



A REVIEW ON: “BLOOD CANCER”

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ABSTRACT :

Blood cancers occur due to abnormal production and the function of your blood cells. Most of these cancers in bone marrow where blood cell is produced. Stem cells in bone marrow mature and develop into three types of blood cells: red blood cells, white blood cells, or platelets. In most blood cancers, the normal blood cell development process is interrupted by the uncontrolled growth of an abnormal type of blood cell. These abnormal blood cells, or cancerous cells, prevent blood cell from performing many of its functions, like fighting off infections or preventing serious bleeding. There are three main groups of blood cancer are leukemia, lymphoma (Hodgkin lymphoma, Non-Hodgkin lymphoma), myeloma, and Myelodysplastic syndromes (MDS). Treatment for blood cancer depends on the type of cancer, age, how fast the cancer is progressing, where cancer has spread and other factors and some common treatments for blood cancers are chemotherapy, radiotherapy and, in some cases, a stem cell or bone marrow transplant.

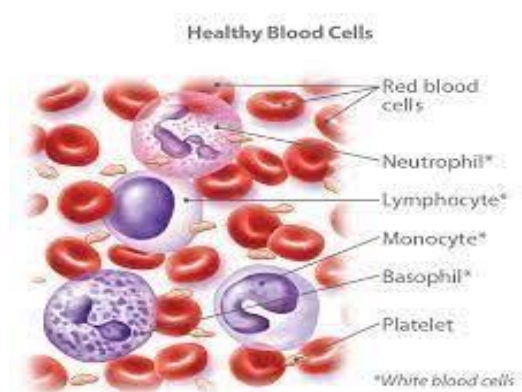
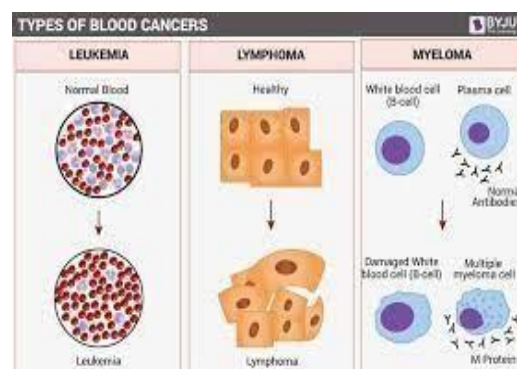
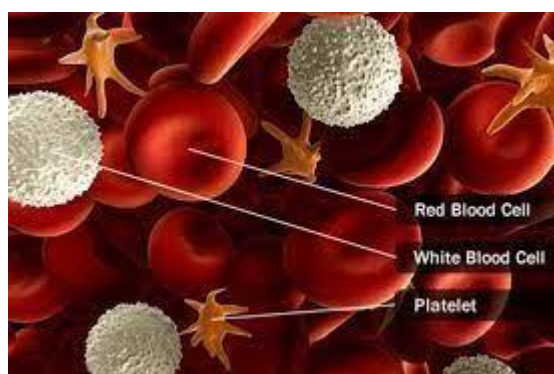
KEYWORDS :

Myelodysplastic syndromes chemotherapy, radiotherapy

INTRODUCTION :

Blood cancer represents a large group of different malignancies. This group includes cancers of the bone marrow, blood, and lymphatic system, which includes lymph nodes, lymphatic vessels, tonsils, thymus, spleen, and digestive tract lymphoid tissue. Leukemia and myeloma, which start in the bone marrow, and lymphoma, which starts in the lymphatic system, are the

most common types of blood cancer. What causes these cancers is not known. As leukemia and myeloma grow within the bone marrow, they can interfere with the bone marrow's ability to produce normal blood cells, including white blood cells, red blood cells, and platelets. This can cause frequent infections, anemia, and easy bruising. Lymphomas, which most typically appear as enlargement of the lymph nodes, can also interfere with the body's ability to fight infections. Additionally, myelomas generate a substance that weakens bones, and produce abnormal proteins that can cause symptoms in other parts of the body.



TYPES OF BLOOD CANCER :

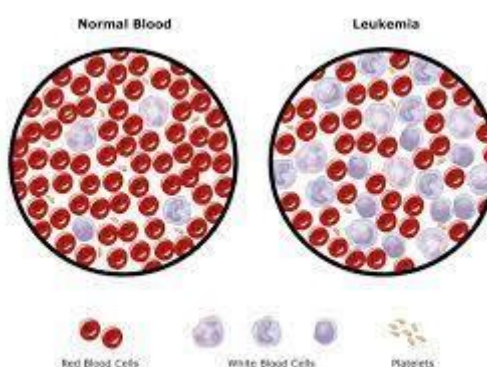
Primarily, there are three basic types of blood cancer. Each of the variety may also include several variations, but in general this cancer is categorized into the following kinds

1. **Leukemia-** With spurt in the multiplicity of cancerous cells affecting either the marrow or the blood; the ability of the circulatory system to produce blood is severely impaired with.
2. **Lymphoma-** The cancerous formation affecting the lymphocytes is referred to as the lymphoma. are one of the varieties of white blood corpuscles.

