LEUKOCYTE-RELATED DISEASE.LEUKEMIA

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Annotation: *There are several types of leukocytosis that are characterized by a significant increase in certain types of white blood cells. Neutrophilia, often observed in bacterial infections, lymphocytosis observed in viral infections, mononucleocytosis associated with chronic infections, eosinophilia associated with allergic reactions or parasitic infections, and basophils associated with certain leukemias or myeloproliferative diseases in rare cases.*

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When people undergo regular medical examinations, they often identify health problems that are not easy to identify in the past. One of them is" leukocytosis". There are a huge number of people who are told in the results of a health test that they need to seek medical help because of the increased number of white blood cells.

Leukocytosis is a condition in which the number of white blood cells (WBC) in the blood increases. Normal white blood cell counts range from 4,500 to 11,000 per microliter of blood. If it is exceeded, it is leukocytosis. Leukocytoses can be classified according to the degree of increase in the number of leukocytes.Mild leukocytosis ranges from 11,000 to 15,000, moderate leukocytosis from 15,000 to 30,000, and severe leukocytosis from over 30,000. .

The reason for this and the policy of future management will vary depending on how severe the leukocytosis confirmed during the examination. Mild leukocytosis is relatively common and occurs under different conditions. In healthy people, it can be caused by temporary stress, exercise or vaccination, while in chronic cases it can be due to obesity or smoking. The cause may be a small infection. Some medications (corticosteroids) and chronic inflammatory diseases such as rheumatoid arthritis also cause mild leukocytosis.

Moderate leukocytosis can also occur in response to serious bacterial infections or tissue damage such as burns, trauma, or surgery.

In the early stages of chronic myeloid leukemia blood disease, moderate leukocytosis may occur. Severe leukocytosis is relatively rare and can be a sign of a serious underlying disease. Severe leukocytosis often occurs in blood cancers such as acute or chronic leukemia, when the bone marrow produces excessive amounts of abnormal white blood cells.

Severe leukocytosis can also occur in people with serious bacterial infections, sepsis, or taking high-dose corticosteroids. A leukemia-like reaction is a more than 50,000 increase in the number of neutrophils.It is often mistaken for leukemia, but is actually caused by sepsis, rejection after organ transplantation, bacterial infection, or a severe organ tumor in the absence of myeloproliferative.

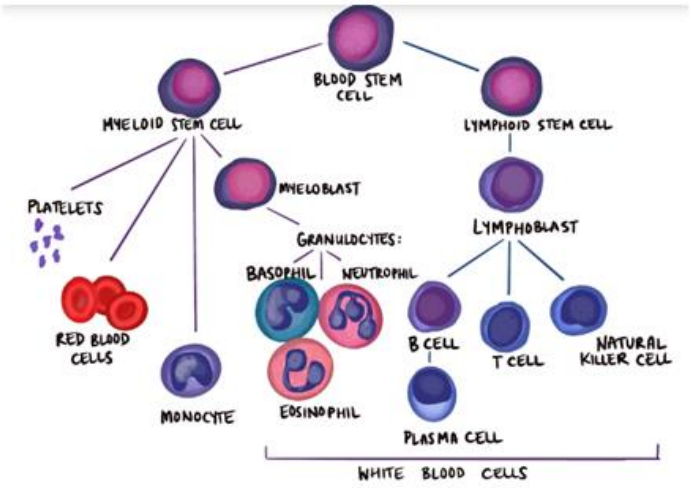
The rule of mild leukocytosis is careful observation in determining the underlying cause. If infection or curable findings are confirmed, appropriate treatment is required.

In the case of moderate leukocytosis, additional blood tests, imaging tests and treatment by a hematologist-oncologist are necessary to confirm the cause. Treatment varies depending on the cause, and patients with moderate leukocytosis, the exact cause of which has not been determined, should undergo a follow-up examination for 1 to 3 months.

It requires emergency medical care to rule out life-threatening situations such as severe leukocytosis, leukemia, or serious infections. If you have such leukocytosis, it is best to know the dangerous signs. It is accompanied by fever, severe fatigue or unexplained weight loss, severe cold sweat, enlarged lymph nodes, easy bruises or bleeding, persistent or recurrent infections, difficulty breathing, bone pain, among others, all of which can be accompanying symptoms of a serious illness. it is associated with leukocytosis, so urgent medical attention should be sought. Leukocytosis accidentally identified during a health check should not be ignored, especially the elderly, and identifying potential causes based on the severity of leukocytosis and accompanying symptoms is essential for appropriate treatment.

