



CANCER TREATMENT AND IT'S PREVENTS MEASURE

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ABSTRACT

Cancer is a genetic disorder that results from genetic or epigenetic alterations in the somatic cells and has abnormal cell growth which may be spread to other body parts. In 2018, 18 million cancer was recorded globally in which 9.5 million cancer cases in men, 8.5 million cases in women, and 9.6 deaths were also recorded in the same year. The most spreading cancer globally is prostate, breast, lung stomach, colorectal cancer, non-melanoma skin malignancies but there are 100 types of cancers that affect humans. The impact of cancer is increasing significantly day by day. Tobacco is 22% responsible for causing cancer, 15% cancer is caused due some infections like HIV, hepatitis b, Epstein-Barretc, and 10% is due to poor diet, obesity, excessive consumption of alcohol, exposure to ionizing radiation, etc. In this review article, we try to shed a light on various cancer-causing factors, type of cancer, how the cancer starts, sign or symptom of cancer, diagnosing tests, the treatments of cancer and problems related to cancer treatments. Nowadays, a lot of research is going on precision medicine for a better future of cancer treatments. The common therapies are given to patient's chemotherapy, radiation therapy, immunotherapy, surgery and hormone therapy and combinations of these therapies. Stem cell transplant is also the best therapy for cancer but it given after the common therapies to recover the patient from blood loss and help in making the patient healthy.

KEYWORDS: Introduction, types of cancer, symptom and signs of cancer, side effects of cancer treatment, types of cancer treatment.

INTRODUCTION

Cancer is a disorder that results from genetic or epigenetic alterations in the somatic cells and has abnormal cell growth which may be spread to other body parts. They form a subset of neoplasm. The unregulated growth of cells in a group called neoplasm or tumor and they form a lump or mass and may be distributed diffusely.

It was predicted by Global demographic characteristics that about 420 million new cases of cancer by 2025 annually, which means increasing cancer incidence in years. Cases of cancer about 18 million in 2018 were recorded worldwide; in men, about 9.5 million and women about 8.5 million. Globally about 9.6 million deaths were estimated in cancer.

The commonest cancers are prostate cancer (1.28 million), female breast cancer (2.09 million), colorectal cancer (1.1 million), stomach cancer (1.03 million) and non-melanoma skin malignancies (1.04 million) 6, 7. Cancer-related deaths, from most to least frequent, are due to lung cancer (1.76 million), colorectal cancer

(862,000), and stomach cancer (783,000), liver cancer (782,000). Over 100 types of cancers affect humans.

- There are many causes which may cause cancer in different body parts like mainly 22% deaths are due to tobacco consumption, 10% of deaths are due to poor diet, obesity, lack of physical activity, excessive drinking of alcohol or other facts include certain exposure to ionizing radiation, environmental pollutants, and infection.
- About 15% of cancer in the world is due to some infections like hepatitis b, hepatitis human papillomavirus infection, helicobacter pylori, and immunodeficiency virus (HIV), Epstein - Barr virus. These factors are at least partly responsible for changing the genes.
- Inherited genetic defects from patient's parents are also responsible for 5-10% of cancer.
- Cancer is caused by the interaction between genetic factors and 3 categories of agents which we consume externally including:

Physical Carcinogens: Ionizing radiation such as radon, ultraviolet rays from sunlight, uranium, radiation from alpha, gamma, beta, and X-ray-emitting sources.

Chemical Carcinogens: Compounds like nitrosamines, asbestos, cadmium, benzene, vinyl chloride, nickel, and Benzodrine and contains about 60 known potent cancer-causing toxins or chemicals in cigarette smoking or tobacco consumption, a drinking water contaminant (arsenic), a food contaminant (aflatoxin).