3. **Myeloma**- As part of Myeloma, the plasma (another variety of WBC) is affected by the cancerous formation.

LEUKEMIA :

Leukemia is a type of cancer of the blood cells. White blood cells are a component of the blood. They help the body to fight against infections. When a person is infected with leukemia, the DNA in the cells mutate in such a way that a large number of immature white blood cells are produced in the body. These cells are called blasts. Leukemia can affect different cells of the blood and the disease is classified into four types according to the cells they infect. These abnormal cells gradually take over the function of the bone marrow and the disease spreads further.



CAUSES :

Leukemia, like other cancers, results from mutations in the DNA. Certain mutations can trigger leukemia by activating oncogenes or deactivating tumor suppressor genes, and thereby disrupting the regulation of cell death, differentiation or division. These mutations may occur spontaneously or as a result of exposure to radiation or carcinogenic substances.

- Natural and artificial ionizing radiation
- A few viruses such as human T-lymphotropic virus. Experiments on mice and other mammals have demonstrated the relevance of retroviruses in leukemia, and human retroviruses have also been identified. The first human retrovirus identified was human T-lymphotropic virus, or HTLV-1, which is known to cause adult T-cell leukemia
- Some chemicals, notably benzene and alkylating chemotherapy agents for previous malignancies. Use of tobacco is associated with a small increase in the risk of developing acute myeloid leukemia in adults. Cohort and case-

control studies have linked exposure to some petrochemicals and hair dyes to the development of some forms of leukemia.

- Diet has very limited or no effect, although eating more vegetables may confer a small protective benefit.
- The common signs and symptoms of the different types of leukemia are as follows:
- Leukemia is a cancer that affects the bone marrow. It gradually hampers the proper functioning of the bone marrow. As a result, people with leukemia tend to bruise and bleed easily.

SIGNS AND SYMPTOMS :

- White blood cells are the responsible for fighting infection in the body. Leukemia attacks these cells. So, the immune system of the body is weakened. So one become more vulnerable to infections like sore throat, sores in the mouth, diarrhea or pneumonia.
- Anemia is common in leukemia.
- Fever, chill, fatigue, flu like symptoms and weight loss are other common symptoms.
- Some type of leukem

TREATMENT :

Leukemia is treated so that abnormal blood cells are destroyed and normal blood cells are produced in the body. The type of treatment depends on the type of leukemia, general physical health, age and the stage of leukemia.

- Chemotherapy is the most widely used treatment of leukemia. It occurs in following three stages:

1. Induction is the stage where all abnormal cells are killed off in the blood.
2. The next stage is consolidation. It destroys those abnormal cells which may be rare enough that they do not show up on regular blood tests.

MACHANISM :

Leukemia cells are known to have an overactive level of a protein called β catenin, which can drive cancer development. Once this protein moves into the nucleus of cells, where DNA is stored, it can assist the activation of genes important for leukemia development

DRUGS :

- Bosulif (Bosutinib)
- Bosutinib.
- Busulfan.
- Busulfex (Busulfan)
- Cyclophosphamide.
- Cytarabine.
- Dasatinib.
- Dexamethasone

PREVENTIONS :

- You may lower your risk of developing leukemia by doing the following.
- Be a non-smoker. Not smoking is the best way to lower your risk of leukemia. ...
- Maintain a healthy body weight. ...
- Avoid breathing in benzene and formaldehyde. ...
- More information about preventing cancer

LYMPHOMA :

Lymphoma is a type of cancer of the blood where lymphocyte – a component of the blood grows at an abnormal rate. They are often present as a solid tumor in certain parts of the body like lymph nodes, bone marrow, spleen etc. In most cases, the causes are not known. The common symptoms include fever, chills, fatigue, pain in lymph nodes and other specific areas of the body.



Chemotherapy, radiation therapy and bone marrow transplantation are the most common treatment options for lymphoma

CAUSES :

- Age. Getting older is a strong risk factor for lymphoma overall, with most cases occurring in people in their 60s or older
- Gender. ...
- Race, ethnicity, and geography. ...
- Family History. ...
- Exposure to certain chemicals and drugs. ...
- Radiation exposure. ...
- Having a weakened immune system. ...
- Autoimmune diseases.

SINGS AND SYMPTOMS :

The most common signs and symptoms of Hodgkin lymphoma are as follows:

- Intermittent fever, night sweat and chills.
- Swelling of lymph glands in neck, groin or armpit.
- Unexplained weight loss.
- Flushed skin
- Coughing and itching • Excessive sweating
- Loss of appetite.
- Most of them are the same as that of the Hodgkin lymphoma.
- Pain in the abdomen.
- Sweating, vomiting and nausea.
- Headache leading to seizures.

Changes in personality

TREATMENT :

Drugs are given to kill of the abnormal cells circulating throughout the body.

1. The drugs also aim to suppress the creation of new batches of abnormal lymphocytes.
2. They are given in cycles. This allows the patient to recover from the side effects like anemia and allow the creation of new healthy white blood cells.
3. The common drugs used to treat Hodgkin lymphoma are ABVD and MOPP. Apart from these, BEACOPP with its seven different components have been shown to have beneficial impact.

