Treating Chronic Lymphocytic Leukemia

If you've been diagnosed with chronic lymphocytic leukemia (CLL), your cancer care team will discuss your treatment options with you. It's important that you think carefully about each of your choices, and to weigh the benefits of each treatment option against the possible risks and side effects.

Main treatments

Because CLL often grows slowly, not everyone needs to be treated right away. When treatment is needed, the main treatments used are:

- Chemotherapy for Chronic Lymphocytic Leukemia (CLL)
- Immunotherapy for Chronic Lymphocytic Leukemia (CLL)
- Targeted Therapy Drugs for Chronic Lymphocytic Leukemia
- Supportive or Palliative Care for Chronic Lymphocytic Leukemia
- Stem Cell Transplant for Chronic Lymphocytic Leukemia

Other treatments

Less often, the following treatments might be used to treat CLL:

- Surgery for Chronic Lymphocytic Leukemia (CLL)
- Radiation Therapy for Chronic Lymphocytic Leukemia (CLL)

Common treatment approaches

It's important to take time and think about your options. Because CLL often grows

- Seeking a Second Opinion

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- Clinical Trials

Considering complementary, integrative, and alternative methods

You may hear about alternative or complementary methods to relieve symptoms or treat your cancer that your doctors haven't mentioned. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods are treatments that are used **along with** your regular medical care. **Alternative** treatments are used **instead of** standard medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- Complementary and Integrative Medicine

Help getting through cancer treatment

People with cancer need support and information, no matter what stage of illness they may be in. Knowing all of your options and finding the resources you need will help you make informed decisions about your care.

Whether you are thinking about treatment, getting treatment, or not being treated at all, you can still get supportive care to help with pain or other symptoms. Communicating with your cancer care team is important so you understand your diagnosis, what treatment is recommended, and ways to maintain or improve your quality of life.

Different types of programs and support services may be helpful, and they can be an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services - including rides to treatment, lodging, and more - to help you get through treatment. Call our Cancer Knowledge Hub at 1-800-227-2345 and speak with one of our caring, trained cancer helpline specialists. Or, if you prefer, you can use our chat feature on cancer.org to connect with one of our specialists.

- Palliative Care
- Programs & Services

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it’s important to talk to your doctors as you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

People who have advanced cancer and who are expected to live less than 6 months may want to consider hospice care. Hospice care is designed to provide the best possible quality of life for people who are near the end of life. You and your family are encouraged to talk with your doctor or a member of your supportive care team about hospice care options, which include hospice care at home, a special hospice center, or other health care locations. Nursing care and special equipment can make staying at home a workable option for many families.

- If Cancer Treatments Stop Working
- Hospice Care

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask your cancer care team any questions you may have about your treatment options.

Chemotherapy for Chronic Lymphocytic Leukemia (CLL)

Chemotherapy (chemo) uses anti-cancer drugs that are taken by mouth or injected into a vein or muscle to kill or control cancer cells. These drugs enter the bloodstream and reach all parts of the body, so chemo can be useful for cancers that tend to spread throughout the body, like chronic lymphocytic leukemia (CLL).

When and how is chemo used to treat chronic lymphocytic leukemia (CLL)?

In the past, when people with CLL needed to be treated, chemo was usually part of the main treatment (often along with an immunotherapy drug, known as **chemoimmunotherapy**, or CIT). But as newer, more effective targeted drugs have become available, chemo is now used less often.

Chemo might be used (often along with an immunotherapy drug) if:

- It's important to get a quick response to treatment
- A person can't be treated with targeted drugs for some reason
- Other drug treatments have already been tried and are no longer helpful

Chemo is also often an important part of the treatment for people getting a stem cell transplant.

Doctors give chemo in cycles, with each treatment period followed by a rest period to allow the body time to recover. Chemo cycles generally last about 3 to 4 weeks. Because of the side effects it can cause (see below), chemo might not be recommended for people in poor health, but age by itself should not keep anyone from getting chemo.