Leukemia

Leukemia is a disease that occurs when hematopoietic stem cells that produce blood cells turn into cancer cells and multiply.



Hematopoietic stem cells produce white blood cells, red blood cells, and platelets through normal cleavage, proliferation, and maturation processes Leukemia cells can multiply indefinitely, interfering with the production of normal white blood cells, red blood cells and platelets, which can cause fatal problems in our body.

Leukemia can be broadly classified into acute leukemia and chronic leukemia, depending on the rate at which the disease develops. If the alteration of cancer cells occurs mainly in the myeloid region, it can be classified as myelocytic leukemia, lymphocytic leukemia if it occurs in the lymphocyte region.

Acute myeloid leukemia

- the most common form of leukemia. The main age of the disease exceeds 60 years. There are 8 types of acute myeloid leukemia, numbered M0 to M7. The treatments are almost identical except for M3 (also called acute promyelocytic leukemia).

Acute lymphocytic leukemia

it is more common in children than in adults. Since adults have a worse prognosis than children, active treatment (allogenic hematopoietic stem cell transplantation) is planned in addition to chemotherapy.

Acute lymphocytic leukemia is classified as L1, L2 and L3, depending on the type of leukemia cells observed under the microscope. With the exception of L3, the treatment method is almost the same.

Unlike acute myeloid leukemia, acute lymphoblastic leukemia can metastasize to the central nervous system, so cerebrospinal fluid is examined during treatment. Even if there is no invasion of cerebrospinal fluid, preventive drugs are introduced into the spinal cavity through a procedure called lumbar puncture.

Chronic myeloid leukemia :

hematopoietic stem cell is a malignant blood disease acquired by chromosome changes, and the" Philadelphia chromosome anomaly " (partial replacement of chromosomes 9 and 22) is divided into chronic, accelerated, and acute stages.

Chronic lymphocytic leukemia:

It is most common in adults over the age of 60.The disease grows slowly and causes few symptoms. In general, treatment begins when the disease progresses rapidly or there are symptoms.

Leukemia cells that become cancer cells when leukemia occurs are over-produced due to cancer hematopoietic stem cells.As a result, normal blood cells are suppressed and not properly produced and cannot fulfill their original function, causing symptoms such as infection, bleeding. , and anemia.Since it can gradually deteriorate, you should consult a doctor to get the appropriate treatment.

Causes that lead to leukemia: the cause of leukemia is not yet known with certainty. Constant long-term exposure to organic solvents such as benzene, chemicals, and large amounts of radiation (e.g. atomic bomb victims) can also be attributed to the development of leukemia, and children born with genetic disorders such as Down

syndrome grow. It is said that leukemia can develop. However, the exact cause of leukemia is still not known.

Unlike diseases such as diabetes and high blood pressure, leukemia is not caused by improper diet or lifestyle habits and is not a disease inherited from the parents. Therefore, children with leukemia are not more likely to develop leukemia.

Symptoms Of Leukemia

Leukemia predicts specific symptoms in advance and does not appear. In general, leukemia cells increase excessively in the bone marrow and interfere with the production of normal blood cells, which can lead to various symptoms.

A decrease in normal white blood cells, especially neutrophils, can make you susceptible to infection. Symptoms of infection include high fever, chills (feeling cold and chills), joint pain, and muscle pain. When oxygen-carrying red blood cells decrease, symptoms such as shortness of breath, dizziness, weakness, easy fatigue, difficulty breathing when running or climbing and descending stairs, headache, nausea, decreased appetite may appear. When platelets are reduced, signs of bleeding may appear. Even if you are not hit or injured, there may be several bruises on your body, red dots may appear there and there as if you were sprayed with sesame on your skin, signs such as nosebleeds, bleeding gums, hematuria may appear.

In addition, weight loss, bone pain, enlarged gums, enlarged liver and spleen may occur.If leukemia cells are infiltrated into the skin, slightly swollen lesions may be felt on the surface of the skin. In addition, if the central nervous system is occupied, nausea, vomiting, convulsions and cranial nerve paralysis can occur.