For non Hodgkin lymphoma, CHOP (cyclophosphamide, doxorubicin, vincristine and prednisone) is commonly used. Other variations depend on the stage and type of the disease

MACHANISM :

Most B-cell lymphomas depend on the expression of a B-cell receptor (BCR) for survival, and in several B-cell malignancies antigen activation of lymphoma cells through BCR signalling seems to be an important factor for lymphoma pathogenesis

DRUGS :

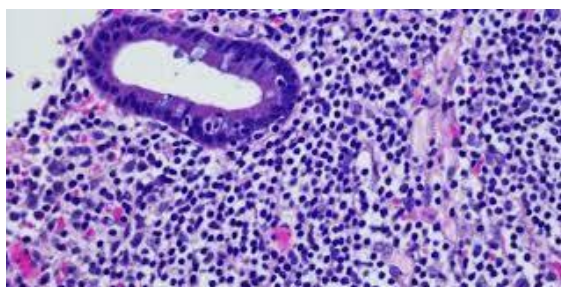
- Acalabrutinib.
- Adcetris (Brentuximab Vedotin)
- Aliqopa (Copanlisib Hydrochloride)
- Arranon (Nelarabine)
- Asparaginase Erwinia Chrysanthemi (Recombinant)-rywn.
- Axicabtagene Ciloleucel.
- Beleodaq (Belinostat) Belinostat.

PREVENTIONS :

Prevention. There is no known prevention for Burkitt's lymphoma. Using protection (condoms) during sex and avoiding intravenous drug use can effectively prevent HIV infection, which is associated with immunodeficiency-related Burkitt's lymphoma.

MYLOMA :

The plasma cells in bone marrow produce antibodies and help immune system to fight against outside aggression. Myeloma is a type of cancer that affects these plasma cells. They begin to behave abnormally and form tumors outside the solid bone. This gradually weakens the bones. It also does not allow the bone marrow to produce healthy blood cells. The cause of the disease is not clearly known.

**CAUSES :**

The exact cause of myeloma is unknown. There are some research suggesting and longtime exposures to certain harmful chemicals or radiation can cause myeloma. However, many cases are reported where no such exposure is recorded. In such cases, it has not been possible to determine the causative factors.

SIGNS AND SYMPTOMS :

The disease interferes with the ability of the bone marrow to produce healthy blood cells. So, anemia is a common symptom. This is a condition where red blood cells fall dangerously below the required quantity. Paleness, fatigue and shortness of breath are common signs of anemia.

- Low platelet count is common because platelets are no longer being produced normally.
- This may lead to abnormal and easy bleeding and bruising.
- Lesions may develop on the bones.
- More than 70% cases report high level of bone pain. Prolonged localized pain can even lead to bone fracture.

Increase in the bone resorption lead to abnormally high levels of calcium. This coupled with the abnormal functioning of the blood cause renal failure which is another symptom of myeloma.

- If the cancerous tumor presses on the nerves, it can affect the nervous system of the body. Hence, weakness, confusion and fatigue are caused. Later, pain and numbness may spread to the arms and legs. Neuropathies may also result.

TREATMENT :

The treatment of myeloma depends on whether it is smoldering or aggressive. No treatment is prescribed for smoldering myeloma but it is closely monitored. The conventional treatment options for aggressive myeloma include chemotherapy and radiation.

- Chemotherapy includes the administration of several drugs, especially biophosphonates to help to maintain the health of the bones.
- Steroids are sometimes administered.
- Radiotherapy is used to treat localized bone pain caused by concentrated tumors.
- Surgery is not a common option. But it is sometimes used to repair bone damage.
- Bone marrow transplantation is used in certain cases. it may be of two types:
 1. Autologous bone marrow or stem cell transplantation is the process that uses the patient's own stem cells.
 2. Allogenic bone marrow transplant is that where stem cells from a donor is used. This treatment option has serious risks, but it offers long term possibilities of cure.

MACHANISM :

Myeloma induces immunoparesis. Plasma cell derived cytokines including transforming growth factor (TGF)- β , interleukin (IL)-10, IL-6 and VEGF mediate suppression of B and T lymphocytes, and impair T-cell co-stimulation by dendritic cells (DC), ultimately leading to poor tumorspecific immune response

DRUGS :

- Abecma(IdecabtageneVicleucel)
- AlkeranforInjection(MelphalanHydrochloride)
- AlkeranTablets(Melphalan)

- Aredia(PamidronateDisodium)
- BelantamabMafodotin-blmf
- BiCNU(Carmustine)
- Blenrep(BelantamabMafodotin-blmf)
- Bortezomib
- Carfilzomib



- Carmustine
- Cyclophosphamide

PREVENTIONS :

There are currently no known ways to prevent it. Currently, there are also no obvious, strong risk factors for myeloma. Although the mutations that cause myeloma are acquired and not inherited, family history is a known risk factor for multiple myeloma

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