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Report From the 2007 Annual Meeting of the American Society of Hematology

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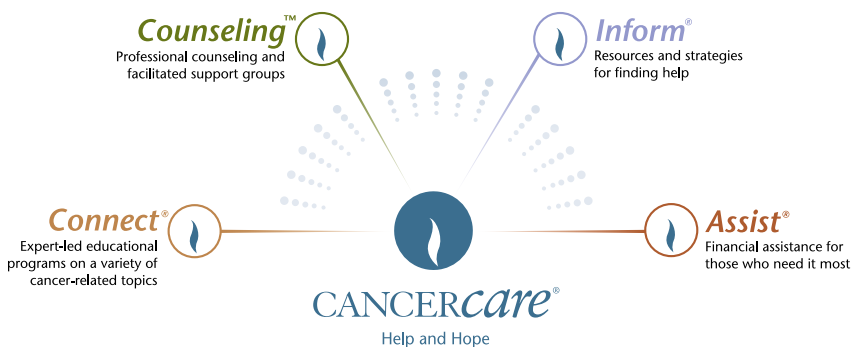
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This special edition of the CancerCare Connect® booklet series presents cutting-edge research highlights from the 2007 Annual Meeting of the American Society of Hematology (ASH), which took place December 8–11 in Atlanta, Georgia.

This guide includes information on advances in the treatment of blood cancers and lymphomas, as well as other promising treatments that researchers continue to study in clinical trials. To make sure this information is accurate, it has been reviewed by a recognized expert in the field. Some of these treatments are still in the earliest phases of research and may not be available to the general public outside of a clinical trial. Your doctor can help guide you as to which medications could be right for you and whether you are eligible to take part in the clinical trials of these new treatments.

The information contained in this booklet *combined with personalized advice from your physician* can help you understand whether these research findings affect your individual treatment plan and overall care.

Leukemia

Leukemia is the general term used to describe several very different types of blood cancers. In this section, we discuss the following forms of leukemia:

- **chronic myelogenous leukemia (CML)**
- **chronic lymphoblastic leukemia (CLL)**
- **acute myelogenous leukemia (AML)**

Approximately 44,000 people in the United States will be diagnosed with some form of leukemia in 2008.

CML: TREATMENT WITH IMATINIB (GLEEVEC)

When introduced in 2001, imatinib (Gleevec) revolutionized the treatment of people with CML, a rare form of cancer—it produced **remission** in most people who took it. According

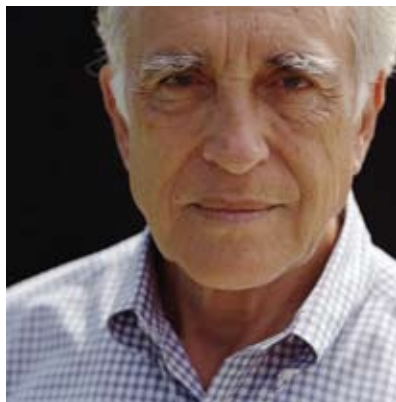
to a long-term follow-up clinical trial, the benefits of taking imatinib can last well into the sixth year of treatment.

The effectiveness of imatinib was studied in the largest clinical trial to date in people who had been newly diagnosed with CML. Called IRIS, the clinical trial showed that the growth of cancer was slowed or stopped in more than 553 people who received continuous treatment with imatinib.

Approximately 65 percent of these people remained on imatinib treatment for six years. The longer they used imatinib, the lower their risk of their cancer growing, which became apparent after the second year of treatment. By the sixth year of treatment, cancer had not grown to an advanced stage in any of the people in this group.

Another interesting finding is that in the first year of treatment, an abnormal change to the genetic material, known as the **Philadelphia chromosome**, that is seen in people with CML was eliminated in 70 percent of this group; by the sixth year of treatment, this number had reached more than 85 percent.

If these trends continue, the researchers say, many of the people with CML in this clinical trial may be able to expect a normal life span with continued imatinib treatment.



CML: TWO-YEAR FOLLOW-UP ON TREATMENT WITH DASATINIB (SPRYCEL)

Even though imatinib often slows or stops the growth of cancer in most people with CML, in some patients it either does not work or causes intolerable side effects. For those patients, a new drug called dasatinib (Sprycel) may be a beneficial alternative.