Chemo drugs used for chronic lymphocytic leukemia (CLL)

The chemo drugs most often used to treat CLL include:

- Fludarabine
- Cyclophosphamide
- Bendamustine
- Chlorambucil
- Corticosteroids, such as prednisone, methylprednisolone, or dexamethasone

Chemo drugs might be combined and/or used with immunotherapy drugs. Examples of commonies of

- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue and shortness of breath (from having too few red blood cells)

These side effects usually go away once treatment is finished. There are often ways to lessen or even prevent these side effects. For instance, drugs can help prevent or reduce nausea and vomiting. Be sure to ask your doctor or nurse about medicines to help reduce side effects, and let them know when you do have side effects so they can be managed before they get worse.

Drugs known as **growth factors,** such as G-CSF (filgrastim), pegfilgrastim, and GM-CSF (sargramostim), might be given to increase white blood cell counts and help reduce the chance of infection (see Infections in People With Cancer[1]*).*

Tumor lysis syndrome is another possible side effect of certain types of chemo. It's most common in people who had large numbers of leukemia cells in their body before treatment. (This may be called **bulky disease**.) It most often happens with the first cycle of chemo. When the CLL cells are killed, they break open and release their contents into the bloodstream. This can overwhelm the kidneys, which can't get rid of all of these substances at once. This can lead to build up of excess amounts of certain minerals in the blood and even kidney failure. The excess minerals can cause heart and nervous system problems. These problems might be prevented by giving the person extra fluids and certain drugs, such as sodium bicarbonate, allopurinol, febuxostat, and rasburicase.

More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see Chemotherapy[2].

To learn about some of the side effects listed here and how to manage them, see Managing Cancer-related Side Effects[3].

Hyperlinks

1. www.cancer.org/cancer/managing-cancer/side-effects/infections.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html
3. www.cancer.org/cancer/managing-cancer/side-effects.html

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Rai KR, Stilgenbauer S. Treatment of relapsed or refractory chronic lymphocytic leukemia. UpToDate. 2024. Accessed at https://www.uptodate.com/contents/treatment-of-relapsed-or-refractory-chronic-lymphocytic-leukemia on June 10, 2024.

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Immunotherapy for Chronic Lymphocytic Leukemia (CLL)

Immunotherapy is treatment that either boosts a person's own immune system or uses lab-made versions of the normal parts of the immune system to kill cancer cells or slow their growth. Some types of immunotherapy can be used to treat chronic lymphocytic leukemia (CLL).

- Monoclonal antibodies
- Chimeric antigen receptor (CAR) T-cell therapy
- More information about Immunotherapy

Monoclonal antibodies

Monoclonal antibodies are lab-made versions of immune system proteins (antibodies). Once inside your body, they attach to a specific target (often a protein on the surface of cancer cells). These drugs can help your immune system react to and destroy the cancer cells. Some monoclonal antibodies also fight cancer in other ways.

A monoclonal antibody might be given along with a targeted drug or with chemotherapy (chemo) as part of the treatment for CLL.

The monoclonal antibodies used to treat CLL can be grouped based on which protein they target.

Antibodies that target CD20

CD20 is a protein on the surface of B lymphocytes (the cells from which CLL starts). Some monoclonal antibodies that target the CD20 antigen can be used to treat CLL:

- Rituximab (Rituxan, other names[1])
- Obinutuzumab (Gazyva)
- Ofatumumab (Arzerra)

Rituximab is most often used along with chemotherapy or a targeted drug, either as part of the initial treatment or as part of a second-line treatment for CLL. It may also be used by itself for people too sick to get chemo.

Obinutuzumab can be used along with the chemo drug chlorambucil or with a targeted drug as a part of the initial treatment for CLL. It can also be used alone for CLL that comes back after treatment or doesn't respond to other treatments.

Ofatumumab is used mainly if CLL is no longer responding to other treatments such as chemotherapy or other monoclonal antibodies such as alemtuzumab (discussed below). It can be given by itself.

How these drugs are given

These drugs are given by infusion into a vein (IV), which can take up to several hours depending on the drug.

There is also a form of rituximab that's given as a shot under the skin (although the first

dose must be given IV). It can take 5 to 7 minutes to inject the drug, but this is much shorter than the time it normally takes to give the drug IV. Possible side effects include local skin reactions, like redness, where the drug is injected, infections, low white blood cell counts, nausea, fatigue, and constipation.

