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A brief Overview of a Fatal Disease Namely Cancer

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ABSTRACT

In today era cancer is a dangerous and terrible disease which cause due to rapid increment of unusual cells within the body. Cancer is the second influential cause of death in the world. It has become very difficult overcome cancerous disease. About an average of 10 million people died per year from cancer. The major cause of cancer is sudden change in DNA within the cells. As a result normal cells convert into cancerous cells which enhance the process of metastasis. There are some treatments of this dangerous disease but those are so expensive not everyone can afford it easily. So, it's our responsibility to spread awareness among the people about this disease. The purpose of this article is providing awareness about this deadly disease, and to follow routine activities so that the occurrence of this disease could be avoided.

Keywords: Neoplasm, Carcinoma, Leukemia, Chemotherapy, Radiation therapy.

1. INTRODUCTION

The uncontrolled growth of abnormal cells inside the body known as cancer.¹ Cancer is the most dreadful disease of human beings and major cause of death all over the world. More than 10 million people suffering from cancer and a large number of people dies annually due to cancer. There are different types of changes takes place in normal cell to become a cancerous cell shown in fig1.

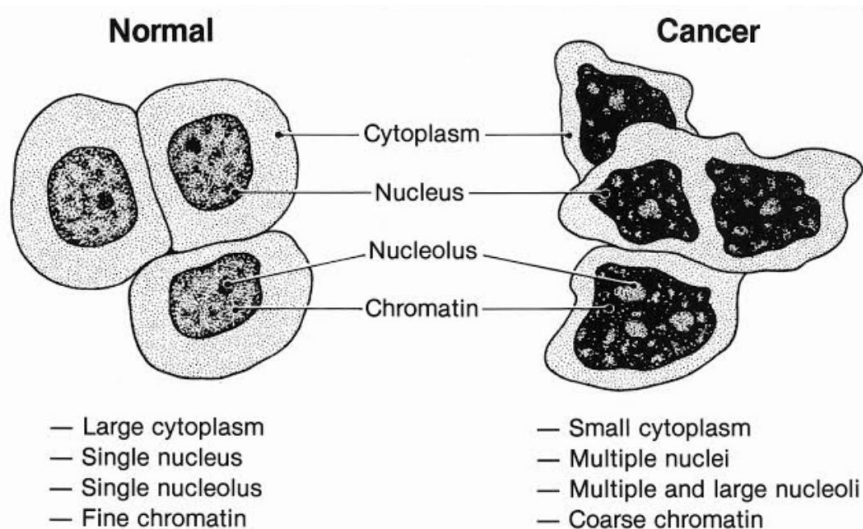


Fig: 1 Cancer cell v/s Normal cell

Sudden changes in DNA of cell called cancer and the process is named as mutation.² More than 260k people are suffering from some stages of cancer in their life-time and it's also diminished by physically like decrease survival rate and weight loss.³ In an entire world, more than 80% patients may use accessory therapies such as relaxation, massage etc. Accessory therapies are effective in cancer treatment. Some other standard medical treatments such as chemotherapy, surgery, immunotherapy, radiation therapy etc, are used to treat this disease.⁴

2. TYPES OF CANCER

These are two types of tumours such as:

1. Malignant tumor
2. Benign tumor

Table 1. Difference between malignant and benign tumor

Benign tumor	Malignant tumor
Cells multiply slowly	Cells multiply rapidly
Never spread to other sites	Spread to other sites
Normal nuclei	Abnormally large, numerous and intensely staining nuclei
Growth rate is slow	Growth rate is fast
Necrosis and ulceration abnormal	Necrosis and ulceration common
Similar to cell of origin	Dissimilar from cell of origin
Can be cured with surgery	Cured with chemotherapy, immunotherapy or radiation therapy treatments. ⁵

2.1.1 Carcinoma

Carcinoma generally affected those glands or organs which are capable for secretion such as breast, lungs and prostate.

2.1.2 Sarcoma

It is a type of cancer that begins in the bones and the soft tissues of the body. The term *sarcoma* originates from the Greek word which means fleshy growth. Mostly sarcomas originate from connective tissues of the body including muscles, bones, cartilages, fat, blood vessels and nerves. For example, liposarcoma, rhabdomyosarcoma, osteosarcoma.⁶

2.1.3 Myeloma

It is a type of blood cancer which procreates from the plasma cells. It occurs due to several changes in DNA of plasma cells. As a result, this disease can damage the bones, kidneys, immune system and red blood cell count (RBC) in the human beings.¹¹

2.1.4 Leukemia

Leukemia is a cancer of blood-forming tissues which cause due to increasing the number of abnormal leukocytes in the body which initiates in the B and T-lymphocytes and mostly spread in lymph nodes and the spleen.