What's New, What's Important

- Long-term treatment with imatinib (Gleevec) may block early-stage CML from growing to an advanced stage.
- Two-year follow-up results show that dasatinib (Sprycel) seems to be an effective alternative for people with CML who do not respond to or cannot tolerate imatinib.
- A three-drug combination of fludarabine, cyclophosphamide, and the new medication oblimersen (Genasense) may help some people with relapsed CLL survive longer.
- A vaccine made with a substance called PR1 peptide appears to slow down the growth of cancer or even produce remission in some people who have myelogenous leukemias.

Dasatinib was approved by the U.S. Food and Drug Administration (FDA) in 2006 as a **second-line treatment** for people with cancer that has not responded to other medications for CML.

Researchers from the Dana-Farber Cancer Institute in Boston led the START-C study, a clinical trial of dasatinib that included nearly 400 people with CML from 75 cancer centers around the world. About 300 of the patients had cancer that was resistant to imatinib. The other nearly 100 patients could not tolerate the side effects of treatment with imatinib.

Two years after treatment with dasatinib, nearly 95 percent of the people survived. More than 60 percent of those treated had a major cytogenetic response, meaning their bone marrow had begun producing normal cells and, at least to some extent, started working properly. In addition, more than half of the patients had a complete cytogenetic response—that is, there was no longer any measurable evidence of cancer in their bone marrow.

These positive results were achieved with relatively few serious side effects. According to the researchers, the side effects could possibly be even less common with a new, lower dose of dasatinib, which was approved since the START-C clinical

trial was conducted. Those who took part in START-C received what had been a common oral dose of 70 milligrams (mg) of dasatinib taken twice a day. Now, another trial has found that a 100-mg dose once a day may be just as effective as—and perhaps better tolerated than—the standard twice-daily dose.

CLL: COMBINATION CHEMOTHERAPY WITH OBLIMERSEN (GENASENSE)

A three-drug combination has shown some promise in helping people with CLL survive longer, according to the results of a multinational clinical trial. CLL is a blood cancer that results from the accumulation of lymphocytes. The lymphocytes build up in the blood, bone marrow, and other areas of the body, crowding out healthy blood cells.

Nearly 250 people with CLL that had **relapsed** or had not responded to previous treatment were separated into two groups. One group received chemotherapy with FC, a combination of fludarabine (Fludara and others) and cyclophosphamide (Cytosan, Neosar, and others). The other group received chemotherapy with FC along with a new medication called oblimersen (Genasense) that is still being studied in clinical trials.

Oblimersen seems to work by interfering with the production of Bcl-2, a protein in CLL cells that may help keep the cells alive or make them resistant to treatment. Adding oblimersen to treatment with FC may also enhance the effects of this chemotherapy.

Cancer went into complete remission in 17 percent of people treated with the FC/oblimersen combination, compared with only seven percent of those treated with FC alone. This



response lasted longer in the oblimersen-treated group than in the group treated only with FC (36 months or longer versus 22 months). More than four years after this treatment, 10 percent of the 120 patients who received the oblimersen combination survived, compared with only two percent of the 121 patients who received FC without oblimersen.

Studies of this encouraging combination treatment are ongoing.

AML AND CML: A VACCINE TREATMENT

Vaccination is a way to trigger the body's immune system to recognize and defend itself against bacteria, viruses, and—doctors hope—some types of tumors. Researchers at the M. D. Anderson Cancer Center in Houston, Texas, have developed a vaccine that may slow down the growth of



cancer or even produce remission in some people who have myelogenous leukemias. The vaccine is made from a substance called PR1 peptide, which stimulates the body's immune cells to kill the leukemia cells while leaving healthy cells alone.

In the largest clinical trial of this approach to date, people who had AML or CML were given the vaccine without chemotherapy. Out of 53 people in the clinical trial, 25 responded to the vaccine. These 25 participants went longer without side effects or the

growth or recurrence of cancer than those whose cancer did not respond to the vaccine (8.7 months versus 2.4 months).

Some patients who had an immune response also went into remission. According to the researchers, this has never before been seen in people with leukemia who received a peptide vaccination.

Patients with milder cases of leukemia seemed to benefit the

most from the vaccine. Researchers believe the reason for this is that their immune systems have more time to mount an effective antitumor response.

Encouraged by these results, researchers are now testing this vaccine in greater numbers of people.