Side effects of these drugs

Infusion reactions: When given IV, all of these drugs can cause infusion reactions[2], either while the drug is being given or several hours afterwards. These can be mild, such as itching, chills, fever, nausea, rashes, fatigue, and headaches. More **serious side effects** can also occur during the infusion, including:

- Chest pain
- Heart racing
- Swelling of the face and tongue
- Cough
- Trouble breathing
- Feeling dizzy, lightheaded, or faint

Because of these kinds of reactions, drugs to help prevent them are given before each infusion.

Hepatitis B virus (HBV) reactivation: All of these drugs can cause HBV infections that were dormant (inactive) to become active again, which can lead to severe liver problems or even death. For this reason, your doctor may check your blood for signs of an old HBV infection before starting this drug. If your blood shows signs of an old HBV infection, the doctor will check your blood during treatment to see if the virus becomes active again. If it does, the drug will need to be stopped.

Increased risk of infections: These drugs may increase a person's risk of certain serious infections[3] for many months after the drug is stopped. For example, rarely, treatment with one of these drugs can lead to a rare brain disease known as **progressive multifocal leukoencephalopathy (PML)** that's caused by a virus. It can lead to headache, high blood pressure, seizures, confusion, loss of vision, and even death.

Tumor lysis syndrome: Rarely, when people with CLL have very high white blood cell counts, these drugs (especially obinutuzumab) may cause a condition called **tumor lysis syndrome**, which most often happens during the first course of treatment. When the CLL cells are killed, they break open and release their contents into the bloodstream. This can overwhelm the kidneys, so they can't get rid of all of these

Their Side Effects[5].

Chimeric antigen receptor (CAR) T-cell therapy

In this treatment, immune cells called T cells are removed from the patient's blood and altered in the lab to have specific receptors (called **chimeric antigen receptors**, or CARs) on their surface. These receptors can attach to proteins on the surface of CLL cells. The T cells are then multiplied in the lab and given back into the patient's blood, where they can seek out the CLL cells and launch a precise immune attack against them.

Lisocabtagene maraleucel (**Breyanzi**, also known as **liso-cel**) can be used to treat adults with CLL that is still growing or that has returned, typically after treatment with at least 2 types of targeted drugs has already been tried.

Side effects of CAR T-cell therapy

To learn more about the side effects mentioned here and how to manage them, see Managing Cancer-related Side Effects[8].

Hyperlinks

www.cancer.org/cancer/managing-cancer/treatment-types/biosimilar-

leukemia. UpToDate. 2024. Accessed at https://www.uptodate.com/contents/treatment-of-relapsed-or-refractory-chronic-lymphocytic-leukemia on June 10, 2024.

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Targeted Therapy Drugs for Chronic Lymphocytic Leukemia

Targeted therapies are drugs that specifically focus on some of the changes inside cancer cells that help them grow. Unlike standard chemotherapy drugs, which work by attacking rapidly growing cells in general (including cancer cells), these drugs target one or more specific proteins on or in chronic lymphocytic leukemia (CLL) cells. When treatment is needed for CLL, a targeted drug is often part of the first line of treatment.

Bruton's tyrosine kinase (BTK) inhibitors

BTK is a protein that normally helps some CLL cells to grow and survive. Drugs that target this protein, known as **BTK inhibitors**, can be helpful in treating CLL.

Ibrutinib (Imbruvica)

Ibrutinib can be used in the initial treatment of CLL. It has also been shown to help when CLL is hard to treat, for instance, if the CLL cells have a chromosome 17 deletion (del17p) or if the CLL has come back[1] after other treatments. This drug is a pill taken daily.

Side effects of ibrutinib can include diarrhea, nausea, constipation, fatigue, shortness of breath, swelling of the feet and hands, body aches, and rash. Low red blood cell counts (anemia), and low levels of certain white blood cells (neutropenia) and platelets

(thrombocytopenia) are also common side effects. Some people treated with this drug get serious infections. Other side effects are also possible, so ask your doctor what you might expect.

Acalabrutinib (Calquence)

Acalabrutinib can be used in the initial treatment of CLL, or after other treatments have been tried. It might be used alone or along with other drugs. This drug is a capsule taken by mouth, typically twice a day.

Side effects of acalabrutinib can include headache, diarrhea, bruising, fatigue, muscle and joint pain, cough, rash, and low blood counts, including low red blood cell counts (anemia), low levels of certain white blood cells (neutropenia), and platelet counts (thrombocytopenia).