2.1.5 Lymphoma

It is a type of blood cancer which is build-up in the lymphatic system and it's mainly affected the lymph nodes and their specific sites. Lymphomas ordinarily procreate due to mutation in lymphocytes and it passage rapidly through blood and lymphatic system and spread in various parts of the body.⁷

3. ETIOLOGY

Gene mutation is the fundamental and common process involves in all types of neoplasm which cause due to mutation within the cell, deregulation of cell mechanism occurs.⁸ Thus, abnormal multiplication of cells due to deregulation of genes or chromosomes. These etiological factors are involved in cancer shown in fig 2.

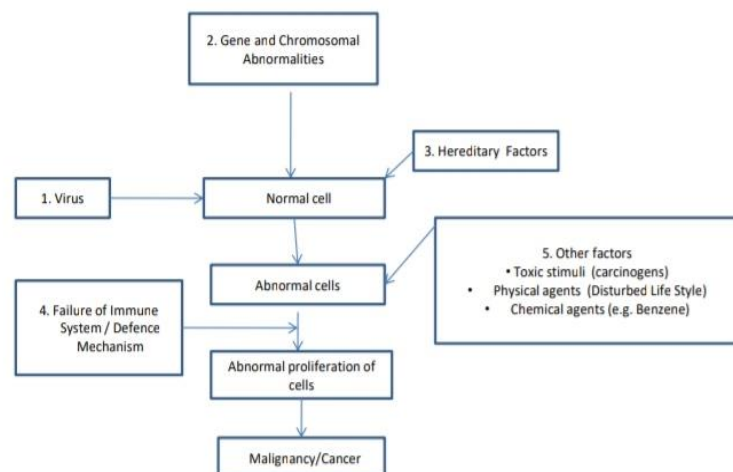


Fig: 2 Etiological factors involved in cancer

4. PATHOGENESIS

Neoplasm is raised through several intrinsic and extrinsic pathways. Tumorigenesis (formation of tumor) is a complex process which commences during the conversion of normal cells into cancer cells. Each neoplastic cell passes expeditiously through the cell cycle, which is composed of different phases. Each phase takes 1-2 hours and the whole cell-cycle completes within 2 to 3 days.³

Cancer cells infiltrate the neighbouring cells and tissues by travelling along with the lymphatic and vascular circulation. Vascular endothelial growth factor and fibroblast growth factor stimulates angiogenesis (formation of blood vessels supplying a tumor). These factors help in the attachment of cells to metastatic sites.⁹ In the coming phase of the cell cycle, the neoplastic cells divide throughout the cell cycle period, disassemble and rest. This entire process of cell division is divided into five phases expressed in fig 3.

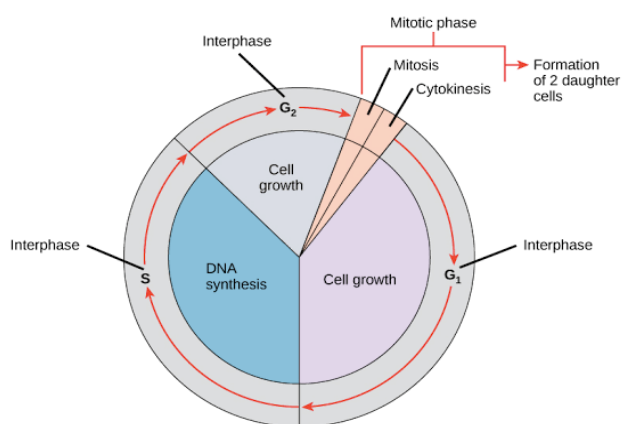


Fig: 3 Growth phases of cancer cell division

4.1 G0 phase

This is also known as resting phase. The cells during this phase rest and halt to proliferation. Because of resting circumstances, this phase is resistant to several chemotherapeutic agents.

4.2 G1 phase

This phase is also known as early protein synthesis phase. In this phase, the cells synthesise proteins, RNA, and DNA molecules.

4.3 S phase

This phase is also known as synthesis phase. In this phase, cells synthesise a DNA protein with the help of DNA polymerase, RNA polymerase II and topoisomerases I and II active enzymes.

