and the necessary preliminary diagnosis, as well as supportive psychotherapy or psychoprophylaxis.

The subject of research. Organization of healthcare in cancer patients with indications for surgical treatment, as well as the specific features of various methods of surgical treatment used in patients with cancer.

The methods of study: collection of history and objective examination of the cancer patient, medical examination and special diagnostic methods, most commonly used in Oncology, including the following: testing for the presence of tumor markers, mammography (if a breast tumor is suspected), endoscopic diagnosis, biopsy and histology, morphological diagnostics, radionuclide diagnostics, molecular genetic diagnosis, diagnostic radiology, interventional diagnostics, clinical pathology, ultrasound examination and functional diagnostics, early diagnosis of regional lymph node involvement in mammary gland disease, and morphological diagnostics. This research study has used such scientific methods as comparative analysis (using various types of surgical procedures) and statistical methods (STATISTICA 10).

The scientific and practical value of the study. During this research study, the investigators have studied the modern specific features of cancer management, the risk factors for development of cancer and the potential ways to reduce the risk for malignant tumors, determined the components of early diagnosis of malignant tumors, defined and investigated the specific features for the choice of treatment tactics and methods of surgical treatment in patients with cancer, defined contraindications to surgical treatment of cancer, investigated the specific aspects of modern diagnostics of cancer, studied certain hereditary tumor syndromes, and investigated the specific aspects of psychological preparation of cancer patient to surgical treatment.

CHAPTER 1
MODERN SPECIFIC FEATURES OF CANCER MANAGEMENT (REVIEW OF LITERATURE)

As reported by the WHO [3, 4, 15, 16, 48], cancer is a leading cause of death worldwide; it accounted for nearly 10 million deaths in 2020.

The most common types of cancer are breast cancer [4, 34], lung cancer [5, 41], colorectal cancer and prostate cancer [43].

Approximately a third of cancer deaths are associated with the use of tobacco, high body mass index, alcohol abuse, low consumption of fruits and vegetables, and lack of physical activity.

Cancer-causing infections such as human papillomavirus (HPV) and hepatitis are responsible for approximately 30% of cancer cases in low- and lower middle-income countries.

Many types of cancer can be cured if detected early and treated effectively.

Cancer is an umbrella term for a large group of diseases that can affect any part of the body [1, 5, 17]. Neoplasms or malignant tumors are other frequently used professional terminology. One of the distinctive features of cancer is the rapid formation of abnormal cells, which grow beyond their usual boundaries and then may penetrate to adjacent parts of the body and spread to other organs; the latter process is referred to as metastasizing. Disseminated metastases [11] are the leading cause of death from cancer.

With age, the incidence of cancer increases sharply [1]. The reason for this may be the increasing accumulation of risks for specific types of cancer with age. Nevertheless, malignant conditions are recently more frequently diagnosed in chidlren [24, 26, 31, 47].

Cancer develops in approximately 400,000 children every year. The most common types of cancer may vary by country. For example, cervical cancer is most common in 23 countries.

WHO experts have found that the most common cancers in 2020 (by the new cases of malignant conditions) were tumors of the following locations [3, 15, 48]:

- breast cancer (2.26 million cases);
- lung cancer (2.21 million cases);
- colorectal cancer (1.93 million cases);
- prostate cancer (1.41 million cases);
- skin cancer (non-melanoma) (1.20 million cases); as well as
- stomach cancer (1.09 million cases).

According to WHO experts, the most common causes of death from cancer in 2020 were tumors of the following locations:

- lung cancer (1.80 million deaths);
- colorectal cancer (916,000 deaths);
- liver cancer (830,000 deaths);
- stomach cancer (769,000 deaths); as well as
- breast cancer (685,000 deaths).

Cancer results from the transformation of normal cells into tumorous cells in a multi-stage process that usually progresses from a precancerous lesion to a malignant tumor [2, 7, 31, 36]. These changes result from interactions between human genetic factors [21] and the three categories of external agents, namely the following:

- physical carcinogens, such as ultraviolet radiation and ionizing radiation;

- chemical carcinogens such as asbestos, components of tobacco smoke, alcohol, aflatoxin (food contaminant) and arsenic (drinking water contaminant), as well as
- biological carcinogens, such as infections caused by certain viruses, bacteria or parasites.

Through its International Agency for Research on Cancer (IARC). the WHO is keeping a classification of cancer-causing agents.

The overall accumulation of risk leads to a situation where the mechanisms of cellular repair are becoming less effective as the person ages [1].

The risk factors for development of cancer are fairly well researched.

The use of tobacco, alcohol abuse, unhealthy diet, lack of physical activity and air pollution are among the risk factors for development of cancer and other noncommunicable diseases.

Some chronic infections are among the risk factors for development of cancer; this is a special problem in low- and middle-income countries. Approximately 13% of cancer cases diagnosed worldwide in 2018 were associated with carcinogenic infections, including *Helicobacter pylori*, human papillomavirus (HPV), hepatitis B virus, hepatitis C virus, and Epstein-Barr virus [16, 48].

Hepatitis B and C viruses and some types of HPV increase the risk of developing liver cancer and cervical cancer, respectively. HIV infection increases the risk of developing cervical cancer sixfold [13, 28] and substantially increases the risk of developing some other cancers, such as Kaposi sarcoma.

Currently, it is possible to reduce the cancer burden due to the use of new modern methods for diagnostics [5, 6, 43] and treatment of cancer. According to the experts, it is currently possible to prevent from 30% to 50% of cancer cases by avoiding risk factors and by implementing the existing evidence-based prophylactic strategies. The burden of cancer can also be reduced through early

cancer detection and appropriate treatment, including high-tech treatment [31], and care for the patients who have developed cancer. Many types of cancer have high chances of being cured if diagnosed early and treated appropriately [2, 28, 39].

Health care personnel and scientists believe that the risk of cancer can be reduced if the potential patients:

- abstain from using tobacco;
- maintain a healthy body weight;
- practice a healthy diet with plenty of fruits and vegetables;
- exercise regularly;
- abstain from or reduce the consumption of alcohol;
- get vaccinated against HPV and hepatitis B if they belong to a demographic group where vaccination is recommended;
- avoid exposure to ultraviolet irradiation (which is primarily associated with exposure to the sun and the use of artificial tanning products) and/or use of sun protection products;
- ensuring safe and proper healthcare uses of radiation (for diagnostic and therapeutic purposes);
- minimizing the professional effects of ionizing radiation, as well as
- reducing the effects of contaminated atmospheric air and indoor air, including those of radon (a radioactive gas produced by the natural decay of uranium, which may accumulate in buildings, i.e. in homes, schools and in the workplaces).

Early detection of cancer reduces cancer-associated mortality provided that the cases are both detected and treated at an early stage. There are two components to early detection: early diagnosis and screening [5, 6, 43, 46].

Early diagnosis of cancer. When detected early, the cancer is more likely to respond to treatment, which may be associated with higher survival odds with lower morbidity, as well as with lower treatment costs. Substantial improvements in the lives of patients with cancer can be achieved by early detection of cancer and by preventing delays in providing care.

Early diagnosis [5, 46] includes the following three components:

- awareness of the symptoms of various types of cancer and of the importance of seeking medical attention when any deviations from normal are detected;
- access to the services of clinical assessment and diagnostics;
- timely referral to a healthcare institution.

Early diagnosis of symptomatic cancer is relevant in all situations and for the majority of types of cancer [4, 13, 32]. Cancer control programs should be designed to reduce delays with and barriers to diagnosis, treatment and supportive care.

Cancer screening. The aim of the screening is to detect the individuals with signs that suggest a specific cancer or a precancerous condition before they develop the symptoms. When deviations are detected during the screening, this should be followed by further testing to establish a definitive diagnosis, as well as by a referral to treatment, if the presence of cancer has been proven.

Screening programs are effective for some, but not all types of cancer. On the whole, such programs are far more complex and resource-intensive than early diagnosis, since they require special equipment and special personnel.

