Lymphoma



Lymphoma is a cancer that develops in the white blood cells of the lymphatic system. Symptoms may include enlarged lymph nodes, unexplained weight loss, fatigue, night sweats and shortness of breath, cough or trouble breathing.

Your doctor will perform a physical exam and may order blood tests or lymph node biopsy to help evaluate your condition. If lymphoma is diagnosed, bone marrow aspiration and biopsy, lumbar puncture, chest x-ray, body CT, PET, bone scan, body MRI or abdominal ultrasound may be used to look for enlarged lymph nodes throughout the body and determine whether the lymphoma has spread. Treatment depends on the type and stage of the lymphoma as well as your age and overall health. Some types of lymphoma may only require monitoring while others may require chemotherapy, radiation therapy, radioimmunotherapy, biologic therapy or stem cell transplant.

What is lymphoma?

Lymphoma is a cancer that develops in the white blood cells (lymphocytes (http://www.radiologyinfo.org)) of the lymphatic system (http://www.radiologyinfo.org) , which is part of the body's immune system.

The lymphatic system includes a network of small channels similar to blood vessels that circulate fluid (called lymph (http://www.radiologyinfo.org)), lymph nodes (http://www.radiologyinfo.org) (also called glands), bone marrow and several organs including the spleen, all of which are made up of lymphocytes.

There are two major types of lymphoma: Hodgkin (HL) (http://www.radiologyinfo.org) and non-Hodgkin (NHL) (http://www.radiologyinfo.org) , each of which has several subtypes. Hodgkin lymphoma—also known as Hodgkin's disease—is far less common than non-Hodgkin lymphoma.

Individual lymphomas differ in how they behave, spread and respond to treatment. The type of lymphoma is determined by examining some of the cancer cells under a microscope. When an abnormal cell called a Reed-Sternberg cell (http://www.radiologyinfo.org) is present, the lymphoma is classified as Hodgkin. When it is not present, the cancer is classified as non-Hodgkin.

Symptoms of lymphoma may include:

- enlarged lymph nodes in the neck, armpits or groin
- unexplained weight loss
- fever
- drenching night sweats
- generalized itching
- fatigue
- loss of appetite
- coughing or trouble breathing

Copyright© 2026, RadiologyInfo.org

- pain in the abdomen, chest or bones
- swollen abdomen
- feeling full after only a small amount of food
- shortness of breath or cough

How is lymphoma diagnosed and evaluated?

Your primary doctor will begin by asking you about your medical history and symptoms and perform a physical exam. Your doctor may also order one or more of the following tests.

Blood tests: The number of white blood cells, platelets and red blood cells may become low when lymphoma spreads to the bone marrow (http://www.radiologyinfo.org) . Blood test results help determine how the liver and kidneys are functioning.

Lymph Node Biopsy: A procedure in which a portion of or an entire lymph node is surgically removed so it can be examined under a microscope to look for the presence of lymphoma cells. Occasionally, a needle biopsy may be sufficient to make a diagnosis. Other laboratory tests may be performed on the biopsy sample, including molecular genetic tests.

Bone marrow aspiration and biopsy: A surgical procedure in which a thin, hollow needle is inserted into the hip bone to remove a small amount of liquid bone marrow so it can be analyzed under a microscope. This procedure is typically performed after lymphoma has been diagnosed to help determine if the disease has spread to the bone marrow. *See the Biopsy page (https://www.radiologyinfo.org/en/info/biopgen) for more information.*

Lumbar puncture (spinal tap) (https://www.radiologyinfo.org/en/info/spinaltap) : A minimally invasive test that involves the removal of a small amount of cerebrospinal fluid (CSF)—the fluid that surrounds the brain and spinal cord—so it can be analyzed for the presence of lymphoma cells. This test is typically only performed for certain types of lymphoma or if the patient has symptoms that suggest the lymphoma may have reached the brain.