Biological Carcinogens: Infections from certain bacteria, viruses, or parasites and Pathogens like human papillomavirus (HPV), EBV or Epstein-Barr virus, hepatitis B and C, Kaposi's sarcoma-associated herpesvirus (KSHV), Merkel cell polyomavirus, Schistosoma spp., and Helicobacter pylori. Aging is also the cause of cancer. Age is the Common incidence of cancer, which dramatically Rises.

- **Genetics:** Genetic is the commonest cause For cancer or tumor-like Ovarian, breast, Prostate, skin cancer, colorectal cancer. Individuals that eat heaps of cooked meat can also increase risk because of compounds Fashioned at high temperatures. Proving that a Substance doesn't cause or isn't associated With hyperbolic cancer risk is tough.

Types of Cancer: Cancers are divided into various Types that are: 1

Carcinomas: It starts in the tissue or the skin, Which covers the glands and internal organ Surface. It forms a solid tumor. Breast cancer, prostate cancer, colorectal cancer, lung cancer.

Sarcomas: It starts in the tissues which connect and support the body. It can be formed in nerves, tendons, joints, fat, blood vessels, bone, lymph vessels, muscles, or cartilage.

Leukaemia's: Leukemia is a cancer of the blood. It begins when healthy blood cells grow uncontrollably and change. It is divided into 4 types, that are acute myeloid leukemia, acute lymphocytic leukemia, chronic myeloid leukemia, and chronic lymphocytic leukemia.

Lymphomas: Lymphoma is cancer that begins in the lymphatic system and it is a network of glands and vessels that helps to fight with infection. Hodgkin lymphoma and Non-Hodgkin lymphoma.

Nervous System Cancers: Cancer that starts in brain tissues and spinal cord called "brain and spinal cord tumors", and others primary CNS lymphomas, vestibular schwannomas, gliomas, pituitary adenomas, primitive neuro-ectodermal tumors, Meningioma, and vestibular schwannomas.

Myeloma: Multiple myelomas is cancer that begins in plasma cells, another type of immune cell. The myeloma cells which are plasma cells, are build up in bone marrow and make tumors in bones. It is called plasma cell myeloma and Kahler disease.

Melanoma: It starts in cells that become melanocytes. These cells are specialized cells that make melanin, i.e., the pigment that gives the color to the skin. Mainly melanomas develop on the skin, but it can also develop in other pigmented tissue like an eye.

Types of Tumors: Germ Cell Tumors: It is the type of tumor that starts in the cells which give rise to eggs or sperms. this can be occurring anywhere in the body and either malignant or benign.

Neuroendocrine Tumors

Neuroendocrine tumors form from cells that release hormones into the blood in response to a signal from the nervous system. It forms from those cells which release hormones in blood in response to signal from the nervous system. These tumors, which can create higher-than-normal amounts of hormones, will cause many various symptoms. It may be either benign or malignant.

There are several steps by which cancer begins in the body:

Cell Changes and Cancer: Our body is made up of small units called cells and more than 100,000,000,000,000 cells combine to make our body. All types of cancer firstly start in cells by changes. Usually, our body has the right number of cells because the cell produces signals. if any signal is missing than cells may start to multiply unnecessarily and make a lump which also called a tumor. But there are also other types of cancer which start from different pathways like blood cells this cancer is called leukemia, and they not make a solid lump.

Genes and Cell Division: Our body has different cells for a different job, but they all are similar. They all have nuclei that control the cell and the nucleus contains chromosomes which are made up of thousands of genes. A long string of DNA (Deoxyribonucleic acid) called genes, which International Journal of Pharmaceutical Sciences and Research 3124 contain a coded message which tells the cell how to behave or divide. When the right time occurs for cell division, the cells divide and make the exact similar copies of them. One cell divides into 2 identical cells, and then 2 cells divide into 4, and so on.