Lymphoma

Lymphoma is a general term for a group of cancers that originate in the lymphocytes, a type of white blood cell that is an important part of our infection-fighting immune system. These lymphocytes are found mainly in lymph nodes, as well as in other parts of the body's immune system, such as the spleen and bone marrow.

Lymphomas are divided into two major categories. In this section we talk about the largest group, called **non-Hodgkin's lymphomas (NHL)**. Each of the 40 or more types of NHLs has a different prognosis and treatment approach. For doctors to prescribe the most effective therapy, they must know the specific type of NHL a person has. NHLs are grouped by how they look under the microscope, which—to a certain extent—predicts how fast the tumors would grow without treatment. We'll focus on:

- NHLs as a group
- follicular NHL (a slow-growing lymphoma), the second most common type of lymphoma
- **mantle cell lymphoma**

A little more than half of all blood cancers are lymphomas. In 2008, about 72,000 people in the United States will be diagnosed with some type of lymphoma.

RELAPSED NHL: TREATMENT WITH LENALIDOMIDE (REVLIMID)

As a rule, NHLs that grow slowly respond well to standard cancer treatments such as chemotherapy and radiation, but they tend to come back many times over several years.

Generally, these NHLs respond again to similar or different treatments, but over time the tumors can become resistant. So it's important to have additional options available when other treatments no longer work. It appears that treatment with a relatively new drug called lenalidomide (Revlimid) may be a useful option for some people with NHLs that have returned.

Lenalidomide has been approved by the FDA for treatment of the blood cancer **multiple myeloma** that has relapsed (returned) or is **refractory** (does not respond or no longer responds to initial treatments). It belongs to a new class of medications called immunomodulators that seem to work, in part, by stimulating the body's immune system to help fight cancer cells.

Researchers from several centers in the United States and Canada tested lenalidomide, given by mouth, in more than



40 people who had slowly growing relapsed or refractory forms of NHL. Before joining this study, these patients had already received an average of three other treatments for cancer that had come back.

The cancer either shrank significantly (by at least

50 percent) or went into complete remission in about one fourth of the people treated with lenalidomide. The cancer neither grew nor shrank—that is, it stopped growing—in about another one third of the patients.

In another clinical trial conducted by some of these same researchers, more was learned about this promising treatment. This time, nearly 20 people took part. These patients had different types of aggressive (fast-growing) NHL that had relapsed or no longer responded to previous treatment with

What's New, What's Important

- Lenalidomide (Revlimid) appears to be a potentially useful treatment for people who have non-Hodgkin's lymphoma that has relapsed or no longer responds to initial treatment.
- Ibritumomab tiuxetan (Zevalin) may help people with advanced follicular lymphoma go longer with their cancer in remission when given as a second step after initial treatment.
- Bendamustine (Treanda) is an important treatment for people with slowly growing types of non-Hodgkin's lymphoma that no longer responds to rituximab (Rituxan).

at least one other medication. In this small study, the cancer shrank significantly in 25 percent of the people who were given lenalidomide; in some of the others, it stayed about the same size for some time.

Researchers are trying to sort out which types of tumors are most likely to respond to treatment with lenalidomide. Other ongoing studies are evaluating the use of this drug in combination with standard lymphoma treatments to see if combinations can be beneficial.

ADVANCED FOLLICULAR NHL: TREATMENT WITH IBRITUMOMAB TIUXETAN (ZEVALIN)

Follicular NHL (a slow-growing cancer) is the second most common type of lymphoma. A medication called ibritumomab tiuxetan (Zevalin) is an effective treatment for people with this type of cancer and is usually an option for people with tumors that have recurred after previous treatment. Called **radioimmunotherapy**, this treatment allows radiation to be delivered directly to tumor cells while most healthy cells are spared. In this treatment, a radioactive substance is linked to **monoclonal antibodies**, proteins that are injected into the body and circulate through the blood. These proteins locate and kill tumor cells with the radiation they carry.

Researchers conducted a clinical trial in 75 centers throughout Europe and Canada that included more than 400 people who had advanced follicular NHL. They wanted to find out whether ibritumomab tiuxetan is beneficial when given as part of the first combination chemotherapy treatment of this cancer, rather than waiting until later. All of their cancers had responded to initial chemotherapy. Once these patients completed their first treatment, half of them then received ibritumomab tiuxetan as a second step of their initial treatment, while the others received no further treatment but were watched closely over the following months and years.