Even when screening programs have already been created, early detection programs are still necessary to detect cases of cancer that occur in the people who fail to meet age-dependent or risk factor-dependent screening criteria.

In order to avoid excessive false-positive tests, the selection of patients for screening programs is based on age and risk factors.

Examples of screening methods include the following:

- HPV test (including HPV DNA and HPV mRNA tests) as the preferred screening method for cervical cancer;
- mammography screening for breast cancer in women aged 50–69 years living in jurisdictions with strong or relatively strong health systems.

Quality assurance is required for both screening programs and for early identification programs.

Nurses [8, 10, 33, 41] and physicians alike are often concerned about organization of effective management of cancer patients and care for cancer patients [1, 2, 31].

The correct diagnosis of cancer is essential for proper and effective treatment since each type of cancer requires a different treatment regimen [14, 30].

The treatment usually includes surgery [2, 19, 36], radiotherapy and/or systemic therapy (chemotherapy, hormonal therapy, targeted biological therapy). The correct choice of treatment regimen takes into account both the type and form of cancer, and the individual characteristics of the person being treated. Completing a treatment protocol within a certain period of time is important for achieving a predicted therapeutic outcome.

Identification of therapeutic goals is an important first step. As a rule, the main objective is to cure cancer or prolong life significantly. Improving the patient's quality of life is also an important goal. This can be achieved by supporting the patient's physical, psychosocial and spiritual wellbeing [1, 10, 17] and by using palliative care in the terminal stages of cancer.

Some of the most common types of cancer, such as breast cancer, cervical cancer, prostate cancer and colorectal cancer, have high chances of being cured if detected early and treated according to best practices.

Some cancers, such as testicular seminoma and various childhood leukemias and lymphomas [24, 42, 47], also have high cure rates if properly treated, even if cancer cells spread to other parts of the body.

There are, however, significant differences in access to treatment between countries with different income levels. Comprehensive treatment is available to more than 90% patients in high-income countries, but less than to 15% patients in low-income countries.

In recent years, biotechnological breakthroughs have led to identification of complex and unique biological features associated with carcinogenesis. Profiling of tumor DNA and extracellular DNA, immune markers, proteomic analysis and RNA analysis are used to identify these characteristics with the goal to optimize anticancer therapy in selected patients. Consequently, clinical trials have evolved from tumor type-specific studies to gene-specific [21], histologically agnostic studies, with innovative adaptive designs tailored to biomarker profiling in order to improve treatment outcomes.

There have been many trials of precision medicine. Most of these trials have demonstrated that matched therapy was associated with better outcomes compared to incompatible therapy in different types of tumors and in certain types of cancer [4, 5, 11].

In order to improve the implementation of precision medicine (high-accuracy evidence-based medicine), this approach should be used in the early stages of the disease, and patients should undergo complete tumor profiling and have access to effective matched therapy [14, 15, 30]. In order to override the complexity of tumor biology, clinical trials of combinations of gene-targeted

therapies with immune-targeted approaches (e.g., checkpoint blockade, personalized vaccines and/or chimeric antigen receptor T cells), hormonal therapy, chemotherapy and/or novel agents should be considered.

These studies should be targeting the dynamic changes in biological abnormalities of the tumor, elimination of minimal residual disease and eradication of significant sub-clones conferring resistance to treatment. The mining and the expansion of real-world data, facilitated by the use of advanced computer processing capabilities, can help validate information to predict new drug uses.

Among many other cancer treatments, photodynamic therapy (PDT) has attracted considerable attention in recent years as a non-invasive and highly selective approach to cancer treatment. PDT involves the activation of a photosensitizer with light of an appropriate wavelength, generating transient levels of reactive oxygen species (ROS).

However, the use of PDT in deeply located tumors is severely limited by insufficient luminous flux and the potential damage to peripheral tissues. Therefore, experts began to investigate whether the combination of PDT with other treatments could improve its effectiveness. There is recent scientific data on in vitro and in vivo experiments, as well as on clinical studies of photodynamic combination therapy, conditionally divided into four parts, corresponding to PDT in combination with chemotherapy, radiation therapy, immunotherapy and other therapies, aimed at comparing the therapeutic benefits of combination therapy vs. monotherapy. Combined photodynamic treatment generally works better than single treatment.

Even surgical treatment of patients with cancer [20, 35, 38] does not always yield positive results. In some cases, palliative care is indicated.

Palliative care is a treatment that aims to alleviate rather than cure the symptoms and the suffering caused by cancer and to improve the quality of life of

patients and their families. Palliative care may help people live more comfortably in their last weeks to months. This is especially important in regions with high proportions of patients with advanced cancers, where chances of cure are slim.

Deliverance from physical, psychosocial and spiritual problems [10, 17] with the help of palliative care is possible in more than 90% of patients with advanced cancer.

Effective public health strategies, including home-based care and community-based care, are needed to relieve pain and to make palliative care available to patients and their families.

Improved access to oral morphine is highly recommended for the treatment of moderate to severe cancer pain, which affects more than 80% of people with end-stage cancer.

In 2017, the World Health Assembly adopted a cancer resolution named "Cancer prevention and control in the context of an integrated approach", which contains a urgent appeal to governments and the WHO accelerate action to achieve the goals set out in Global Action Plan for Cancer Prevention and Control [3, 4, 16, 48].

The WHO collaborates with other organizations within the UN system and partners in order to [4, 15, 48]:

- strengthen political commitment to cancer prevention and control;
- coordinate and conduct studies into the causes of human cancer and the mechanisms of carcinogenesis;
- conduct cancer burden monitoring (as part of the work within the framework of the Global Cancer Registry Initiative);
- identify priority strategies for cancer prevention and control;

- develop the standards and instruments to manage the planning and implementation of preventive interventions, early diagnosis, screening, treatment, palliative care and care for adult and pediatric cancer survivors;
- strengthen health systems at national and local levels to help them improve access to cancer treatment;
- provide global leadership as well as technical assistance to support governments and their partners in building and sustaining high-quality cervical cancer control programs as part of the Global strategy to accelerate the elimination of cervical cancer;
- improve the efforts against breast cancer and reduce preventable mortality from breast cancer, focusing on health promotion, timely diagnosis and access to medical care, to expedite the coordinated implementation of WHO Global Breast Cancer Initiative;
- support governments to improve childhood cancer survival through country-specific support, regional networks and global action through the WHO Global Initiative to Fight Childhood Cancer using a “Treatment for All” approach;
- expand access to essential cancer medicines, in particular through the Global Platform for Access to Children's Cancer Medicines;
- provide technical assistance for the rapid and efficient transfer of best practices to countries.

In addition to that,it should be emphasized that many nurses have difficulty communicating with their patients [8, 9, 33, 34, 41], especially in oncology institutions, where numerous problems occur in the course of diagnosis and surgical treatment, and a need exists to be able to make important decisions.

Providing specialized communication skills training for nurses [40, 44] is one way to improve communication between nurses and their patients. In many

countries, specialists have developed and implemented a communication skills training program for nurses, which includes such training modules as empathic responding to patients [29, 33, 34] and responding to complex interactions with families. Inpatient oncology nurses participate in communication skills training programs. Implementation of communication skills training programs for nurses in cancer institutions yields positive results and has a significant influence on the acquisition of communication skills by the nurses working with cancer patients.

CHAPTER 2
THE OBJECT OF RESEARCH AND METHODS OF STUDY

The object of the study included patients with cancer who have had surgical treatment and the necessary preliminary diagnosis, as well as supportive psychotherapy or psychoprophylaxis.

In order to achieve the objective of the study, in total, 510 patients took part in our research study.