More serious side effects can include bleeding (hemorrhage), serious infections, and irregular heartbeat (atrial fibrillation). Some people taking this drug have developed skin or other cancers, so while taking this drug, it's important to use sun protection when outside.

Zanubrutinib (Brukinsa)

Zanubrutinib can be used in the initial treatment of CLL, or after other treatments have been tried. This drug is a pill taken by mouth, typically once or twice a day.

Side effects of zanubrutinib can include a low white blood cell count (with an increased risk of infection), low platelet count (with an increased risk of bleeding and bruising), upper respiratory infections, muscle and joint pain, feeling tired, headache, cough, skin rash, and diarrhea.

More serious side effects can include bleeding (hemorrhage), serious infections, and heart rhythm problems. Some people taking this drug have developed skin or other cancers, so it's important to use sun protection when outside while taking this drug.

Pirtobrutinib (Jaypirca)

Pirtobrutinib is a newer type of BTK inhibitor that works in a slightly different way. It can be used to treat CLL, typically after other treatments (including another BTK inhibitor and a BCL-2 inhibitor) have been tried. This drug is taken by mouth as pills, typically once a day.

Common side effects of pirtobrutinib can include diarrhea, bruising, feeling tired, muscle and joint pain, cough, and low blood cell counts.

Less common but **more serious side effects** can include bleeding (hemorrhage),

that can affect cell growth. Drugs that target these proteins, known as **PI3K inhibitors**, can be helpful in treating CLL.

Idelalisib (Zydelig)

Idelalisib blocks a kinase protein called PI3K-delta. It's been shown to help treat CLL after other treatments have been tried. It's a pill, typically taken twice a day.

Common **side effects of idelalisib** include diarrhea, fever, fatigue, nausea, cough, pneumonia, belly pain, chills, and rash. Low blood counts, including low red blood cell counts (anemia), low levels of certain white blood cells (neutropenia), and platelet counts (thrombocytopenia), are also common.

Less often, **more serious side effects** can occur, such as liver damage, severe diarrhea, lung inflammation (pneumonitis), serious allergic reactions, severe skin problems, and holes (perforations) in the intestines.

Old (dormant) **infections** (like hepatitis) may become active again when someone is takes this drug. You may be given preventive (prophylactic) medicines to help keep this from happening. Your cancer care team will also watch you closely for signs of infection.

Duvelisib (Copiktra)

Duvelisib blocks two kinase proteins called PI3K-delta and PI3K-gamma. It's been shown to help treat CLL after other treatments have been tried. It's a pill, typically taken twice a day.

Common **side effects** include diarrhea, fever, fatigue, nausea, cough, pneumonia, belly pain, joint/muscle pain and rash. Low blood counts, including red blood cells (anemia) and certain white blood cells (neutropenia) are also common.

Less often.

see Managing Cancer-related Side Effects[3].

Hyperlinks

1. www.cancer.org/cancer/survivorship/long-term-health-concerns/recurrence.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/targeted-therapy.html
3. www.cancer.org/cancer/managing-cancer/side-effects.html

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Surgery for Chronic Lymphocytic Leukemia (CLL)

Surgery has a very limited role in treating chronic lymphocytic leukemia (CLL). Because CLL cells tend to spread widely throughout the bone marrow and to many organs, surgery can't cure this type of cancer. Surgery is rarely needed even to diagnose CLL, which can often be done with blood tests. But there are some situations where surgery might be done.

- Surgery to help diagnose chronic lymphocytic leukemia (CLL)

More information about surgery

For more general information about surgery as a treatment for cancer, see Cancer Surgery[3].

To learn about some of the side effects listed here and how to manage them, see Managing Cancer-related Side Effects[4].

Hyperlinks

1. www.cancer.org/cancer/types/chronic-lymphocytic-leukemia/detection-diagnosis-staging/how-diagnosed.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/blood-transfusion-and-donation.html
3. www.cancer.org/cancer/managing-cancer/treatment-types/surgery.html
4. www.cancer.org/cancer/managing-cancer/side-effects.html

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Radiation Therapy for Chronic Lymphocytic Leukemia (CLL)

Radiation therapy is treatment with high-energy rays or particles to destroy cancer cells. It's not usually the main treatment for chronic lymphocytic leukemia (CLL), but there are times when it might be helpful.