Chest x-ray (https://www.radiologyinfo.org/en/info/chestrad) : A chest x-ray is used to look for enlarged lymph nodes.

Body CT (https://www.radiologyinfo.org/en/info/bodyct) : A CT of the body is used to detect enlarged lymph nodes or organs and abnormalities in the abdomen, pelvis, chest, head and neck.

In some cases, CT may be used to guide a biopsy needle precisely into a suspicious area so that a tissue sample can be removed and examined under a microscope. This procedure is called a CT-guided needle biopsy (https://www.radiologyinfo.org/en/info/biopgen) .

PET scan: (https://www.radiologyinfo.org/en/info/pet) A PET scan, which uses a small amount of radioactive material (http://www.radiologyinfo.org) , can help show if an enlarged lymph node is cancerous and detect cancer cells throughout the body that may not be seen on a CT scan. Some patients with lymphoma undergo PET scanning after receiving therapy to determine if the cancer is responding to treatment. A PET scan is combined with a CT or MRI scan to provide highly detailed views of the body.

Bone scan: (https://www.radiologyinfo.org/en/info/bone-scan) In a bone scan (http://www.radiologyinfo.org) , a radioactive isotope called technetium-99m is injected into a vein and travels to damaged areas of bone. This test is typically performed if the patient is having bone pain or other tests suggest lymphoma has traveled to the bone.

MRI (https://www.radiologyinfo.org/en/info/bodymr) : An MRI scan is helpful in detecting lymphoma that has spread to the spinal cord or brain. It can be helpful in other areas of the body as well, such as the head and neck area.

Abdominal ultrasound: (https://www.radiologyinfo.org/en/info/abdominus) Abdominal ultrasound may be used to examine enlarged lymph nodes, especially in the abdomen. Ultrasound is also used to image the abdominal organs and

Copyright© 2026, RadiologyInfo.org

kidneys, which may be affected by enlarged lymph nodes.

Women should always inform their physician or x-ray technologist if there is any possibility that they are pregnant. For pregnant women with lymphoma, MRI and ultrasound may be used to stage the disease while protecting the fetus from harmful radiation (http://www.radiologyinfo.org) . *See the Safety page (https://www.radiologyinfo.org/en/info/safety-radiation) for more information about pregnancy and radiation.*

How is lymphoma treated?

Treatment options are based on the type and stage of lymphoma and the age and overall health of the patient. For some types of lymphoma, if the disease is advanced but slow-growing (indolent (http://www.radiologyinfo.org)), a wait-and-see approach may be an option. When treatment is required for lymphoma, one or more of the following therapies may be used.

Chemotherapy (http://www.radiologyinfo.org) : Chemotherapy, used alone or in combination with radiation therapy, is one of the main methods of treatment for lymphoma. It involves the use of cancer-killing drugs that are given by mouth or injection.

CNS prophylaxis (http://www.radiologyinfo.org) , in which chemotherapy is injected into the spinal column through a lumbar puncture (https://www.radiologyinfo.org/en/info/spinaltap) , may be used to treat certain types of non-Hodgkin lymphoma that have spread to the brain or are at high risk for such spread. In addition, steroid drugs may be used to relieve swelling and inflammation.

Radiation therapy: (https://www.radiologyinfo.org/en/info/intro_onco) Radiation therapy uses high-energy radiation to shrink tumors and kill cancer cells. Patients with lymphoma may be treated with external beam therapy (https://www.radiologyinfo.org/en/info/ebt) in which beams of high energy x-rays are generated by a machine outside the patient and directed at the tumor and cancerous lymph nodes. External beam therapy may be used alone or in combination with chemotherapy.

Monoclonal antibody therapy (also called targeted therapy) (http://www.radiologyinfo.org) : This is a treatment involving laboratory-produced molecules called monoclonal antibodies that are engineered to recognize and bind to the surface of cancer cells. Monoclonal antibodies mimic naturally produced antibodies in the body that attack invading foreign substances, such as bacteria and viruses. Monoclonal antibodies may be combined with a chemotherapy drug or radioactive material, allowing the antibody to deliver a direct dose of the cancer-killing agent to the cancer cell.