In addition to general clinical and general surgical methods of patient assessment, the following methods are used for diagnosis in Oncology:

- Testing for tumor markers
- Mammography (if a breast tumor is suspected)
- Endoscopic diagnosis
- MRI
- Ultrasound
- X-ray diagnostics
- Histology

In this study, we studied the application of some diagnostic methods in more detail, including for patients at high risk for cancer:

- Morphological diagnostics
- Radionuclide study
- Molecular genetic diagnosis
- X-ray imaging
- Interventional diagnostics
- Endoscopic diagnostics
- Laboratory diagnosis

- Ultrasound and functional diagnostics
- Early identification of regional lymph node involvement in diseases of the mammary gland
- Morphological diagnostics
- Biopsy

This research study has used such scientific methods as comparative analysis (using various types of surgical procedures) and statistical methods (STATISTICA 10).

CHAPTER 3
MODERN SURGICAL TREATMENT OF PATIENTS WITH CANCER

Surgery is the oldest method in the fight against malignant tumors. It is a part of the classic triad of cancer treatment, along with chemotherapy and radiation therapy. Surgical techniques are constantly improving. Minimally invasive interventions, where tissue trauma and blood loss are minimal, and where the patient can recover faster and return to a full life, are becoming more and more widespread.

In this series of the research study, we have studied indications to surgical treatment of cancer and reviewed the types of surgical interventions performed in cancer patients in our study.

The selection of treatment strategy is performed on a collegiate basis, with involvement of surgeons, chemotherapists and radiation therapists. An individualized approach to treatment should be guaranteed for each patient.

As a rule, removal of the tumor is indicated under the following circumstances:

- the tumor is confined to the organ;
- the tumor has well-defined boundaries;
- the tumor at least partially retains the structure and the function of the original tissue, i.e. when the cells have not lost capacity to differentiate;
- the tumor has formed under the influence of external factors;
- the tumor is growing relatively slowly.

On the whole, surgical intervention is the most efficient at early stages of the disease. Often, surgery is not the only method of treatment in many locations of

cancer; surgical treatment is frequently combined with chemotherapy and radiation therapy.

We have also reviewed the types of procedures in Oncology.

The selection of the type of surgical intervention is determined by its purpose:

- to eliminate the cause of the abnormal process;
- to restore the damaged organ;
- to alleviate the symptoms of cancer and to improve the quality of life;
- to clarify the diagnosis.

Therefore, the following types of procedures in cancer patients are distinguished:

- radical;
- reconstructive;
- palliative;
- diagnostic.

A total of 510 patients have taken part in this series of the research study.

Table 3.1. The types of surgical procedures performed in cancer patients in our study

The type of surgery	Number of patients	%
Radical	293	57.4
Reconstructive	120	23.5
Palliative	73	14.3
Diagnostic	24	4.7
Total	510	100

It should be always kept in mind that any surgical intervention is a hazardous and responsible stage of treatment, which should have a thorough rationale. In a radical procedure, a tumor is removed together with the involved organ or its part. Thus, for example, the liver has a high regeneration capacity, its previous volume can be restored over a relatively short time. Therefore, in a patient with liver cancer, the surgeon may remove a substantial portion of this organ without fear of disrupting vital bodily functions.

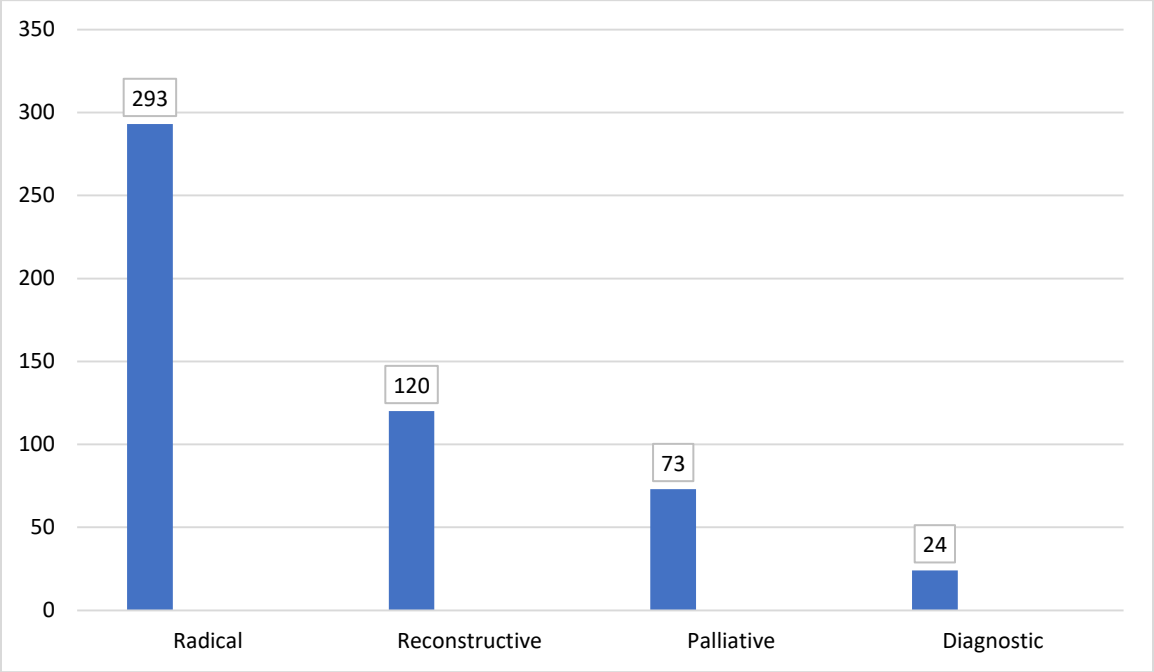

Figure 3.1. The number of patients who underwent surgical procedures of various types

Radical operations for removal of cancerous tumors have their distinctive features. Thus in a typical surgery, in order to prevent the development of metastases, the tissues are removed together with the adjacent lymphatic apparatus. But sometimes the circumstances necessitate the inclusion of additional groups of

lymph nodes into the block of tissues to be removed. Such a radical procedure is referred to as extended surgery.

Combined radical surgery is only performed when the abnormal process has also involved adjacent organs.

There is also such a concept as organ-sparing surgery. This is relevant, for instance, in women diagnosed with an initial stage of breast cancer.

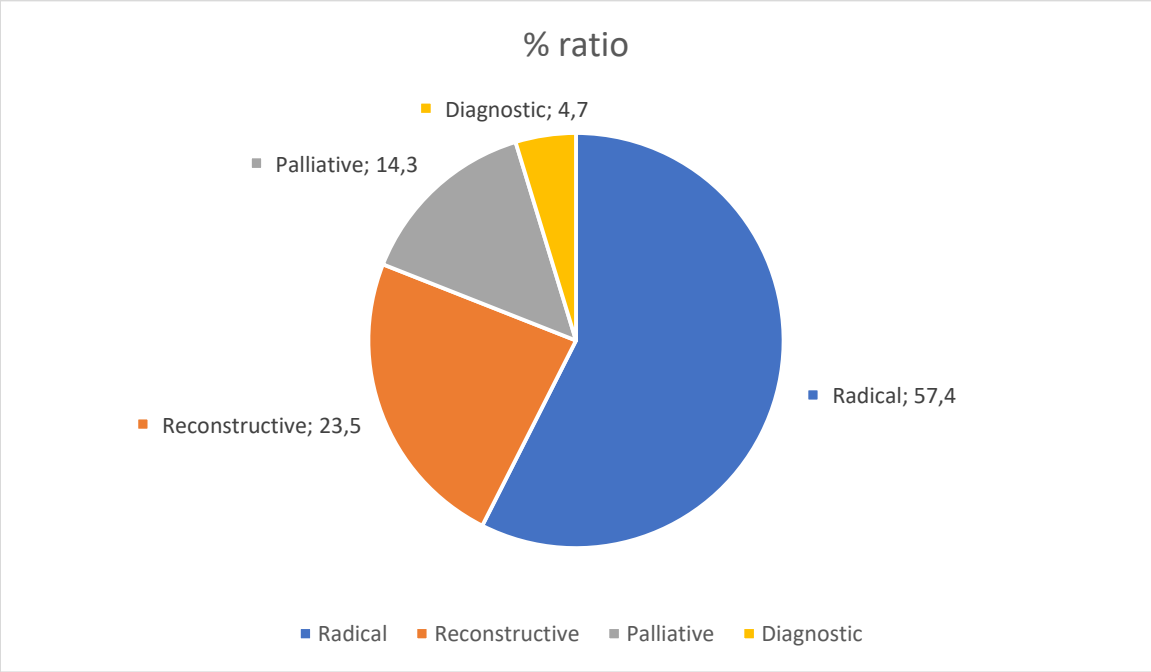

Figure 3.2. The percentage ratio of patients who underwent surgical procedures of various types

Reconstructive procedures are required in complete removal of mammary glands; thus, the appearance of the organs is restored. In aggressive stomach cancer removal of the organ may be indicated; in that case, plastic replacement of the stomach with the patient's own tissues is performed to restore the functions. Reconstructive surgery may be effective in locally advanced laryngeal cancer. Such surgical interventions reduce the duration of patients' rehabilitation.