When is radiation therapy used for chronic lymphocytic leukemia (CLL)?

Radiation therapy is seldom part of the main treatment for people with CLL, but it may be used in certain situations.

- It can be used to treat symptoms caused by swollen organs (like an enlarged spleen) pressing on other organs. For instance, pressure against the stomach may make it hard to eat. If these symptoms are not improved with other treatments like targeted drugs or chemotherapy, radiation therapy may help shrink the organ.
- It can be useful in treating pain from bone damage caused by leukemia cells growing in the bone marrow.
- It is sometimes given to the whole body (known as **total body irradiation**, or **TBI**), to help destroy the cells in the bone marrow (including leukemia cells) before a stem cell transplant.

The number of treatments you will have depends on why the radiation is being given.

How is radiation therapy given for chronic lymphocytic leukemia (CLL)?

External beam radiation therapy, in which a machine sends a beam of radiation to a specific part of the body, is the type of radiation used most often for CLL.

Before your treatment starts, the treatment team will take careful measurements to

determine the correct angles for aiming the radiation beams and the proper dose of radiation. Getting radiation therapy is a lot like getting an x-ray, but the radiation is more intense (stronger). The procedure itself is painless. Each treatment lasts only a few minutes, but the setup time getting you into place for treatment usually takes longer.

Side effects of radiation therapy

The side effects of radiation therapy depend on where in the body the radiation is aimed. They can include:

- Skin changes in the treated area, which can vary from mild redness to what looks and feels like a burn

National Cancer Institute. Chronic Lymphocytic Leukemia Treatment (PDQ®)–Health

Supportive or Palliative Care for Chronic Lymphocytic Leukemia

immunotherapy) may help with some of the problems related to CLL over time, other treatments may be needed in the meantime.

Treatments to help prevent infections

People with CLL often have weakened immune systems. This can be from the CLL itself, as well as from some of the medicines used to treat it. Because of this, people with CLL are at higher risk for infections, which can sometimes be serious.

Antibiotic and antiviral medicines

Some medicines used to treat CLL, including some chemo drugs can raise your risk of certain infections such as cytomegalovirus (CMV) and pneumonia caused by *Pneumocystis jiroveci*.

You might be given an antiviral drug like acyclovir or valacyclovir to help lower your risk of CMV infection. To help prevent Pneumocystis pneumonia, a sulfa antibiotic is often given (such as trimethoprim with sulfamethoxazole). Other treatments are available for people who are allergic to sulfa drugs.

Some drugs used to treat CLL can also cause dormant viruses to become active. For instance, if you already carry the hepatitis B virus (HBV) or CMV, CLL treatment may allow them to grow and cause problems. Blood tests will be done to watch virus levels. You might be given drugs to help keep these viruses under control.

Vaccines

Vaccines to help prevent certain infections are often an important part of the care for people with CLL. But there might be times when vaccines might not be recommended, such as when you're being treated with medicines that weaken your immune system (which could make vaccines less effective). If you have CLL, it's best to speak to your health care provider before getting any vaccine.

Some examples of vaccines usually recommended for people with CLL include yearly flu (influenza) shots, COVID-19 vaccines, the pneumococcal vaccine (to help prevent pneumonia), and the recombinant zoster vaccine (to help prevent shingles).

It's important for people with weak immune systems to avoid vaccines that contain live viruses. These vaccines can sometimes cause serious infections in people with weak immune systems.

For more information on vaccines, see Vaccinations and Flu Shots for People with Cancer[1].

Treatments for low blood counts

CLL or its treatment can cause low blood cell counts, especially red blood cells and platelets, which normally help the blood clot.

Having a **low red blood count (anemia)** can make you feel tired, lightheaded, or short of breath. Anemia can have different causes. If anemia is causing symptoms, it can be treated with red blood cell transfusions[2]. These are often given in an outpatient clinic.

Having a **low platelet count** can lead to serious bleeding. Platelet transfusions can help prevent this.

In some people with CLL, low red blood and platelet counts can also be caused by the cells being destroyed by abnormal antibodies.