Two common monoclonal antibodies used for lymphoma are:

- Rituximab® (http://www.radiologyinfo.org) , a monoclonal antibody designed to seek out and lock onto the protein receptor (CD20) found on a specific type of lymphocyte (B cells), which causes the lymphoma cell to die. This treatment is used for many patients with "B-cell" lymphoma and may be combined with chemotherapy and/or radiation therapy.
- Brentuximab vedotin (Adcetris®) (http://www.radiologyinfo.org) , which combines a chemotherapy drug with a monoclonal antibody that attaches to a specific molecule (CD30) on the surface of Hodgkin disease cells and some other types of lymphoma.

Immunotherapy (http://www.radiologyinfo.org) : Immunotherapy includes agents such as pembrolizumab and nivolumab. These drugs block the ability of malignant cells to “co-opt” the immune system by interfering with normal lymphocyte function. These agents are often combined with conventional chemotherapy.

Radioimmunotherapy (also called radiolabeled monoclonal antibody therapy): (https://www.radiologyinfo.org/en/info/radio-immuno) This therapy pairs a monoclonal antibody with a radioactive material, such as Yttrium-90 (http://www.radiologyinfo.org) with Ibritumomab Tiuxetan

Copyright© 2026, RadiologyInfo.org

(Zevalin®) (http://www.radiologyinfo.org) . The radiolabeled monoclonal antibody travels to and binds to cancer cells, allowing a high dose of radiation to be delivered directly to the tumor.

Biologic therapy (http://www.radiologyinfo.org) : This treatment involves natural or laboratory-made substances designed to boost, direct or restore the body's natural defenses against cancer, or to interfere with specific biologic pathways within the lymphoma cells. Interferon (http://www.radiologyinfo.org) is one type of biologic therapy that affects the division of cancer cells and can slow tumor growth. Lenalidomide and ibrutinib are examples of agents that interfere with metabolic pathways within the lymphoma cells.

Stem cell transplant (http://www.radiologyinfo.org) : In this treatment, diseased bone marrow is replaced with the patient's own healthy stem cells (called autologous (http://www.radiologyinfo.org)) or the stem cells of a donor (called allogeneic (http://www.radiologyinfo.org)) in order to help new bone marrow grow. A stem cell transplant may be an option if lymphoma returns after treatment. Patients undergoing a stem cell transplant may first receive whole-body external beam radiation along with high-dose chemotherapy to eliminate as many lymphoma cells as possible throughout the body.

Disclaimer

This information is copied from the RadiologyInfo Web site (http://www.radiologyinfo.org) which is dedicated to providing the highest quality information. To ensure that, each section is reviewed by a physician with expertise in the area presented. All information contained in the Web site is further reviewed by an ACR (American College of Radiology) - RSNA (Radiological Society of North America) committee, comprising physicians with expertise in several radiologic areas.

However, it is not possible to assure that this Web site contains complete, up-to-date information on any particular subject. Therefore, ACR and RSNA make no representations or warranties about the suitability of this information for use for any particular purpose. All information is provided "as is" without express or implied warranty.

Please visit the RadiologyInfo Web site at **http://www.radiologyinfo.org** to view or download the latest information.

Note: Images may be shown for illustrative purposes. Do not attempt to draw conclusions or make diagnoses by comparing these images to other medical images, particularly your own. Only qualified physicians should interpret images; the radiologist is the physician expert trained in medical imaging.

Copyright

This material is copyrighted by either the Radiological Society of North America (RSNA), 820 Jorie Boulevard, Oak Brook, IL 60523-2251 or the American College of Radiology (ACR), 1891 Preston White Drive, Reston, VA 20191-4397. Commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is prohibited.

Copyright ® 2026 Radiological Society of North America, Inc.