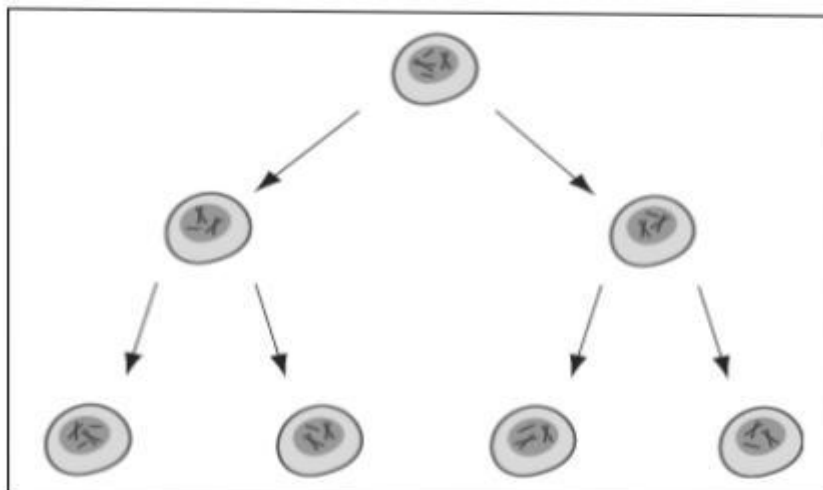


Figure 1- cell division.

Gene Changes within Cells (mutations)

When a cell is dividing mainly, a mutation occurs in this step but also by the chemical changes which are coming from outside like tobacco smoke, and it is happening by chance. Mutation means the gene is copied twice, damaged or lost. The meaning of mutation is that the cells are not growing by its instructions, and grow unnecessarily.

Mutation of genes may mean that a cell stops producing proteins that require cell division and may produce too many proteins by which the cell division occurs rapidly and form lump or, the tumor is made up of millions of cancer cells.

Cancer Grows: A cancer can continue to grow because cancer cells act differently than normal cells. Cancer cells have the same needs as normal cells. Cancer cells need nutrients and oxygen from blood vessels to survive

and grow. The tumor can easily grow by nutrients and oxygen. They need a blood supply to bring oxygen and nutrients to grow and survive. When a tumor is very small, it can easily grow, and it gets oxygen and nutrients from nearby blood vessels.

Cancer cells are different from normal cells because of they:

- Divide out of control.
- They are immature and don't develop into mature cells with specific jobs.
- Avoid the immune system.
- Ignore signals that tell them to stop dividing or to die when they should.
- Don't stick together very well, and through blood or lymphatic system, they can spread to other body parts.
- Grow into and damage tissues and organs.

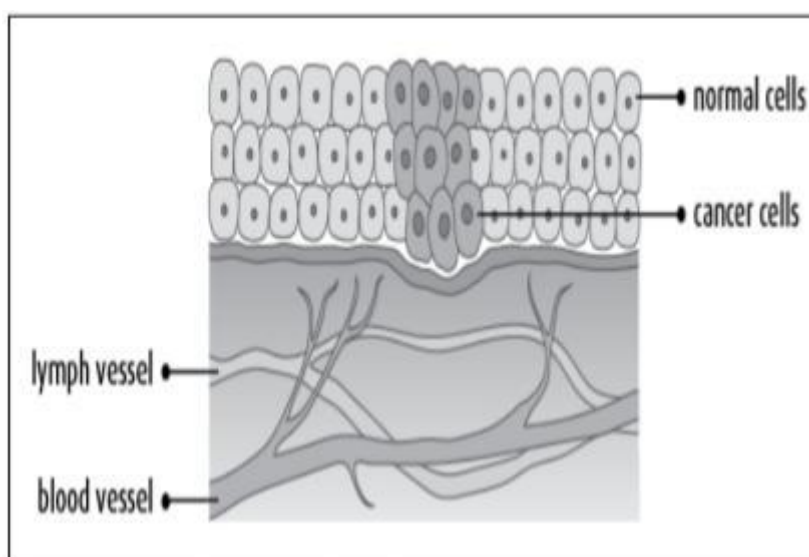


Figure 2- cancer grows.

spread: As the tumour grows, the cancer cells are carried with the lymphatic system or bloodstream to

other body parts, Then the cancer cells may be developed into new tumours and it is called metastasis. Cancer may

spread to lymph nodes, which are bean-shaped organs and tiny that helps to fight with infection. Neck; underarms and groin area etc. these are the body parts where the lymph nodes are located. Cancer may also spread through the bloodstream to other body parts like the liver, bones, brain, or lungs. If cancer spreads to different body parts from that area where it began than it is named as metastatic cancer of that particular area where it starts.