People with follicular NHL who were treated with ibritumomab tiuxetan after their first treatment went more than twice as long with their cancer in remission than those who did not receive the drug (37 months versus

13.5 months). Also, more than 75 percent of the people whose cancer had shrunk significantly with the original treatment experienced complete remission of their cancer after treatment with ibritumomab tiuxetan.

NHL: TREATMENT WITH BENDAMUSTINE (TREANDA)

Rituximab (Rituxan) has been used to treat many types of NHL. It belongs to a new class of drugs called monoclonal antibodies. Rituximab zeros in on and destroys cells that have a molecule called CD20 on their surface. That molecule is found on most lymphoma cells, particularly the B-cell types of lymphoma, which are among the most common types of NHL.

Many people taking rituximab may have NHL that becomes refractory to rituximab. Having additional options in this

situation is important. Radioimmunotherapy with medications such as ibritumomab tiuxetan or tositumomab (Bexxar) can be very useful in this situation. Another option is the drug bendamustine (Treanda).

Developed in East Germany during the 1960s, bendamustine was used there for many years to treat thousands of people with various cancers, including multiple myeloma, CLL, and NHL. There have been many clinical trials of bendamustine in the United States in recent years, and the FDA just approved the drug for the treatment of CLL.

Researchers also are testing bendamustine in clinical trials for people with NHL. Many cancer centers in the United States are studying bendamustine in 100 people who have slowly growing types of NHL that has stopped responding to rituximab. Results for the first 38 patients are promising.

Before joining this clinical trial, these patients had already received an average of three treatments, including an average of two that contained rituximab.

When treated with bendamustine in the clinical trial, the tumors shrank in 84 percent of the participants. In nearly 30 percent of these patients, their cancer went into a complete remission. Although some of the responses to treatment were shorter, half of the patients had remissions with bendamustine that lasted nearly 10 months or longer.

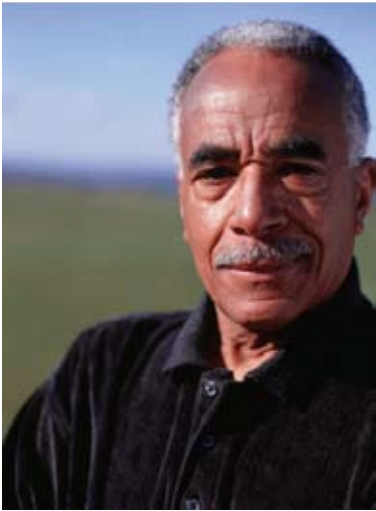
Researchers report that this is the first chemotherapy to show such positive results in people who have slowly growing lymphomas that have stopped responding to rituximab. Results for the full group of 100 study participants will be available soon.



NEWLY DIAGNOSED MANTLE CELL LYMPHOMA: COMBINATION TREATMENTS

Mantle cell lymphoma is a relatively rare form of B-cell NHL. For most people with mantle cell lymphoma who are treated with current medications, the cancer returns after a remission; in some it can quickly become more difficult to treat.

Now that doctors are learning how mantle cell lymphoma differs from other lymphomas, they are studying several combination treatments to find the most effective one for people who have been newly diagnosed with this cancer. Some researchers have seen excellent results for mantle cell lymphoma patients treated with stronger chemotherapy-based treatments. Researchers still need to determine whether



these results demonstrate that such treatments are actually better or simply reflect the fact that only healthier patients—who generally do better no matter what treatment is used—are given more intensive treatments.

In one approach, researchers from several cancer centers in the United States and Canada are conducting a clinical trial of a promising combination of standard and newer medications. Rituximab has been added to the standard chemotherapy combination

doctors refer to as “CHOP.” After treatment with rituximab and CHOP, ibritumomab tiuxetan is also given.