Palliative surgeries are performed when the malignant tumor went beyond its boundaries and cancerous cells began spreading throughout the body, and non-removable metastases have developed. A need arises to eliminate the complications caused by an inoperable tumor. The aim is to restore the vital bodily functions.

In this case, surgical oncologists are able to improve the patient's well-being. These procedures aim to stop the bleeding, reduce intoxication of the body, restore patency, eliminate the compression of internal organs and reduce pain. In this way, quality of life is increased.

In order to confirm or rule out the diagnosis, diagnostic procedures are performed, which are accompanied by collection of material for subsequent histological examination.

If a malignant tumor is diagnosed in the early stages, it is often possible to perform a radical procedure. The surgeon removes the neoplasm along with a part of intact surrounding tissues, attempting to leave no cancer cells in the patient's body.

A radical surgical treatment is often appended with a course of radiation therapy or chemotherapy. These therapies are needed both preoperatively (in order to reduce tumor size) and postoperatively (to help destroy any remaining cancerous cells).

Palliative surgery in Oncology.

Palliative surgery is used for cancer with metastases. These interventions help to cope with various symptoms and improve the patient's well-being. Oncologists use palliative interventions for different purposes:

- Restoring the patency of organs (for example, of the esophagus, the stomach, the intestines and the biliary tract).
- Stopping the bleeding.

- Eliminating the compression of internal organs, nerves and blood vessels.
- Cytoreductive surgery

One of the distinguishing features of malignant tumors is their capacity for invasive growth. Sometimes they grow into neighboring organs so much that it becomes impossible to remove them completely. In such cases, surgeons resort to cytoreductive operations. Their goal is to remove as much tumor tissue as possible. After a cytoreductive intervention, the tumor is greatly reduced in size, which may increase the effectiveness of chemotherapy, radiation therapy, targeted biological therapy and hormonal therapy.

Curative resection.

Quite often, when the organ is affected by a tumor, it must be completely removed. However, in some cases (as a rule, in the early stages), it is possible to spare the organ by removing its affected part only. This operation is referred to as resection. For example, if a single small tumor is found in the liver, which has not grown into neighboring organs and has not yet metastasized, a resection can be performed. Due to its ability to regenerate, the liver can restore its previous volume within about 6 months.

In some cancers, it is necessary to resort to amputation of limbs or their parts. In part, such interventions are performed in bone cancer and in melanoma.

Diagnostic procedures in Oncology.

Diagnostic surgical interventions are used when a neoplasm is detected in the tissues, but its is not clear whether it is a cancer. In such cases the neoplasm is removed and sent to the laboratory, where pathologists study tissue structure and cell structure under the microscope. Such procedures are referred to as incision biopsy (i.e. removing a part of an abnormal mass) or excision biopsy (i.e. removing the abnormal mass in its entirety).

Removal of lymph nodes.

If tumor tissue is suspected to affect the lymphatic nodes situated the nearest to the organ (i.e. regional lymphatic nodes), these nodes are also removed and sent for a biopsy. This operation is referred to as lymph node dissection.

If the surgeon is not sure whether cancer cells have spread to the lymph nodes, a sentinel lymph node biopsy is performed during tumor removal. A special dye is injected in the site of the tumor, which penetrates the lymphatic system; then the surgeon observes which lymph node the dye goes into first. This lymph node is called a sentinel lymph node: it is to this node that cancer cells should have gotten in the first place, if they began spreading by the lymphogenous route.

The sentinel lymph node is removed and its biopsy is performed. If cancerous cells are found within the sentinel lymph node, lymph node dissection is performed.

Surgical treatment of metastases.

Sometimes, when solitary metastases are detected, they can be surgically removed. However, such a situation is rare. More often, the metastases are fine, multiple and often located in different organs. In such cases, surgery is powerless. Metastatic cancer is fought with chemotherapy, radiation and targeted therapy.

In liver metastases, special methods are sometimes used, such as radio-frequency ablation, chemoembolization.

Reconstructive surgery.

Reconstructive interventions allow restoring the function and the appearance of the organ after the tumor has been removed. Sometimes they are performed immediately after the main procedure, and sometimes after a while. Examples of reconstructive interventions in Oncology include breast prosthetics in women and testicular prosthetics in men.

Preventive surgery.

Preventive surgical interventions help prevent cancer if the risk of cancer development is very high. For example, if polyps are detected in the colon during a colonoscopy, they are removed.

One of the most noted cases in preventive surgery is removal of mammary glands in patients after they were found to harbor a defective gene that greatly increases the risk of breast cancer.

Minimally invasive surgery.

Currently, oncological surgeons still have to resort to classic open surgery, where a large incision is made. There are situations when a viable alternative is absent.

Nevertheless, the indications to minimally invasive surgical interventions have expanded in the recent decades. Their principal advantages include minimization of tissue injury and blood loss, as well as reduction of the rehabilitation period.

In laparoscopic procedures, several punctures are made instead of an incision. An instrument with a video camera and a light source (laparoscopy) is inserted through one of the puncture sites, and special surgical instruments are inserted through other puncture sites.

Endoscopic interventions are performed without any incisions and punctures. The endoscope and the surgical instruments are inserted through natural orifices, e.g. mouth, rectum, urethra and vagina. The indications to endoscopic procedures are limited. The surgeon may remove a fragment of suspicious tissue, benign neoplasms or cancer in the early stages, which has not yet grown deeper.

In some neoplasms, surgeons may use laser surgery, cryosurgery (i.e. destruction of the tumor by low temperature), high frequency radio wave surgery and other modern methods.

In most cases, surgical treatment of cancer is performed under anesthesia. In some minimally invasive interventions, local anesthesia is used or the patient is immersed into a state of "drug-induced sleep".

Surgical treatment in cancer of organs of the digestive system.

Gastrointestinal cancer is one of the most common groups of malignant tumors. Surgeons are performing interventions in cancer of the esophagus, stomach, liver and gallbladder, pancreas, small intestine and colon, rectum and other sites.

Apart from complex open and laparoscopic operations, the following types of interventions are performed:

- Endoscopic removal of polyps of the stomach and colon, and cancer in the initial stages. This is usually performed during a diagnostic gastroscopy or colonoscopy.

- Stenting of the esophagus, stomach, duodenum, colon and bile ducts. A surgeon in a tertiary care centers may have performed hundreds of such interventions. A stent is a metal or polymer hollow frame with a meshed wall. It dilates the lumen of the organ and restores its patency.

- Chemoembolization, radioembolization, radiofrequency ablation in tumors of the liver.

- Laparocentesis and minimally invasive procedures aimed at eliminating ascites, i.e. accumulation of fluid in the abdominal cavity.

- Installation of infusion port systems. Port system is a small reservoir that is sutured under the skin and connected to a vein by means of a catheter. It greatly facilitates the injections of chemotherapy agents and reduces the risk for local complications.

Operations in Oncogynecology.

At the initial stages of cancer in the female reproductive system, various minimally invasive interventions are performed, such as conization (a cuneiform excision of abnormal tissue) and cervical amputation, hysteroresectoscopic ablation, resection and removal of the ovaries and uterine appendages, and laparoscopic transposition of the ovaries (in order to protect them from the effects of radiation therapy).

