CONDITION

Non-hodgkin lymphoma in children

Non-Hodgkin lymphoma is a cancer of immune cells that can grow quickly in children but is often curable with treatment.

WHAT IT IS
Cancer of lymphocytes in children and teenagers

BODY SYSTEM
Immune and lymphatic systems

MAIN SYMPTOMS
Painless lump, belly swelling, fever, night sweats

WHAT CAUSES IT
Usually acquired cell changes; rarely immune disorders or infections

HOW IT IS DIAGNOSED
Tumor biopsy with laboratory analysis

MAIN TREATMENT
Combination chemotherapy, sometimes with immunotherapy

CAN IT BE CURED?
Yes - cure is common with modern treatment

IS IT AN EMERGENCY?
Sometimes - breathing trouble, facial swelling, or treatment fever

LONG-TERM OUTLOOK
Often favorable; subtype and treatment response shape the outcome

Overview

Non-Hodgkin lymphoma is a group of cancers that begin in lymphocytes. Lymphocytes are white blood cells that help the immune system fight infection.

These cells are found in lymph nodes, the spleen, bone marrow, thymus, and other tissues. Because lymphocytes travel throughout the body, lymphoma can develop in the chest, abdomen, head and neck, skin, bones, or other areas. It is different from Hodgkin lymphoma.

The main types in children include Burkitt lymphoma, diffuse large B-cell lymphoma, lymphoblastic lymphoma, and anaplastic large cell lymphoma. The type matters because each can behave differently and may need a different treatment plan.

Childhood non-Hodgkin lymphoma often grows quickly. This means symptoms may develop

over days or weeks rather than months. It also means that the cancer cells may respond well to medicines that attack rapidly dividing cells.

Many children can be cured, including some whose lymphoma has spread to several parts of the body. The outlook is influenced by the lymphoma subtype, where it is found, laboratory findings, and how it responds to treatment.

Symptoms

Symptoms depend on where the lymphoma is growing. A lump is not always present, and many possible symptoms also occur with common childhood illnesses.

A child may have:

A mass in the chest can press on the airway or major blood vessels. This may cause noisy or difficult breathing, facial or neck swelling, prominent veins on the chest, or dizziness.

Symptoms alone cannot confirm lymphoma. Infections and other non-cancerous conditions are much more common causes of swollen lymph nodes in children.

- A painless, firm, or quickly enlarging lump, often in the neck, armpit, or groin
- Swelling, pain, or a feeling of fullness in the abdomen
- Reduced appetite, nausea, constipation, or unexplained weight loss
- Cough, chest discomfort, shortness of breath, or trouble lying flat
- Fever without a clear infection, drenching night sweats, or unusual tiredness
- Bone pain, headaches, weakness, or changes in balance
- Easy bruising, paleness, or frequent infections if bone marrow is affected
- Skin lumps or patches in some forms of lymphoma

Causes and risk factors

Non-Hodgkin lymphoma develops when genetic changes cause a lymphocyte to grow and divide without normal control. These changes are usually acquired during the child's lifetime. They are not caused by anything the child or family did.

For most children, there is no identifiable cause. Childhood non-Hodgkin lymphoma is generally not inherited and cannot spread from one person to another.

Risk is higher in some children whose immune systems do not work normally. This can include

children with certain rare inherited immune conditions, HIV infection, or immune suppression after an organ or stem cell transplant. Some previous cancer treatments can also increase the later risk of lymphoma.

Epstein-Barr virus, which causes glandular fever, is linked to certain lymphomas, especially when the immune system is weakened. Most people infected with this common virus never develop lymphoma.

Having a risk factor does not mean a child will get lymphoma. Many affected children have no known risk factors.

Diagnosis

A clinician will ask about the symptoms and examine the child, including the lymph nodes, abdomen, chest, skin, and general health. Blood tests may check blood cell counts, kidney and liver function, and chemicals that can change when many cancer cells are breaking down.

A biopsy is needed to confirm the diagnosis. During a biopsy, all or part of an abnormal lymph node or mass is removed. A pathologist examines the tissue and uses specialized tests to identify the exact type of lymphoma. These tests may look at proteins on the cells, chromosomes, and genetic changes.

After lymphoma is confirmed, further tests show where it is and help guide treatment. These may include:

Some procedures require sedation or a general anesthetic. The care team should explain how each test will be done and how the child will be kept comfortable.

Childhood lymphoma is grouped by subtype and risk rather than by location alone. The amount of lymphoma, the organs involved, and early response to treatment help determine the treatment plan.

- Ultrasound, CT, PET, or MRI scans
- A bone marrow aspiration and biopsy
- A lumbar puncture, which samples the fluid around the brain and spinal cord
- Heart, kidney, or lung checks before certain treatments

Treatment and management

Treatment is planned by a specialist pediatric cancer team. The plan is based on the lymphoma

subtype, its locations, the child's overall health, and test results.

Combination chemotherapy is the main treatment. This uses several medicines that attack cancer cells in different ways. Childhood lymphoma treatment is often given in repeated, intensive blocks with planned recovery periods.

Some children with B-cell lymphoma receive immunotherapy as well as chemotherapy. Immunotherapy uses the immune system or laboratory-made antibodies to target features on lymphoma cells. Other targeted medicines may be considered for selected subtypes or for lymphoma that has returned.

Medicines may also be placed into the fluid around the brain and spinal cord. This is called intrathecal treatment. It treats or helps prevent lymphoma in the central nervous system.

Radiotherapy is used less often than chemotherapy but may be appropriate in selected situations. Surgery is usually needed to obtain a biopsy rather than to remove all the lymphoma. Removing a large mass is rarely the main treatment because lymphoma cells may be present in more than one area and usually respond to medicines.