When antibodies cause low numbers of platelets, it's called **immune thrombocytopenia(ITP)**. Before diagnosing this, the bone marrow is often checked to make sure that something else isn't causing the low platelet counts. In ITP, giving platelet transfusions doesn't usually help increase the platelet counts, because the antibodies just destroy the new platelets, too. This can be treated with drugs that affect the immune system, like corticosteroids, IVIG, and the antibody drug rituximab. Another option is to remove the spleen, since after the antibodies stick to the platelets, they're

1. www.cancer.org/cancer/managing-cancer/side-effects/infections/vaccination-during-cancer-treatment.html

Some situations in which a SCT might be considered include:

- To treat CLL that comes back after treatment or that's no longer responding to standard treatments, especially if it's a type of CLL that's harder to treat, such as if the cells have a chromosome 17 deletion or a *TP53* gene mutation.
- To treat CLL that has transformed into a more aggressive type of leukemia.

Types of stem cell transplants (SCT)

The main types of stem cell transplants are:

Allogeneic SCT

In an **allogeneic transplant**, the stem cells come from someone else (a donor). To lower the chance of serious health problems, the donor needs to match the patient in terms of tissue type. Often, a close relative, like a brother or sister is a good match. Less often, a matched unrelated donor may be found.

This type of transplant can cause severe or even life-threatening complications and side effects, so it's often not a good option in people who are older or have other health problems.

Non-myeloablative transplant (mini-transplant): For people who are older or who have other health issues and can’t tolerate a standard allogeneic transplant that uses high doses of chemo, a non-myeloablative transplant (also known as a mini-transplant or reduced-intensity transplant) might still be an option. For this type of transplant, a person gets lower doses of chemo and radiation that don’t completely destroy the cells in their bone marrow. They then get the allogeneic (donor) stem cells. These cells enter the body and establish a new immune system, which sees the leukemia cells as foreign and attacks them (a **graft-versus-leukemia** effect).

This is the most common type of SCT used to treat CLL.

Autologous SCT

For an **autologous transplant**, the person’s own stem cells are collected from their blood or bone marrow before treatment. They are frozen and stored while the person gets treatment (high-dose chemotherapy and/or radiation). In the lab, a process called purging may be used to try to remove any leukemia cells in the samples. The stem cells

are then put back (reinfused) into the patient's blood after treatment. One problem with this type of SCT is that there might be remaining leukemia cells that might be given back to the person along with the stem cells.

This type of SCT is rarely used to treat CLL.

More information about stem cell transplant

To learn more about stem cell transplants, including how they are done and their potential side effects, see Stem Cell Transplant for Cancer[3].

For more general information about side effects and how to manage them, see Managing Cancer-related Side Effects[4].

Hyperlinks

1. www.cancer.org/cancer/managing-cancer/side-effects/infections.html
2. www.cancer.org/cancer/managing-cancer/making-treatment-decisions/clinical-trials.html
3. www.cancer.org/cancer/managing-cancer/treatment-types/stem-cell-transplant.html
4. www.cancer.org/cancer/managing-cancer/side-effects.html

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as obinutuzumab (Gazyva) or rituximab (Rituxan, other brand names[3])
- Venetoclax (Venclexta) and ibrutinib
- Venetoclax with either rituximab or obinutuzumab
- High-dose methylprednisolone and either rituximab or obinutuzumab
- Obinutuzumab alone

For people whose CLL cells **do not** have a deletion in chromosome 17 or a *TP53* gene mutation, another option might be chemoimmunotherapy, such as:

- Fludarabine, cyclophosphamide, and rituximab (FCR)
- Bendamustine and either rituximab or obinutuzumab
- Chlorambucil and obinutuzumab

Other drugs or combinations of drugs may also be used.

Radiation or surgery

If the only problem is an enlarged spleen or swollen lymph nodes in one part of the body, localized treatment with low-dose radiation therapy may be an option. Splenectomy (surgery to remove the spleen) is another option if the enlarged spleen is causing symptoms.

Stem cell transplant

It's not common, but some people who have very high-risk CLL (based on prognostic factors[4]) may be referred for a stem cell transplant (SCT) early in treatment.

Second-line or later treatments for CLL

If the first treatment for CLL is no longer working, or if the leukemia comes back[5], another type of treatment often helps. The options are generally the same as with the first treatment (targeted drugs, immunotherapy, and possibly chemotherapy), although they will depend on what the first treatment was and how well it worked, as well as other factors such as a person's overall health.

If the response to the initial treatment lasted a long time (usually at least a few years), the same treatment might be used again. If the initial response wasn't long-lasting, using the same treatment isn't as likely to be helpful.