The Surgical Oncology department performs open and laparoscopic operations at any stage of cancer, such as complete hysterectomy or extirpation (removal) of the uterus, including extended hysterectomy combined with ovarian transposition, and pelvic lymphadenectomy (removal of lymph nodes affected by tumor cells).

Whenever possible, surgeons try to prioritize upon organ-preserving oncogynecological operations, especially when it comes to nulliparous patients who would like to have children in the future.

Important principles of surgical intervention in operations related to cancer include ablastics and antiblastics.

The principles of ablastics and antiblastics are used by surgical oncologists in order to strictly adhere to the surgical technique.

What is ablastics?

The word "ablastics" comes from the Greek word *blastikos*, which means "sprouting, germinating". The "a" here is a prefix with the meaning of negation.

In order to prevent tumor recurrence, the principle of ablastics is widely used in Oncology. During the surgical intervention, all tumor elements are removed from healthy tissue, along with a complex of lymphatic vessels and lymph nodes. Handling is carried out very carefully, without compressing and trauma; the tissue is removed *en bloc*, i.e. the tumor is removed as if "wrapped" in healthy tissues, blocking the potential pathways for dissemination of abnormal cells.

There is no visible border between intact cells and cancerous cells. Therefore, the experience, qualifications, skillfulness and intuition of the surgical oncologist come to the fore in this battle on the operating table.

What is antiblastics?

The prefix "anti" is used to express the opposite, and in the context of Oncology, this means counteracting the spread of the abnormal process.

Therefore, adherence to the principle of antiblastics means using a combination of techniques, which help to prevent the spread of cancer cells beyond the tumor and the surgical site. These techniques represent the physical and chemical effects on the body during the surgery. They include the following:

- frequent change of instruments and supplies;
- washing the wound with antiseptics;
- the use of chemotherapy and radiation therapy before, during and/or after surgery;
- the use of lasers and electrocoagulation (cauterization with high frequency electric current) and cryodestruction (using the effects of ultra-low temperatures).

Through the use of the principles of ablastics and antiblastics, surgical oncologists also solve the task of minimizing the damaging effects in healthy tissues and organs.

Contraindications to surgical treatment of cancer.

Surgeries are not performed if the elderly patient is burdened with chronic disease of the heart, lungs, liver and/or kidneys, which determine their serious general condition.

Although, in an in-patient setting, it is possible to improve the functional measures in such patients, and then resume the discussion of the feasibility of surgical intervention.

Prognosis after removal of a cancerous tumor. Surgical interventions in Oncology are becoming increasingly less traumatic; it becomes possible to remove tumors through small incisions and to use fiber optic technology and miniature video cameras that help make operations more efficient. There is increasing adoption of the techniques to increase the body's resistance to surgical stress; new methods of wound healing are being introduced.

Patient compliance, i.e. thorough implementation of the recommendations of the treating physician, and having regular health checks and additional procedures in a timely fashion helps to stop the unceasing division of cancer cells.

Owing to the development and implementation of simultaneous surgeries in patients with surgery-naïve competing disease (e.g., a tumor and cardiovascular disease), there are chances to attain the cure of both diseases in selected patients. Two operations are performed during one anesthesia: one to remove the tumor and the other to manage cardiovascular disease.

In disseminated pleural lesions, including mesothelioma, combined treatment using thermochemotherapy is carried out.

Surgeries for primary and secondary tumors of the heart are performed in a setting of cardiopulmonary bypass. In low functional indices, lung transplant is performed.

Another modern treatment for malignant neoplasms is stereotactic radiotherapy.

Stereotactic radiosurgery for cerebral tumors includes the delivery of a large dose of radiation to the target in one fraction (session). Despite its name, stereotactic radiosurgery (radiotherapy) is not a surgical procedure per se. This method implies a high-precision delivery of a large dose of ionizing radiation to a tumor while bypassing any adjacent healthy tissues.

Radiosurgical treatment represents an important alternative to open surgical interventions, especially in the patients who are unable to undergo surgery.

Stereotactic irradiation is also possible in tumors located in proximity to vital parts of the brain or in places, which are difficult for the surgeon to access.

The definition of stereotactic irradiation or radiosurgery was originally given by Lars Leksell, a pioneering Swedish neurosurgeon: "a single high dose fraction of radiation, stereotactically directed to an intracranial region of interest". A fine example of modern radiosurgery system is the “Leksell Gamma Knife Perfexion” (manufactured by Elekta), which effectively originated the popular marketing term “Gamma Knife”.

The procedure is performed under local anesthesia; treatment is possible in both in-patient and out-patient setting within one business day.

The radiosurgery session includes the following 4 stages:

1. Fixation of the navigation frame: this stage is performed under local anesthesia and is not accompanied by significant painful sensations.
2. Performing navigational magnetic resonance imaging (computed tomography or direct angiography, as needed).
3. Planning the radiation.
4. A radiosurgery session on a “Leksell Gamma Knife Perfexion” (Elekta) system may last anywhere from tens of minutes to several hours, depending on the complexity of the case.

The procedure is performed by a specialist team, which includes highly qualified radiation oncologists, radiologists and medical physicists.

The following conditions are indications to radiosurgery using a Gamma Knife system:

- metastatic brain lesions (provided the size of the (largest) neoplasm is not more than 3 cm in greatest dimension and the total number of lesions is up to 10);
- neurinomas of the cranial nerves (not more than 3 cm in greatest dimension);
- meningiomas (not more than 3 cm in greatest dimension);
- pituitary adenomas (not more than 3 cm in greatest dimension);
- arteriovenous malformations;
- craniopharyngiomas;
- cavernomas;
- pinealomas;
- recurrent malignant brain gliomas after previous specialized treatment (not more than 3 cm in greatest dimension).

CHAPTER 4
THE SPECIFIC ASPECTS OF MODERN DIAGNOSTICS OF CANCER

The correct and timely surgical treatment of cancer requires early and accurate diagnosis. Therefore, in this study series, we have reviewed in detail some diagnostic methods, without which making a correct diagnosis would have been impossible at the present stage of medical development.

In this chapter, we will discuss the diagnostic methods, which have been highly important for the early and accurate diagnosis of cancer, and which were used in the examination of patients in our research study.

Biopsy is a diagnostic procedure where small parts of tissue (biopsy samples) are obtained from “suspicious” sites, e.g., a mass, a polyp, a recalcitrant ulcer, etc. This diagnostic method has been used in 49 patients in our study.

Depending on the site from which the biopsy sample is taken, different instruments are used.

It can be a thick needle, an endoscope (when examining the esophagus or stomach), a flexible probe (during bronchoscopy), or a conventional scalpel (during a surgical operation).

The main purpose of a biopsy is to establish whether a benign or a malignant process will need to be treated. This procedure is also used when the outcomes of treatment for cancerous tumors are being monitored.

Obtaining a biopsy correctly is a special art that requires experience and skill from the physician. The result of the test and, accordingly, the choice of treatment tactics hinge upon its accuracy (at the beginning, a malignant focus is usually quite small).

Histological testing. This diagnostic method has been used in 255 patients in our study.

The pieces of tissue obtained by biopsy are sent to a special laboratory where they are subject to histological testing. The testing is based on the fact that all cells of the body have a characteristic structure, depending on which tissue they belong to. However, in malignant transformation, the presentation changes dramatically: the internal structure of the cell is disrupted, and it loses similarity to its intact counterparts. As a rule, these abnormalities are so significant that they can be seen in a conventional light microscope.

Processing a biopsy sample. Before examining the material taken during the biopsy, it should be processed in a special manner, i.e. cut into very thin transparent slices (referred to as slices or cross sections) and stain them. In order to prepare the sections, the fragment of tissue is first solidified (for example, impregnated with paraffin) and then fixed in a special holder to be cut with a special ultra-sharp knife referred to as microtome.