Supportive care is an important part of treatment. It can include antibiotics like amoxicillin or doxycycline , blood or platelet transfusions, anti-sickness medicines, pain relief, nutrition support, and medicines or fluids to protect the kidneys.

The team may discuss fertility preservation before treatment when there is enough time and the planned treatment could affect future fertility. Options depend on the child's age, development, and clinical situation.

Complications

Lymphoma can cause problems by pressing on nearby organs. A chest mass may narrow the airway or restrict blood flow. Abdominal lymphoma can block the bowel, affect the kidneys, or occasionally create a hole in the bowel.

Tumor lysis syndrome can happen when many lymphoma cells break down quickly, sometimes before treatment but more often after it begins. This releases chemicals into the blood that can affect the kidneys, heart, muscles, and nervous system. Children at risk are closely monitored and may receive intravenous fluids and medicines to reduce that risk.

Chemotherapy can temporarily lower healthy blood cells. This can increase the risk of infection, anemia, bleeding, and bruising. Other effects may include mouth sores, nausea, hair loss, tiredness, or changes in appetite. The likely effects differ between treatment plans.

Some treatments can cause health effects months or years later. These may involve growth,

fertility, learning, the heart, bones, or the development of another cancer. The risk is not the same for every child. Long-term follow-up is used to watch for effects linked to the specific treatment received.

Prevention

Most childhood non-Hodgkin lymphoma cannot be prevented. The cell changes that lead to it usually occur without a known avoidable cause.

Children taking immune-suppressing medicines need planned medical monitoring, but these medicines should never be stopped or changed without specialist advice. They may be essential for preventing organ rejection or controlling another serious condition.

There is no routine screening test for non-Hodgkin lymphoma in children without symptoms. Families with a known inherited immune condition may receive condition-specific monitoring from a specialist team.

Living with it and what to expect

Treatment may last for several months, although the schedule differs by subtype and risk group. Some phases are more intensive than others. Hospital stays may be needed for chemotherapy, infection treatment, or monitoring, while other care may happen through an outpatient clinic.

School attendance, appetite, energy, sleep, and mood can change during treatment. Children may need flexible schooling and gradual activity. Play, contact with friends, and age-appropriate explanations can help maintain a sense of normal life.

Scans, examinations, and laboratory tests are used to assess response. A shrinking mass is encouraging, but imaging and other tests are needed to understand whether active lymphoma remains.

After treatment, follow-up visits check for signs that lymphoma has returned and for delayed effects of treatment. Visits are usually more frequent at first and become less frequent over time. The follow-up plan is tailored to the subtype, treatment, and child's needs.

Many survivors return to school, activities, and adult life after treatment. Some need continuing support for fatigue, anxiety, learning difficulties, fertility concerns, or other late effects. A treatment summary can help the child and future healthcare teams understand which long-term checks are appropriate.

Lymphoma can return after treatment, although this does not happen to every child. If it returns, treatment options may include different chemotherapy, immunotherapy, targeted treatment, or stem cell transplantation. The options depend on the subtype, previous treatment, and timing of the relapse.

When to get medical help

Arrange a prompt medical assessment for a lump that is growing, firm, painless, or not improving, especially if it occurs with persistent fever, night sweats, weight loss, unusual tiredness, abdominal swelling, or ongoing breathing symptoms.

Children receiving treatment should follow the cancer team's instructions about fever and infection. A fever during chemotherapy can be urgent because the body's infection-fighting cells may be low. Do not wait for other symptoms or give fever-reducing medicine to delay contacting the treatment team.

Seek emergency help for:

For less urgent concerns during treatment, contact the child's cancer team. New symptoms, medicine problems, poor fluid intake, repeated vomiting, or changes in behavior may still need same-day advice.

- Severe or rapidly worsening trouble breathing
- Blue, grey, or very pale lips or skin
- Rapid swelling of the face or neck
- Fainting, new confusion, a seizure, or difficulty waking
- Severe chest or abdominal pain
- Very little urine, severe weakness, or an irregular heartbeat during treatment
- Uncontrolled bleeding

Common questions

Is childhood non-Hodgkin lymphoma curable?

Yes. Cure is common with modern treatment, but no single outcome applies to every child. The exact subtype, sites involved, laboratory findings, and response to the first treatments all influence the outlook.

How fast does non-Hodgkin lymphoma grow in children?

Many childhood types grow quickly and can enlarge over days or weeks. Prompt assessment matters, but rapid growth does not mean treatment will fail. Fast-growing lymphoma cells can be highly sensitive to chemotherapy.

Does lymphoma spreading mean it cannot be cured?

No. Lymphocytes naturally travel around the body, so childhood lymphoma is often found in more than one place. Children with widespread lymphoma may still be cured. Risk grouping is more informative than spread alone.

Is non-Hodgkin lymphoma the same as leukemia?

No, but the conditions can overlap. Lymphoma mainly forms masses in lymph nodes or organs, while leukemia mainly involves blood and bone marrow. Lymphoblastic lymphoma and acute lymphoblastic leukemia arise from closely related cells and may receive similar treatment.

Will my child need surgery?

Usually, surgery is used to obtain tissue for diagnosis rather than to remove all the cancer. Chemotherapy can reach lymphoma cells throughout the body and is the main treatment for most children.

Can my child go to school during treatment?

Some children attend for part of treatment, while others need home or hospital teaching during intensive phases. Attendance is shaped by energy, infection risk, blood counts, appointments, and the treatment team's advice.

Sources

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