Diagnosis of leukemia

Morphological

Sternal puncture

Trepanobiopia

▶General blood test

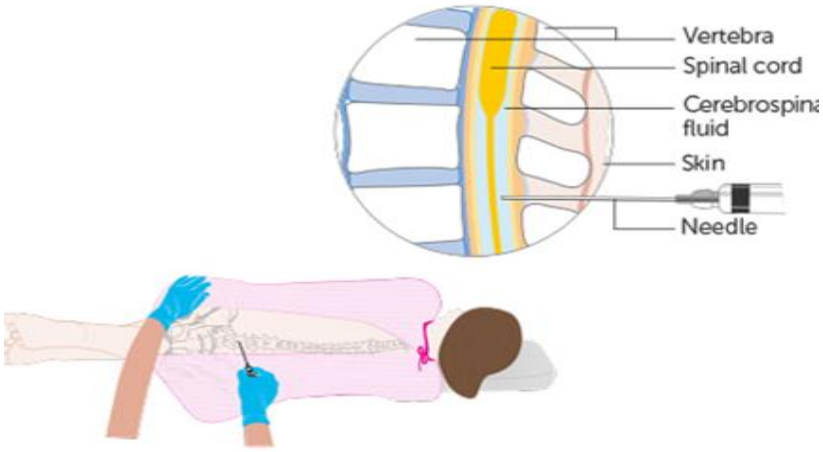
This is a test that allows you to determine the level of white blood cells, red blood cells, platelets, as well as the presence and level of leukemia cells in the peripheral blood. Inpatient patients are examined daily, and outpatient patients are also examined at each visit.

▶General chemistry tests such as liver function, kidney function, protein, albumin, LDH, etc .are not tests that directly test blood diseases, but tests that assess the values confirmed or the activity of the corresponding organs when the disease is suspected. to the course of treatment.It is carried out regularly.

▶Blood coagulation tests

normal blood function in the body in preparation for bleeding are tests that are evaluated and performed regularly to determine the risk of bleeding in advance.

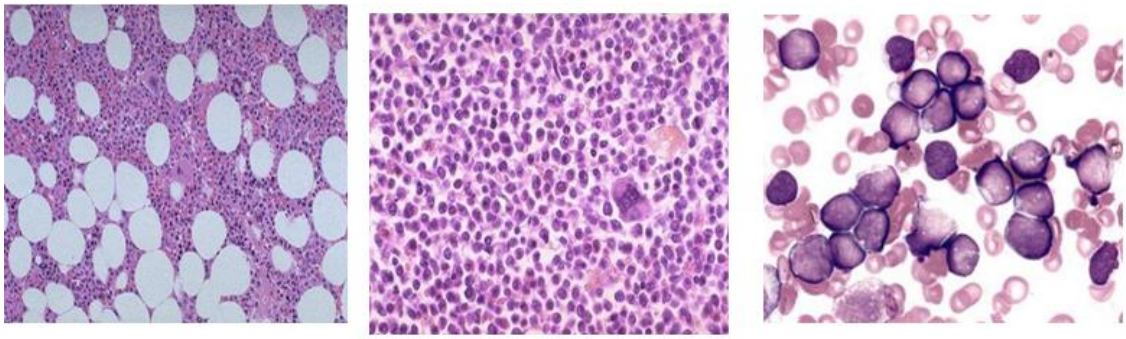
Bone marrow test



The bone marrow test is a test that confirms the diagnosis of leukemia. Blood is drawn from a cavity inside the bone called the bone marrow and observed under a microscope to confirm the presence and ratio of leukemia cells and to differentiate between myeloid or lymphoid contents. Meanwhile, cytogenetic tests are also carried out to simultaneously check for chromosomal abnormalities in order to determine the prognosis and determine the direction of treatment.

Acute leukemia is diagnosed when myeloid or lymphocytic leukemia blast cells make up more than 20% of the total nucleated cells in the bone marrow. In rare cases, acute mixed leukemia is diagnosed when both species are involved.

Normal bone marrow Acute leukemia Acute lymphoblastic leukemia



Lumbar puncture is a test technique that involves piercing the area between the lower back vertebrae from an empty space inside the spine with a local anesthetic and then taking a small amount of cerebrospinal fluid through the space between the vertebrae. The test process is simple, and after the procedure, you need to lie down in the right position and rest for a certain time.

Treatment prevention

Leukemia treatment is based on chemotherapy, and the method of chemotherapy can vary depending on the type and development of leukemia and the physical condition of the patient at the time of diagnosis.

Treatment of acute leukemia

Blood cancer, such as acute leukemia, cannot be treated surgically, and the standard treatment is chemotherapy, which involves the use of drugs belonging to the anticancer class, which are systemic treatments. The type and schedule of anti-cancer drugs varies depending on whether the cancer is myeloid or lymphoid.

