LYMPHOMA
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Getting the Facts

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Radioimmunotherapy

Overview

Radioimmunotherapy (RIT) is a type of cancer therapy that combines a monoclonal antibody with a source of radiation.

What Is a Monoclonal Antibody?

Antibodies are normal components of the body's immune system that can recognize and destroy foreign invaders such as bacteria and viruses. Scientists can now produce monoclonal antibodies designed to recognize very specific targets (antigens) that are present on the surface of certain kinds of cancer cells. Monoclonal antibody therapy is administered by intravenous (IV) infusion, generally on an outpatient basis. Once in the bloodstream, monoclonal antibodies travel throughout the body and attach themselves to specific target antigens on cancer cells. This assists the body's immune system in identifying and destroying the cancer cells. Although some normal cells that also have the specific target antigen on their surface may be affected as well, the body can usually replace these normal cells following treatment.

What Is Radioimmunotherapy?

With RIT treatment, a radioactive particle (radioisotope) is attached to a monoclonal antibody. This allows the radiation to be delivered directly to the target cancer cells, limiting the exposure of healthy cells to radiation. Specialists such as a nuclear medicine physician or radiation oncologist who specializes in the delivery of radiation, as well as other healthcare professionals such as an oncologist or medical physicist, may be involved in the administration of RIT treatment. Treatment is commonly administered by IV infusion, similar to monoclonal antibody treatment.

Ibritumomab Tiuxetan: Zevalin

Ibritumomab tiuxetan was the first RIT approved by the U.S. Food and Drug Administration (FDA). This RIT contains a radioactive isotope called yttrium-90 (Y^{90}) that kills the cancer cells. Ibritumomab is an anti-CD20 monoclonal antibody that targets the CD20 antigen expressed on the surface of malignant B cells. Tiuxetan is the linker that attaches the Y^{90} to the antibody. Ibritumomab tiuxetan has been approved for the treatment of patients with relapsed (disease returns after treatment) or refractory (disease does not respond to treatment), indolent (slow-growing) or follicular B-cell non-Hodgkin lymphoma (NHL) as well as previously untreated patients with follicular NHL who achieved partial or complete responses to first-line chemotherapy.

Patients being treated with ibritumomab tiuxetan first receive two infusions of rituximab (Rituxan), a monoclonal antibody that also targets CD20 but does not carry any radioactive isotope, followed by a one-time infusion of ibritumomab tiuxetan. Specifically, on day one, the patient receives premedication with acetaminophen and diphenhydramine followed by an IV infusion of rituximab, which takes a few hours. Approximately one week later, the patient will return for a second infusion of rituximab followed by ibritumomab tiuxetan. Dosing is based on the patient's weight and platelet count.

Ibritumomab tiuxetan is generally well tolerated, without the hair loss and nausea that often accompany chemotherapy. The most common side effect is a temporary decrease in blood cell counts, which usually occurs approximately four weeks after treatment and returns to near-normal levels by eight weeks after receiving treatment. The side effects of rituximab can include headache, nausea, flushing, indigestion, light-headedness, and mild fever and chills, especially after the first dose. This is not a complete list of side effects, and physicians will check for these and other effects during follow-up visits.

Radiation from ibritumomab tiuxetan does not escape outside the body, but a small amount may be present in body fluids such as blood and urine. It is important for patients to avoid transferring body fluids for up to seven days following treatment. Patients should wash their hands thoroughly after urination and use a condom during sexual intercourse. It is not necessary to avoid contact with friends or family during this time, and patients can typically return to work and their usual activities following treatment. Patients should speak with their physician regarding safety precautions.

Treatments Under Investigation

Y^{90} epratuzumab tetraxetan is currently under investigation for the treatment of NHL, including in patients with newly diagnosed follicular lymphoma, B-cell acute lymphoblastic leukemia, and

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diffuse large B-cell lymphoma. The antibody epratuzumab targets the molecule CD22. Tetraxetan is a "chelator" that links the monoclonal antibody to the radioisotope Y^{90}. Y^{90} epratuzumab tetraxetan is being investigated for the treatment of patients with NHL and relapsed/refractory follicular lymphoma, potentially in combination with rituximab.

Y^{90} daclizumab, a CD25 antibody, is another RIT being investigated in the treatment of Hodgkin lymphoma.

Clinical Trials

Clinical trials are crucial in identifying effective drugs and determining optimal doses for patients with lymphoma. Patients interested in participating in a clinical trial should talk to their physician or contact the Lymphoma Research Foundation's (LRF) Helpline for an individualized clinical trial search by calling (800) 500-9976 or emailing helpline@lymphoma.org.

Follow-up

Patients in remission should have regular visits with a physician who is familiar with their medical history and the treatments they have received. Some medical tests (such as blood tests and computed axial tomography [CAT] scans) may be required at various times during remission to evaluate the need for additional treatment.

Some treatments can cause long-term effects or late effects, which can vary based on duration and frequency of treatments, age, gender, and the overall health of each patient at the time of treatment. A physician will check for these effects during follow-up care. Visits may become less frequent the longer the disease remains in remission.

Survivors and their caregivers are encouraged to keep copies of all medical records and test results as well as information on the types, amounts, and duration of all treatments received. This documentation will be important for keeping track of any effects resulting from treatment or potential disease recurrences.

Support

A lymphoma diagnosis often triggers a range of feelings and raises concerns. In addition, cancer treatment can cause physical discomfort. Support groups and online message boards can help patients connect with other people who have lymphoma. One-to-one peer support programs, such as the LRF Lymphoma Support Network, match lymphoma survivors (or caregivers) with volunteers who have gone through similar experiences.

Resources

LRF offers a wide range of resources that address treatment options, the latest research advances, and ways to cope with all aspects of lymphoma. LRF also provides many educational activities, from in-person meetings to teleconferences and webcasts, as well as E-Updates that provide the latest disease-specific news and treatment options. For more information about any of these resources, visit our website at www.lymphoma.org, or contact the LRF Helpline at (800) 500-9976 or helpline@lymphoma.org.