**All about Cancer and treatment of cancer**

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In everyday language, the malignant disease is most often referred to as cancer, and cancer is generally considered the worst condition. However, cancer is much better than its reputation. Currently, nearly two-thirds of people living with cancer live at least five years after their illness and more and more recover from it. Cancer has become one of the diseases, among others - it is a disease that is cured of, hoped for, and can lead a good life.

Cancer is a very diverse set of diseases that are linked by a single factor, the uncontrolled proliferation of cells. Growth and reproduction are due to changes in the genes that regulate cell and tissue growth. The body has a large number of defenses to prevent and repair dangerous genetic changes and therefore requires several simultaneous or sequential genetic damage before the situation "gets out of hand"1.

Cancer cells produce as part of the aging process of the body, and therefore, cancer becomes more common with age. Coincidence plays an important part, but external factors also play a significant role. Lifestyle and living environment affect the formation of a cancer cell and the defense mechanisms by which the body rejects cancer. External factors can also affect the growth of latent or established cancer by slowing or accelerating it. Prolonged exposure to smoke, especially tobacco smoke, causes more cancer than any other known environmental factor. Other causes of cancer include alcohol, ultraviolet radiation, obesity, and lack of exercise. Red meat (mainly industrially processed) seems to increase the risk of cancer, while fiber-rich carbohydrates (rye bread, oatmeal, fruits, vegetables) reduce the risk. It is estimated that four out of ten cancers could be prevented by addressing these factors2.

Cancer grows very slowly in the beginning. It is estimated that it takes on average about ten years for one malignant cell to become a centimeter in diameter. Thus, a delay of several weeks in the initiation of treatment does not, in most cases affect the prognosis. Again, cancer is not a single disease. Several cancers grow very slowly and a small number very fast. For example, a great deal of prostate cancer belongs to slow-growing "kind" cancers that do not cause actual harm during a man's lifetime. According to the old saying, the prognosis of prostate cancer is usually so good that it does not die but dies with it.

The slow average growth of cancer is indicated by the change in the risk of lung cancer after smoking cessation. The risk of illness begins to decline slowly within a couple of years of stopping smoking, but well over ten years before the risk returns to non-smoking levels. The danger of lung cancer is partial because it discovers so late that treatments no longer help.

The varied nature of cancer is also illustrated by changes in the prevalence of individual cancers. Lung cancer is rarer in men but more common in women. Esophageal and gastric cancers are reduced when the colon and rectum cancers are increasing in both sexes. Breast cancer and cancer of the uterine body have become increasingly common in women. Prostate cancer is found more in men each year, but the increase may be apparent and due to screening (PSA, prostate-specific antigen)3. As a result of all these changes, the overall rate of cancer in men is currently increasing slowly and slightly faster in women.

On the other hand, cancer mortality is declining rapidly. The change is due to a reduction in disease (lung cancer, esophageal and stomach cancer), screening (cervical cancer), and giant steps in treatment (all cancers). Treatment results in pediatric cancer are particularly useful. They are still deficient in pancreatic cancer, gastric cancer, and lung cancer. The treatment of even the most severe cancers is progressing slowly but surely. Research states that by the end of this decade, 80-90% of all cancers will be completely cured. Money can become a barrier because some of the new treatments are very expensive3.

Prevention is the best treatment for cancer. The same measures that can reduce the risk of heart disease, type 2 diabetes, and even dementia also prevent cancer. If cancer is found, it is best to be as calm as possible. The chances of healing are good and year by year. Hope should never be lost. New treatments are often useful even if the disease has already spread or recurred3.

How does cancer develop?

The origin of cancer is a multistep event in which damage to a cell's genetic material makes a normal cell malignant. The disturbance gradually accumulates in the cell growth-regulating system. Cancer comes from a genetic defect. Human genetic factors, or genes, are located inside cells in structures called chromosomes. Genes control cellular functions, such as their distribution. Genes can be altered or mutated if the mechanisms that regulate cell division fail. One gene defect is usually not enough to cause cancer. Cancer occurs when mutations occur in several genes that play an essential role in the regulation of cell growth and differentiation. The so-called cancer genes are normal genes controlling cell function that are just damaged. There are two types of cancer genes: oncogenes, cancer-causing genes whose activation causes uncontrolled cell division growth-inhibitory genes or anticancer genes whose carcinogenic effect is due to their cessation of action4.

Genetic damage is continually occurring in many cells. However, the human body has a sophisticated defense system that corrects damage. If the system fails, the damaged cells may begin to divide uncontrollably, eventually leading to cancer. There are billions of cancer cells in a cancerous tumor. The cancer cell must divide many thousands of times before the cancer is even pea-sized. Thus, it may take years for the cancer to show up on an X-ray or be palpable. Sometimes, however, a tumor can also grow much faster.

Cancer treatment

The human body is made up of cells. Typically, the distribution of cells in the body is carefully regulated, so that new cells are created as the old ones reach the end of their life cycle. Sometimes, however, the cell begins to grow and divide abnormally. The mass formed from uncontrolled dividing cells is called a tumor. Tumors can be benign or malignant. There are three types of treatment including;

Surgical intervention

The oncological surgeon removes the tumor, in the hope that cancer cells are localized so far only in one place. However, modern science cannot guarantee the absence of metastases. Most often, surgery is an integral part of complex treatment.

Chemotherapy

Treatment directed against the rapid division of cells and contributing to their weakening by toxic drugs. Alas, therapy affects both cancer cells and healthy cells. Unfortunately, a gentler alternative to this method of treatment has not yet been invented, but doctors are qualitatively choosing the dosage of the drugs and explain how to minimize side effects.

Radiation therapy

Tumor irradiation, or radiotherapy, is by far the safest way to treat cancer. High-energy radiation negatively affects the DNA of the cell, destroying it, and the cancer cell is unable to divide and grow after irradiation actively5. Healthy cells have a much higher chance of regeneration than cancer cells, so radiation therapy is much more destructive for aggressor cells.

Modern methods of remote radiation therapy

The most recent techniques, such as 3D conformal radiation therapy, radiation therapy with intensity modulation and radiation therapy with visual control, allow achieving extremely accurate target formation, to which the prescribed dose of radiation is applied5. Modern technology can significantly prevent the irradiation of vital organs located near the tumor. Another essential tool is radiobiological research to help one to choose the best treatment regimen. A comprehensive quality assurance program should be in place at the medical facility.

Bibliography

1. Tiu, C., Loh, Z., Gan, C. L., Gan, H., John, T., & Hawkes, E. (2019). Effect of Reasons for Screen Failure on Subsequent Treatment Outcomes in Cancer Patients Assessed for Clinical Trials. Oncology, 1-7.
2. Niazi, K. R., Rabizadeh, S., & Bredesen, D. E. (2018). U.S. Patent No. 9,885,704. Washington, DC: U.S. Patent and Trademark Office.
3. Lambert, J. M., & Berkenblit, A. (2018). Antibody-drug conjugates for cancer treatment. Annual review of medicine, 69, 191-207.
4. Song, M., Vogelstein, B., Giovannucci, E. L., Willett, W. C., & Tomasetti, C. (2018). Cancer prevention: Molecular and epidemiologic consensus. Science, 361(6409), 1317-1318.
5. Senapati, S., Mahanta, A., Kumar, S., and Maiti, P. (2019). Controlled drug delivery vehicles for cancer treatment and their performance.