For example, if lung cancer spreads to the breast than it is called metastatic lung cancer, not breast cancer.

Common Cancers: There are more than 100 There are more than 100 cancers which affect humans but commonest among all are: Bladder, breast (female-male), endometrial, thyroid, colorectal cancer, leukemia, lung (including bronchus), melanoma, kidney (renal cell and renal pelvis) cancer, non-Hodgkin lymphoma, prostate, pancreatic cancer.

Symptoms and Signs of Cancer

Early Symptoms: At the earliest stage cancer gives no sign or symptoms by which we cannot indicate the disease. Moreover, the symptoms or signs are shown in harm condition. Some common symptoms that may occur with cancer are as follows:

Persistent Cough or Blood-Tinged Saliva: If brain is having cough from a month or blood in the mucus, then these are the sign of bronchitis or sinusitis, but they could be symptoms of neck, head or lung cancer.

A Change in Bowel Habits: It usually depends on the diet of a person and fluid intake. People with cancer felt that they need to have a bowel movement and also feel the same if they had if this symptom lasts more than a few days than it is a symptom of cancer. Mainly in cancer, there is continuous diarrhoea.

Blood in the Stool: It is also the early symptom of cancer by which we can examine cancer. The evaluation includes colonoscopy etc.

Unexplained Anaemia: People with low RBC in their blood from normal, then this condition is called anaemia. Bowel cancer can cause iron-deficiency anaemia. The evaluation includes X-ray studies or endoscopy of your lower and upper intestinal tracts.

Breast Lump or Breast Discharge: Most breast lumps are noncancerous tumours like cysts or adenomas, but all lumps are needed to check. The evaluation includes Ultrasound and x-ray study included MRI of the breast. Discharge from the breast is also the sign of cancer, and it is quite common, but not from only one nipple or bloody.

Lumps in the Testicles: Men with cancer have an uncomfortable or painless lump on a testicle.

Change in Urination: The symptoms are slow urine flow, frequent urination, change in bladder function or small amounts of urine, caused by a urinary infection in women or by an enlarged prostate gland. Most men will suffer from enlargement of the prostate gland as they age, these may be the symptom of prostate cancer. The evaluation includes PSA blood tests and the biopsy of the prostate.

8. Persistent back pain

9. Unexplained weight loss

10. Stomach pain and nausea

11. Bone pain

Late Symptoms: These symptoms are depending on cancer type, location or wherethe cancer cells have spread.

- Change in bowel or bladder habits
- Obvious change in the size, color, shape, or thickness of a wart or mole
- Indigestion or difficulty in swallowing
- Change in size, shape, color or thickness of mole.
- A sore throat that does not heal.
- Hoarseness
- Thickening or lump in the breast, testicles, or elsewhere
- Other signs or symptoms may also alert you. These include the following:
 - Unexplained loss of weight or loss of appetite
 - Nausea
 - Vomiting
 - Fatigue
 - Unexplained low-grade fevers may be either persistent or not.
 - Recurring Infections
 - Pain in the bones and other body parts

Many cancers will present in with general signs or symptoms, but they often have more than these symptoms, for more specifications. For example lung cancers have a common symptom of pain it the chest. The patient may have a persistent cough with bleeding. Lung cancer patients are become very fatigued due to shortness of breath.