The resulting thin films are placed on slides and stained directly on the slides. There are quite a lot of staining methods, but they have one thing in common: they are all carried out in several stages.

Previously, preparations were transferred from bath to bath by hand, but nowadays all stages of sample staining are carried out by automation. This, however, the single stage where automation is possible. Everything else depends entirely on the skill and attention of specialists.

Interpretation of biopsy findings. When the stained preparation is under the eyepiece of the microscope, the pathologist, a doctor of an extremely important medical specialization, comes into play. After evaluating the features of the cells under study, he or she makes their verdict: whether benign or malignant tissue was taken for a biopsy.

Moreover, depending on the type of cancerous defects in the cells, it is often possible to determine the type, the features, and even the prognosis of the disease.

Cytological examination. This diagnostic method has been used in 136 patients in our study.

The cytological method, similar to the histological method, is a method for morphological verification of the diagnosis. Study material can be obtained from virtually anywhere in the body by using a smear or scarification (scraping) from the surface of the lesion (skin or mucous membranes), puncture of a subcutaneous or an intradermal mass, during endoscopic examination (bronchoscopy, gastroscopy, colonoscopy), and from natural or abnormal body fluids (such as urine, sputum, discharge from the nipple of the mammary gland, effusions from cysts and body cavities, etc.). The material obtained is distributed evenly on a glass slide or placed into a sealed container or test tube, and sent to the cytology laboratory.

The advantages of the cytological method are as follows:

- Being virtually painless due to small amount of injury (discomfort in case of scarification; pain as in intramuscular injection in case of puncture).
- Safety of obtaining the material (including from sites where biopsy is difficult to impossible or associated with high risk of complications).
- Rapid diagnosis: depending on the facility, this can be as fast as 30 minutes from sampling to microscopy.
- The possibility of diagnosing cancer in the initial (preclinical) stage. At the same time, the results are comparable to and approximate the efficiency of the histological method.
- The relative simplicity and availability: inexpensive equipment and reagents for cytological examination, and the relative simplicity and reproducibility of the technique.

- A small amount of material needed to make a morphological diagnosis.

The cytological method is used under the following circumstances:

- in preventive and diagnostic examinations in an outpatient setting (i.e. in the polyclinic);
- in course of patient follow-up: multiple studies to see how abnormal findings change with time from before treatment to after treatment; in order to assess the therapeutic pathomorphosis (death) of the tumor;
- in parallel with histological examination;
- in situations when the severity of the patient's condition does not allow a more traumatic histological examination.

The stages of the cytological examination.

The material can be sampled by a gynecologist or midwife, an oncologist, a specialist physician, or a general surgeon. Then the material obtained is sent to the cytological laboratory, where medical laboratory assistants prepare cytological microscopic preparations, and cytologists examine them under a microscope.

In most cases, registration and preparation of microscopic preparations takes no more than 30 minutes. However, the amount of time required for microscopic examination and diagnosis largely depends on the complexity of the microscopic presentation and the informative value of the material obtained. In most cases, the test report can be issued on the day of sample arrival. However, in cases with complicated diagnosis, when additional testing methods are required (such as immunochemistry testing, flow cytometry, etc.), the result can be expected in 10-14 days.

The cytological method is a method for morphological confirmation of the diagnosis, valuable in a number of non-oncological diseases and mandatory for many oncological patients.

Cytological examination confirms the presence of inflammation, determines its activity and severity; in many cases, it indicates the infectious agent that may have caused the inflammation, which contributes to administration of correct treatment.

It is not always possible to accurately determine the nature of a non-tumor disease according to international classifications using a cytological examination. However, it is more important that cytology clearly shows if a malignant degeneration of cells has begun, which will allow a timely referral of the patient to an oncologist.

As a rule, a malignant nature of a mass is clearly visible in the cytological preparation. The level of modern knowledge of cytologists allows them to establish their diagnosis in accordance with international histological classifications of malignant tumors both in common disease (cancer of the lung, stomach, intestines, uterus, breast), as well as in less frequent ones (melanoma, lymphoma, liver cancer, kidney cancer, pancreatic cancer, etc.). Based on the results of a cytological study, a list of necessary additional examinations is determined, the types and volumes of treatment are planned, and a preliminary prognosis is given for the outcome of the disease.

Radioisotope diagnostics and nuclear medicine.

Nuclear medicine is an area of clinical medicine, which deals with the use of radionuclide pharmaceuticals in diagnosis and treatment of disease. Methods of remote radiation therapy are sometimes included in nuclear medicine.

The diagnostic realm mainly uses single-photon emission computed tomography (SPECT, these tomographs capture gamma rays) and positron emission tomographs (PET scanners).

Radionuclide studies.

Bone scan (skeletal scintigraphy). This diagnostic method has been used in 45 patients in our study.

It is used to diagnose diseases of the skeletal system, both primary and secondary. The study is carried out in one day, 2-4 hours after the injection of the radiopharmaceutical.

No special preparation is required.

Single-photon emission computed tomography (SPECT) of the areas of interest.

After planar studies, if there is a need to more accurately determine the size, shape and location of the abnormal focus, it is possible to conduct single-photon emission computed tomography of the body part of interest. The tomography is usually performed immediately after the planar study.

After planar studies, if there is a need to more accurately determine the size, shape and location of the abnormal focus, it is possible to conduct single-photon emission computed tomography combined with the X-ray computed tomography of the body part of interest.

The combination of the data obtained with SPECT with the accurate anatomical data of CT scan provides a new level of diagnostic information. The use of the hybrid technology makes it possible to reliably determine the presence or absence of an abnormal process.

Accurate overlay of anatomical and functional images increases the reliability of locating the focal lesions. The SPECT/CT is usually performed immediately after the planar study.

Scintigraphy and SPECT of the thyroid gland. This diagnostic method has been used in 27 patients in our study.

It is performed to determine the anatomical and topographic characteristics of the thyroid gland, as well as to identify "cold", "warm" and "hot" foci in the tissue of the organ, and to identify the functional autonomy of the "hot" nodes. Depending on the aim of the study, it may be performed in multiple phases in one day: in 10-15 minutes after intravenous injection of the radiopharmaceutical and 2-3 hours later. When conducting a suppressive test, a second study is carried out after a 7-day oral administration of thyroid hormones.

Preparation for the study. Iodine-containing drugs should be discontinued 3-4 weeks prior to the study, and hormonal and antithyroid drugs should be discontinued 1-2 weeks prior to the study.

Scintigraphy and SPECT of the parathyroid glands. This diagnostic method has been used in 6 patients in our study.

It is used for determination of “hot” spots in the tissue of the organ when adenoma or cancer is suspected. The study is performed in two phases in one day, i.e. 10-15 minutes and 2-3 hours after an intravenous injection of the radiopharmaceutical.

No special preparation is required.

Dynamic scintigraphy of the hepatobiliary system allows the assessment of the functional status of the liver and the biliary tract. This diagnostic method has been used in 12 patients in our study.

The study is carried out in one day, immediately after the injection of the radiopharmaceutical.

Preparation for the study. The patient should fast for at least 4 hours before the study.

SPECT/MRI of the brain (hybridization with the previously performed MRI). This diagnostic method has been used in 18 patients in our study.

It is used for the differential diagnosis of cerebral malignancies with benign, infectious or post-therapeutic lesions. The study is performed in one day, 10-15 minutes after an intravenous injection of the radiopharmaceutical.

No special preparation is required.

SPECT/CT of the area of interest for identification of the sentinel lymph node in malignant neoplasms of different locations. This diagnostic method has been used in 35 patients in our study.

This method allows detecting the sentinel lymph node of the affected organ before surgical treatment. This allows assessment of this lymph node during the procedure and defining the extent of the surgical intervention. The study is performed in one day, in multiple phases, i.e. 10 minutes and 1-2 hours after subcutaneous injections of the radiopharmaceutical. Additional assessments may be performed as required.

No special preparation is required.

SPECT/CT of the area of interest for identification of the primary tumor and the affected lymph nodes in malignant lesions of different locations. This diagnostic method has been used in 28 patients in our study.