Many of the same drugs and combinations listed above (as well as others) may be options as second-line treatments. Targeted therapy drugs and monoclonal antibodies are commonly used, alone or in combination. Chemo drugs might also be an option for some people.

Other types of treatments might be options as well. For example, some people who've already had treatment might benefit from a type of immunotherapy known as CAR T-cell therapy.

At some point, a stem cell transplant may be an option for some people, especially if they have a type of CLL that's harder to treat, such as if the cells have a chromosome 17 deletion or a *TP53* gene mutation.

Clinical trials[6] of newer treatments might also be a good option at some point, especially if many treatments have been tried.

Treating complications of CLL

People with CLL are at risk for a number of complications, including low blood counts, infections, and an increased risk of some more aggressive types of cancer. Treating the CLL itself might help with some of these. But sometimes other types of treatments might be needed as well.

Low blood cell counts and infections

CLL can sometimes cause serious problems with low blood counts and infections. These are discussed in Supportive or Palliative Care for Chronic Lymphocytic Leukemia.

Leukapheresis for very high white blood cell counts

Although it's rare, some people with CLL have very high numbers of leukemia cells in their blood when they're first diagnosed, which causes problems with their blood circulation. This is called **leukostasis**, and it needs to be treated right away. Sometimes a procedure called **leukapheresis** might be used to remove the white blood cells, although this isn't used very often.

To learn more, see Supportive or Palliative Care for Chronic Lymphocytic Leukemia.

Other cancers

One of the most serious complications of CLL is a change (transformation) in the leukemia to a high-grade or aggressive type of non-Hodgkin lymphoma[7] (NHL) called diffuse large B-cell lymphoma (DLBCL) or to Hodgkin lymphoma[8]. This is known as **Richter's transformation** (or **Richter's syndrome**). Treatment is often the same as it would be for that type of lymphoma, and it might include a stem cell transplant, because these cancers are often hard to treat.

Less often, CLL may progress to prolymphocytic leukemia, which can be hard to treat. Some studies have suggested that certain drugs such as cladribine (2-CdA) and alemtuzumab may be helpful.

In rare patients with CLL, the leukemia transforms (changes) into acute lymphocytic leukemia (ALL)[9]. If this happens, treatment is likely to be similar to that used for patients with ALL.

Acute myeloid leukemia (AML)[10] is another rare complication in people who have been treated for CLL, especially with chemotherapy. Drugs such as chlorambucil and cyclophosphamide can damage the DNA of blood-forming cells. These damaged cells may go on to become cancer, leading to AML, which tends to be very aggressive and often hard to treat.

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Treating Hairy Cell Leukemia (HCL)

When does hairy cell leukemia (HCL) need to be treated?

Treatment may be advised for people with HCL if they have low blood cell counts, recurrent infections, an enlarged spleen or lymph nodes, or other bothersome symptoms.

Treatment doesn't cure HCL, but it can help with symptoms, stop the HCL from progressing, and help people live longer.

Which treatments are used for hairy cell leukemia (HCL)?

The first treatment for HCL is most often chemotherapy (chemo)[1], with either cladribine (2-CdA) or pentostatin. Sometimes the monoclonal antibody rituximab is given after the chemo.

Most often HCL responds well to these drugs, and the responses often last for many years.

If the leukemia comes back at some point, it can often be treated with the same drug again, especially if the HCL stayed in remission for a long time (typically at least 2 years). If one chemo drug doesn't work, another can be tried.

In rare cases where HCL doesn't respond to chemo, or if the response to treatment doesn't last for long, other types of medicines might be tried. For example, targeted drugs known as **BRAF inhibitors**, such as vemurafenib (sometimes with rituximab) or dabrafenib (plus trametinib) might be options. BTK inhibitors might also be an option, as might rituximab alone or peginterferon-alfa[2], a type of immunotherapy.

If a person is uncomfortable because of an enlarged spleen, surgery to remove the spleen (splenectomy) can often help relieve pain.

Treatment of other problems caused by hairy cell leukemia (HCL)

Like chronic lymphocytic leukemia (CLL), HCL can cause low blood counts and infections. Treatment of these problems is discussed in Supportive or Palliative Care for Chronic Lymphocytic Leukemia.

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