4.4 G2 phase

This phase is also known as pre mitosis phase. Several cellular and structural components present in the mitosis of this phase. At the end, the number of chromosomes is double and the cell becomes ready for active division.

4.5 M phase

This phase is also known as mitosis phase and it is the shortest phase of the cell cycle. It is further divided into four stages.¹⁰

- Prophase
- Metaphase
- Anaphase
- Telophase

5. SYMPTOMS AND DIAGNOSIS

Cancer is a set of diseases which cause various types of symptoms such as Malnutrition, Infection, Fatigue, Pain, Hormonal imbalance, Bleeding, Weight loss, Skin change. These symptoms will be dependent on the part of the body which is affected due to cancer.¹¹

These are used several perspectives for the diagnosis of cancer. It is utterly common to commit diagnosis of cancer more than 3 months after the first symptoms appear.

Physical examination- Physical examination is required for the diagnosis comprises looking for the abnormalities and augmentation of an organ which shows the presence of cancer.

Radiographic techniques- There are the various radiographic techniques such as x-rays, computed tomography, ultra sonography use for the identification of cancer.¹²

Tissue biopsy and surgery- As a sample, a small piece of cancer cell (biopsy) will be examined under the microscope. It is helpful to determine the stage of neoplasm.

Laboratory tests- Laboratory tests are used to discriminate the abnormalities during cancer namely blood and urine tests.¹³

6. TREATMENT OPTIONS

Most of the treatments depend on the stages of cancer which consists of many types such as chemotherapy, radiation therapy, surgery, stem cell transplant, hormone therapy etc.

6.1 Chemotherapy

Chemotherapy or the word 'chemo' mainly used for the drug concern. It is also known as cytotoxic, which are able to kill and extenuate the growth of cancerous cells. This is a dominant way for the treatment of cancer.¹⁴

6.2 Radiation therapy

It is also known as radiography therapy, which achieves its therapeutic effect by inducing different types of cell death in which high dose of the radiation will be used to kill or extenuate the growth of cancerous cells. Apoptosis is a major cell death mechanism in radiation therapy.¹⁵ Radiation therapy also causes many side effects such as hair lose, fatigue, skin changes etc.

6.3 Surgery

Surgery is a medical procedure which is used to eliminate the cancer cell from the body. The consequences of surgery also must be admissible in term of quality of life issues.¹⁶

6.4 Stem cell transplant

This technique is also known as bone marrow transplant in which patient attains healthy stem cells after replacement of damage stem cells.

6.5 Hormone therapy

Hormone therapy is a way by which removing those types of hormones from the body or blocking their effects which may cause the cancer cells to stop growing.¹⁶

6.6 Immunotherapy

Immunotherapy is use for the cancer treatment. Basically immunotherapies improve the immune system to fight against cancer disease.

It will be initiated or can be done in couple ways:

- Stimulate or boost up, the natural defences of our immune system. So it works smarter or harder to quest and aggression on the cancer cells.

- Making those types of substances in the lab which help to restore or improve how our immune system works to find and attack on cancer cells.

In the last few decades immunotherapy has become a crucial part to treating some types of cancer.¹⁷

7. PREVENTIONS

There are several preventions which can lower the risk of cancer.

- Eat healthy and nutritious meal
- Be physically active
- Limiting the dose of alcohol.¹⁸
- Avoid tobacco
- Reducing unnecessary sun exposure
- Maintenance of healthy body weight
- Avoid exposure to industrial and environmental toxins.¹⁹

8. CONCLUSION

Cancer is a direful and terrifying disease in the human beings which cause due to alteration in the normal cells within the body. It has a tendency to infiltrate the surrounding normal tissues and into the blood vessels. Now a days, it becomes very serious problem and we have need to fight against it. On the basis of current information more than 80 percent of the patients can be treated who suffers from the first stage of the cancer. The ratio is near about 65 percent in the second stage, 35 percent in the third stage and below 10 percent of the fourth stage. It has been seen that more than one-third of the cancer cases are due to consumption of alcohol, tobacco and their products. One-third cases are related to food, mode of life and other social factors. So, there is a big difference in the spreading and appearance of cancer in the world wide. We need to spread the awareness about the preventions and management of cancer. So, the people become cautious for all those things which are the causing agent for cancer.

CONFLICT OF INTEREST

The author has declared that no conflicts of interest exist.

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