It is used to identify the primary tumor and its metastases in the lymph nodes, as well as to predict the chemotherapy sensitivity of the tumor. This allows for clarification of the disease stage and for defining further treatment strategy. The study is performed in two phases in one day, i.e. 10-15 minutes and 2 hours after an intravenous injection of the radiopharmaceutical.

No special preparation is required.

The studies are conducted only as clinically indicated (as referred by the physician).

Depending on the type of assessment, the radiopharmaceutical is administered intravenously, subcutaneously or intramuscularly when performing radionuclide diagnostics.

Administration of radiopharmaceuticals is contraindicated in pregnant and breastfeeding women.

For 3 days after the injection of a radiopharmaceutical, the patient should limit their time in immediate proximity from other people, especially children before 10 years of age and pregnant women.

Molecular genetic diagnosis. This diagnostic method has been used in 43 patients in our study.

Molecular genetic diagnostics is a method of examination allowing for an accurate and rapid detection of viruses and infections, disease-causing gene mutations, and assessment of the risks for congenital abnormalities and other disease. And this is far from the full range of possibilities offered by DNA studies.

The most important advantage of molecular genetic diagnostics is the minimal degree of medical intervention, since the study is performed in vitro. The method is successfully used even for diagnosis of disease in embryos, as well as in debilitated and seriously ill patients.

The most common test material is blood from a vein; however, it is possible to isolate DNA/RNA from other fluids and tissues, such as saliva, scrapings of the oral mucosa, secretions from the genital organs, amniotic fluid, hair, nails, etc.

Molecular diagnostics is a significant step towards personalized medicine, since it allows to take into account all the characteristics of a particular patient during assessment and therapy.

Table 4.1. The use of modern methods of cancer diagnosis for selection of methods and tactics of surgical treatment (SPECT = single-photon emission computed tomography)

The diagnostic modality	The number of patients where the diagnostic modality was used
Biopsy	48
Histological testing	255
Cytological examination	136
Bone scan (skeletal scintigraphy)	45
Scintigraphy and SPECT* of the thyroid gland	27
Scintigraphy and SPECT* of the parathyroid glands	6
Dynamic scintigraphy of the hepatobiliary system	12
SPECT*/MRI of the brain (hybridization with the previously performed MRI)	18
SPECT*/CT of the area of interest for identification of the sentinel lymph node in malignant neoplasms of different locations	35
SPECT*/CT of the area of interest for identification of the primary tumor and the affected lymph nodes in malignant lesions of different locations	28
Molecular genetic diagnosis	43

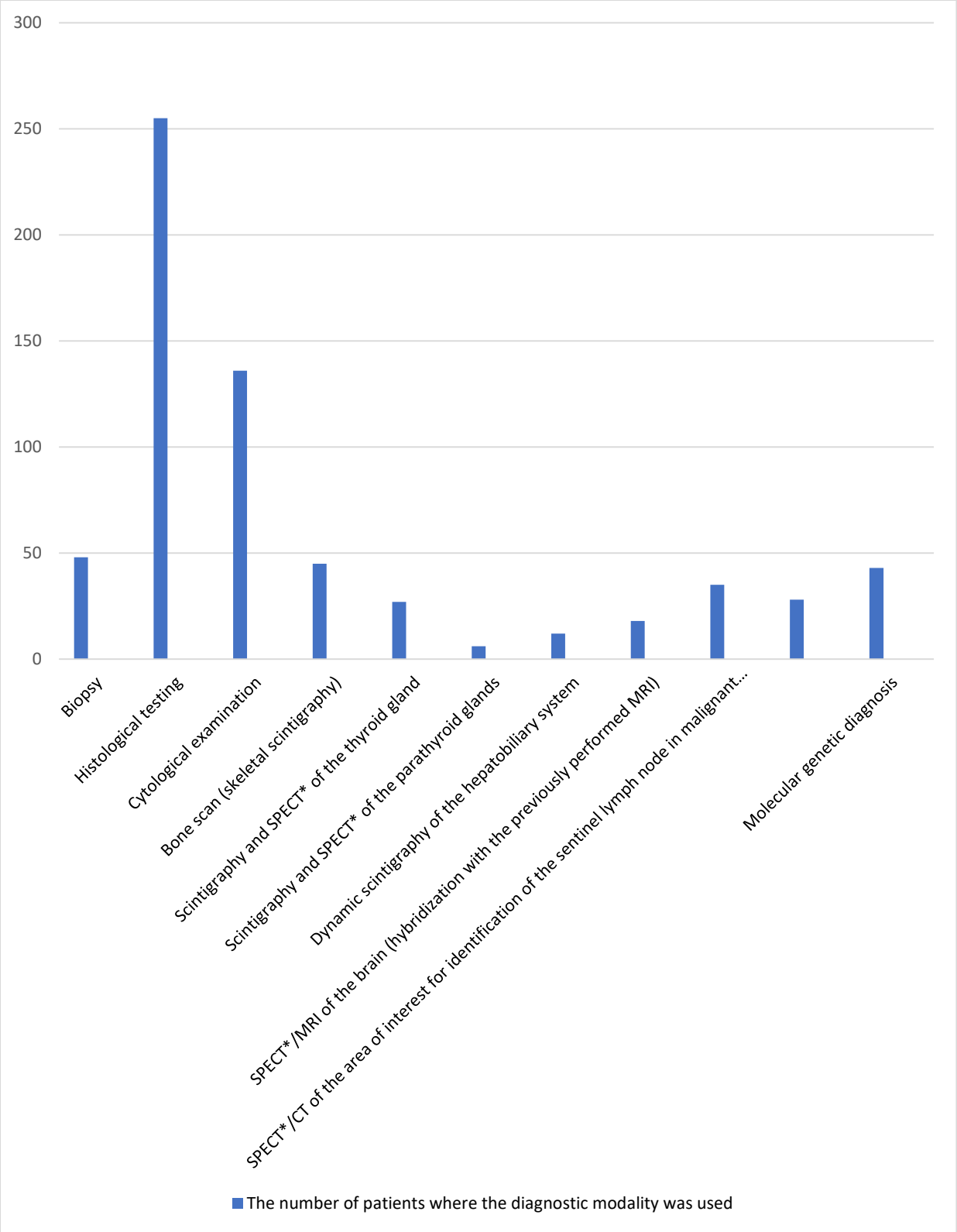
300
250
200
150
100
50
0
Biopsy
Histological testing
Cytological examination
Bone scan (skeletal scintigraphy)
Scintigraphy and SPECT* of the thyroid gland
Scintigraphy and SPECT* of the parathyroid glands
Dynamic scintigraphy of the hepatobiliary system
SPECT*/MRI of the brain (hybridization with the previously performed MRI)
SPECT*/CT of the area of interest for identification of the sentinel lymph node in malignant...
Molecular genetic diagnosis
The number of patients where the diagnostic modality was used

Figure 4.1. The modern methods of cancer diagnosis used in our study for selection of methods and tactics of surgical treatment

* = single-photon emission computed tomography (SPECT)

The use of findings of modern modalities for the diagnosis of cancers and their specific features in the patients (location, the degree of spread to surrounding tissues and neighboring organs and other particulars) contributed to the early and accurate diagnosis of cancers in patients of our research study. This contributed to a more successful selection of the methods and tactics of surgical treatment.

More recently, molecular biological studies have been very widely used for the diagnosis of cancer prior to surgical treatment.

Up to date, molecular genetic markers are routinely used in clinical practice at all stages of cancer care, including prevention, early and differential diagnosis, as well as treatment of patients with malignant tumors.

Two areas of clinical and applied research seem to be the most significant: the diagnosis of hereditary cancer syndromes and the individual selection of drugs based on the molecular characteristics of the tumor.

We have also studied certain hereditary tumor syndromes.