Acute leukemia is treated with" remission-induced chemotherapy "to induce" remission", in which case the leukemia cells are destroyed and normal blood is formed and treated to prevent recurrence after remission.

▶Chemotherapy Chemotherapy

- a treatment that uses anti-cancer drugs to reduce or destroy cancer cells.Blood cancer is a cancer and chemotherapy has a relatively good therapeutic effect. Usually, the treatment process does not end with just one treatment and requires repeated medication several times.

Remission-induced chemotherapy

The main goal of treating acute leukemia is to achieve a state of complete remission. The usual duration of treatment is about 4 to 6 weeks. To assess the healing process, a blood test is carried out daily, and an intermediate bone marrow test is carried out in the second week.When the blood test reaches the norm between 4 and 6 weeks, a bone marrow test is performed to check for remission.

The total reported total response rate is about 60-90%, and if a complete response is not achieved in the first treatment, chemotherapy is used again and a complete response can be achieved with the second or third treatment.

In acute leukemia, leukemia cells cannot be eliminated by 100% with a single chemotherapy. If the remission condition persists for a long time, complete treatment occurs, but as a "consolidation therapy" to increase the actual success rate of treatment, several rounds of chemotherapy and allogenous hematopoietic stem cell transplantation may be performed in the future. Usually, between treatment and further treatment, the patient is removed and rested for 2 to 4 weeks.

Consolidation therapy

After complete remission, chemotherapy is periodically required several times as a treatment to remove any remaining leukemia cells and prevent recurrence.

- Consolidation therapy for acute myeloid leukemia

There is no exact number of consolidation treatments, but in the case of acute myeloid leukemia, the hematology department conducts 4-6 sessions for those under 60 and 1-2 sessions for those over 60. In the case of promyelocytic leukemia (M3), three drugs are taken as storage therapy for 2 years after 2-3 rounds of consolidation therapy.

- Consolidation therapy for acute lymphocytic leukemia

In our hospital, consolidation therapy is carried out in 5 stages, and after consolidation therapy, patients are taking two drugs as a preventive therapy for 2 years. If you have Philadelphia chromosome-positive acute lymphoblastic leukemia,

you will additionally receive Gleevec or second generation Philadelphia chromosome therapy every day during maintenance.

▶Hematopoietic stem cell transplantation

Hematopoietic stem cell transplantation is an active treatment method performed to restore healthy blood function by removing the patient's diseased bone marrow and leukemia cells, administering high-dose anticancer drugs and immunosuppressants, and injections of others (blood or non-kin). hematopoietic stem cells.

Hematopoietic stem cell transplantation is determined depending on the patient's disease, various forecasts in the diagnostic time and the treatment process during chemotherapy.

▶Treatment method in cases of refractorism/recurrence

Refractorism is understood as a condition in which the disease persists, not responding to any desired goal of anti-cancer drug treatment.

Relapse refers to the recurrence of cancer that has been removed, and treatments include the following.

Relapse-inducing chemotherapy (rescue chemotherapy) and allogeneic hematopoietic stem cell transplantation are used.

Treatment of chronic leukemia

Chronic leukemia receives a different treatment than acute leukemia. Rather than treating chronic leukemia for the purpose of treating the disease, it is treated with the concept of controlling and stabilizing the disease, maintaining a healthy lifestyle and parallel treatment such as chronic adult diseases such as high blood pressure and diabetes.

▶ Treatment of chronic myeloid leukemia

Imatinib (product name: Gleevec), a newly developed treatment since 2000, is a drug that inhibits the rearrangement of Philadelphia chromosomes, the cause of chronic myeloid leukemia, which has become the standard treatment drug for leukemia.

In most cases of chronic myeloid leukemia, the treatment effect is sufficient only with Gleevec, but if some patients develop resistance to the drug or experience serious side effects, medical personnel can switch to another medication for treatment.

After Gleevec, dasatinib (brand name: Sprycel) and nilotinib (brand name: Tasigna) are commercialized as the next generation targeted treatment for chronic myeloid leukemia, and medical personnel choose the best treatment depending on the treatment process.

▶ Treatment of chronic lymphocytic leukemia

. Chlorambucil, an oral anticancer drug, is used as an initial treatment for chronic lymphocytic leukemia. Fludarabine injection is widely used as a treatment of choice when initial treatment does not work well or resistance occurs, and treatment with injection of B lymphocyte-selective mononuclear antibodies called rituximab (brand

name: MabThera) is also used. Usually, chronic lymphocytic leukemia grows slowly and sometimes there are no symptoms, so it is observed without treatment.

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