Diagnosis: Diagnosis of cancer is carried by doctors by taking screening tests of patients. For example, colonoscopy, mammography, and a pap test. Other tests are also performed before screening tests to check the abnormalities in the body. For example, CT scan, MRI scan, X-rays and ultrasound. In that area which is not clearly visualized like some lymph nodes or inside bones, radionuclide test is performed for this purpose.

Lab Tests

Lab test include urine, blood and other body fluids to measures the substances which are responsible for the cancer in our body, like low and high levels of the substance which can cause cancer. Tumour markers are produced by the cancer cells and other cells in response to cancer. Lab tests are not the accurate result for cancer

diagnosis, so doctor needs to clarify these tests by performing other cancer tests also.

Side Effect of Cancer Treatments: The treatment of cancer can affect also to the normal cells, tissue, and organs. side effects are the effects of treatment which are shown with therapeutic effect. Common side effects are shown below.

- Anaemia
- Appetite loss
- Bruising and bleeding (thrombocytopenia)
- Constipation
- Delirium
- Diarrhoea
- Enema
- Fatigue
- Fertility issue in boys and men
- Fertility issue in girl and women
- Flu-like symptoms
- Hair loss (Alopecia)
- Infection and Neutropenia
- Lymphedema
- Memory or concentration problems
- Mouth and throat problems
- Nausea and vomiting
- Nerve problems (Peripheral Neuropathy)
- Organ related inflammation and immunotherapy
- Pain

Types of Cancer Treatments: There are various types of cancer treatments, which depend upon the cancer type and how to advance it is. Some patients have only onecancer treatment but mainly have a combination of treatments like surgery with radiation therapy. The various types of treatments are:

Surgery: To prevent or reduce the disease's spread and remove cancer from the body, surgeon may remove lymph nodes.

Radiation Therapy: In this therapy high doses Of radiation are used to treat cancer by Shrinking tumours and to kill cancer cells.

Chemotherapy: In this therapy, chemicals are used to treat cancer by killing cancer cells and also by shrink tumors but have severe side effects.

Immunotherapy: In this therapy, the immune system is boost by medication or other treatments. Example, adoptive cell and checkpoint inhibitors treatment.

Targeted Therapy: In this therapy, changes in a cancer cell that help them divide, spread and grow by targeting and immune system also boost. Example, monoclonal antibodies and small-molecule drugs.

Hormone Therapy: In this therapy, hormones are used to treat cancer, such as prostate and breast by stop and slow growth.

Stem Cell Transplants: In this therapy, the stem cells restore in cancer patients, which are destroyed by very high doses of radiation or chemotherapy.

Precision Medicine: It is the newer approach, in which the best treatment for a patient is determined by genetic testing.

Types of Stem Cell Transplant: Stem cells are injected through a needle in the vein, once they enter the bloodstream, and then they get a place of cells that get destroyed by treatments by traveling to bone marrow. The stem cells come from bloodstream, bone marrow, and umbilical cord.

A transplant can be:

- **Allogeneic:** In this, the stem cells come from someone else like blood relations or other people.
- **Autologous:** In this, the stem cells come from the patient itself.

Syngeneic: The stem cells come from identical twins if the patient has one.

CONCLUSIONS

In review paper cancer and treatments of cancer were illustrated in detail like sign or symptoms, diagnosing tests and how the cancer cause, spread, etc. The cancer treatment include surgery, immunotherapy, chemotherapy, target therapy, hormone therapy, radiation therapy, stem cell transplant, precision medicine. These therapies include many drugs, like antibiotics, which are mainly used in chemotherapies, different targeted systems to treat, microspheres, etc. Different radiations are used to treat cancer in radiation therapies cancer direct like nanotechnology that directly attack cancer cells. In hormone therapy, different hormones are used to treat cancer, mainly breast and prostate cancer which are caused by hormones. In immunotherapy, the immune system is making stronger to fight against the cancer cells by different drugs.

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