Hereditary tumor syndromes is a group of diseases whose manifestations include transmission of an almost fatal predisposition to a particular type of cancer from one generation to another. They make up an insignificant proportion of the total number of neoplasms (approximately 1%), although for individual locations (mammary gland, ovary and colon), their specific contribution reaches higher rates (5-20%).

The causes of such disease include the carriage of an inherited “cancerous” mutation. Up to a certain point, individuals with such genetic damage remain otherwise healthy. Nevertheless, they have a fatally increased risk of developing neoplasms: the penetrance of the corresponding mutations is usually at 85-100%.

The vast majority of known oncogenes involved in the pathogenesis of hereditary tumor syndromes are the so-called. suppressor genes. These genetic elements normally exercise negative control over cell division, regulate DNA repair processes, trigger the mechanisms of programmed cell death, etc.

If these genes are inactivated, the corresponding clone acquires new qualities (i.e. accelerated proliferation, immortalization, abnormal accumulation of mutations, etc.). Such events accelerate the acquisition of new critical genetic disturbances; there is a chain reaction ultimately leading to tumor formation.

CHAPTER 5
PSYCHOLOGICAL PREPARATION OF CANCER PATIENT TO SURGICAL TREATMENT

More recently, the problem of treatment compliance (i.e. patient's adherence to treatment) is extremely relevant in healthcare, including surgical treatment of cancer. This issue has a major impact on both the effectiveness of therapy and the quality of life of the patient. The need to take into account the patient's adherence to surgical treatment is especially acute in Oncology.

New high-tech methods for diagnosis and treatment of cancer patients focus the attention of the nurse and the physician on the treatment and the responsibility for its results.

At the same time, the psychological dimension of the disease, i.e. the personality of the patient, their experiences and psychoemotional status, which are affecting the treatment, are taken into account by the physician to a lesser extent.

In course of treatment, the nurses and the physicians enter into a direct psychological interaction with the patient. In the setting of cancer, and even more than in any other disease, this interaction is significant for the treatment of the patient and for their adjustment to disease. The physician is the very human person who most competently and most adequately can help the patient to exist in a situation of illness. The very life of the patient largely depends on his/her words and actions. According to a study aimed at identifying the socio-psychological needs of cancer patients, the most effective measures were those aiming to improve communication between the doctor and the patient, followed by psychotherapeutic and psychological counseling, and only then by the use of psychopharmacological agents (in the third place). Thus, a psychologically competent professional interaction with the patient is expected from the nurse and the oncologist. The

absence of professional preparation for communicative activity, which is an essential element of every physician's work, creates a number of difficulties in relationships with cancer patients.

The "nurse/physician–patient" relationships are asymmetric. While the patient perceives their status and communication with the physician as unique and often critical, for the physician, the relationships with this patient are one of many relationships with patients, with whom the physician may simultaneously interact in the course of treatment. The challenge for the physician is to establish individual relationship with each patient, but at the same time, the physician should be informed not by their personal preferences and assessments, but rather be guided by the need to achieve professional goals. Such relationships are affecting not only the emotional state of the patient, but that of the doctor as well, and contribute to burnout.

In a situation of conditionally "unfavorable" psychological interaction with the patient, the physician's focus may shift from a professional standpoint into the realm of personal relationships.

In other words, while being engaged in professional activity, the physician may use not their professional communication skills, but the casual interpersonal communication skills used in daily life.

The shift from the professional standpoint into the realm of personal relationships increases the emotional tension in the physician's interaction with the cancer patient, and a basis for conflict appears.

Resolving these issues lies in the nurse's and the physician's awareness of their professional standing and in their attempts at a meaningful relationship with the patient.

Anticipating the surgery may become a most serious injurious factor in the preoperative period.

Preoperatively, most patients experience elevated levels of anxiety, which is a situational norm. As is known, anxiety is playing a substantial role within the framework of preoperative stress. The quite tangible risks of unexpected lethal outcome, the fear of “narcosis”, the fear of “never waking up”, etc. put the patient in a special traumatic situation.

At this step, the importance of psychological work is indisputable.

The main objective of psychological assistance is to change the patient’s attitude to the upcoming surgery and to accept the fact of the need for surgery as the only chance to save life.

In the postoperative period, there is some relief of all emotional stress experienced by the patient. Asthenic-depressive and anxious-hypochondriac syndromes predominate at this stage. The fear of complications, anxiety due to the consequences of the surgery and general physical fatigue are coming to the fore in the patient’s consciousness. Anticipating the histological report, which determines prognosis and further treatment, causes special emotional distress.

Undoubtedly, during this period it is important to conduct psychological preparation of the patient to further treatment. To this end, all of the aforementioned psychotherapeutic methods are used.

No significant psychopathological conditions are observed at the stage of discharge from the hospital. Individual patients may experience high levels of anxiety and fear associated with the lack of medical supervision in a home setting. Family support is a very important and essential factor contributing to favorable adjustment of the patient. Returning to the family may aggravate the mental condition of the patient, if the behaviors of significant others do not meet the patient’s expectations. When treated inadequately, the patient becomes isolated from the family and the wider social network, their relationships with the people are dramatically changed, and the patient finds themselves in the conditions of

social deprivation. Therefore, an important aspect in the work of a psychologist is being a source of assistance and support to the relatives and significant others of the patient, who often also find themselves under stress and may experience even greater anxiety than the patient.

The studies associated with a more remote dynamics of malignant conditions, stress out the two main scenarios of patient adjustment: favorable and unfavorable. The favorable scenario is seen with early identification and timely treatment of the tumor, without cosmetic and functional impairment; in other words, a convalescence scenario. In this case, after an insignificant recovery period, the patients are returning to their previous way of life showing no signs of neuropsychiatric disorders.

The unfavorable scenario unfolds in case of a prolonged treatment associated with severe complications, cosmetic defects (i.e. after a mutilating surgery, post-chemotherapy alopecia, etc.), as well as anatomical and functional impairment as a result of surgical intervention.

In the event of significant mental disorders, a psychiatrist's consultation is mandatory.

Psychological assistance for the family of patients with cancer.

It is widely believed that family members should maintain their composure and outward calm in order to provide support to the patient. However, such belief is false, because the patient may perceive the unnaturalness of such situation, and lose confidence in their loved ones. In an extremely opposite situation, the family may be very much scared themselves; they may keep talking about their loved one's disease all the time, constantly browse for information on the internet and keep asking the doctors about the potential complications of treatment, the prognosis, etc.

Such a behavior upsets the patient even more, and they may lose their motivation to fight the disease. The family support should be felt as calm, self-evident, and grounded in the belief in the patient's recovery.

The psychological support for the family members implies "working" with fears, changing the attitude to the disease, and, most importantly, refocusing the family's and the patient's attention from the disease to the everyday chores and activities of the family unit. The more the patient is involved in daily life, the quieter the treatment will be. Rather than keep being scared of a global threat (i.e. death), it is better to redirect attention to compliance with sleep and wakefulness routine, the diet, walks in the open air, compliance with doctor's recommendations, participation in feasible household chores, hobbies, gardening, etc.

It is important to be natural, to discuss the patient's pain, fears and emotionally hurtful experiences; this seems to be the only way to help and support the patient. The most important thing is to let the patient feel that their significant others are always there for them and walk with them through their illness step by step.

It should be emphasized that all 510 cancer patients who took part in our research study, and who had surgical treatment and the required preliminary diagnosis, had timely supportive psychotherapy or psychoprophylaxis, which, in general, yielded a positive result.

CONCLUSIONS

1. Modern specific features of cancer management have been studied.
2. The risk factors for development of cancer and the potential ways to reduce the risk for malignant tumors have been studied.
3. The authors have determined the components of early diagnosis of malignant tumors.
4. The specific features for the choice of treatment tactics and methods of surgical treatment in patients with cancer have been defined and investigated.
5. Contraindications to surgical treatment of cancer have been defined.
6. The authors have studied the specific aspects of modern diagnostics of cancer.
7. Certain hereditary tumor syndromes have been studied.
8. The authors have investigated the specific aspects of psychological preparation of cancer patient to surgical treatment.

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