In one clinical trial, this combination of medications was tested in 51 people with newly diagnosed, untreated mantle cell lymphoma. In nearly 75 percent of the patients, the tumor either shrank by at least half or disappeared. More than one and a half years after treatment, the tumor had not yet grown

What's New, What's Important

- People with newly diagnosed mantle cell lymphoma, a relatively rare blood cancer, may benefit from more aggressive treatment with new combinations of drugs. However, additional clinical trials are needed to determine whether the benefits outweigh the extra risk.
- Updated results support the benefit of bortezomib (Velcade) for treatment of people with mantle cell lymphoma that has recurred after standard treatment.
- ABT-263 appears to be a promising drug in the treatment of people with different types of lymphomas. Studies are ongoing.
- A new treatment, epratuzumab, may work in combination with standard treatments to help fight NHL.

in about two thirds of them, which seems better than results from some clinical trials with other treatment plans.

Although researchers need to follow these patients for a longer time to determine how long their cancer will remain in remission, early results with this multidrug combination are encouraging.

In a separate clinical trial, another combination of stronger treatment for newly diagnosed mantle cell lymphoma was tested by the Southwest Oncology Group. Here, rituximab was added to a regimen called **hyperCVAD**, an intensive combination of a number of anticancer medications. Generally reserved for use against aggressive forms of blood cancers, hyperCVAD has been used to treat several forms of leukemia and NHL.

The “hyper” stands for hyperfractionated, which means that the drugs are given in small doses more often to reduce the side effects that this aggressive treatment causes. R-CVAD (rituximab, cyclophosphamide, vincristine, doxorubicin, and dexamethasone) is alternated every 21 days with rituximab plus two other anticancer drugs (high-dose methotrexate and cytarabine).

Nearly 50 people with newly diagnosed mantle cell lymphoma took part in this clinical trial. In 35 of 40 patients who were followed, the tumor shrank by at least half or completely disappeared. One year after treatment, 89 percent of the people who were followed had survived without their tumor growing. However, because of side effects such as nausea, diarrhea, mouth sores, and a potentially dangerous drop in the number of infection-fighting blood cells, which required transfusions to correct, about half of the participants did not complete the full treatment plan. More follow-up is needed.

RELAPSED MANTLE CELL LYMPHOMA: TREATMENT WITH BORTEZOMIB (VELCADE)

Because mantle cell lymphoma can be difficult to treat, it's particularly important to find new ways to fight this cancer. A number of new medications are now being developed.

One of these medications is bortezomib (Velcade), which is the first in a new class of drugs called **proteasome inhibitors**. The FDA has approved bortezomib for the treatment of people with multiple myeloma—a cancer of cells in the bone marrow.

Researchers from many medical centers across the United States have studied bortezomib in people with mantle cell lymphoma that has not responded or stopped responding to standard treatment.

More than 150 patients have completed treatment with bortezomib as part of the clinical trial known as PINNACLE. The tumor shrank by at least half or more in about one third of the people treated. According to the updated results of this clinical trial, some of these patients went for more than a year and a



NHL: ON THE HORIZON

Treating Relapsed Lymphomas With ABT-263

Scientists' growing knowledge about cancer has led to the development of newer drugs that target the specific genes and proteins involved in the growth of cancer cells. For example, Bcl-2 genes and the proteins they produce have become the focus of some recent clinical trials in lymphoma. Bcl-2 has been linked to many cancers, including those of the breast, prostate, and lung. The presence of Bcl-2–related proteins appears to help make cancers resistant to some standard treatments.

A new drug called ABT-263 has been developed that blocks some of the Bcl-2–related proteins that help keep cancer cells alive. ABT-263 is being studied in people with lymphoid and lung cancers.

Initially, 17 people with lymphoid cancers took part in a clinical trial of ABT-263. They received ABT-263 by mouth every day for 14 consecutive days, followed by seven days off the drug. Preliminary results suggested that ABT-263 deserves further research on its ability to effectively treat different types of lymphomas. The clinical trial is continuing.

A New Combination Treatment for Relapsed NHL

A combination treatment is showing encouraging results in people with relapsed, previously treated NHL. It includes a new medication that works by stimulating the body's immune system to attack cancer cells.

Researchers from cancer centers in the United States and Canada combined a new monoclonal antibody, epratuzumab, with rituximab, a standard monoclonal antibody used to treat B-cell lymphomas. These drugs target different proteins on cancer cells, and the goal was to see whether the combination might be more effective than either drug alone.

Nearly 50 people with recurrent NHL received treatment with both drugs for one month. In more than half of these patients, the tumor either shrank by at least half or disappeared. This response lasted for an average of nearly 13½ months, and some patients had remissions lasting several years.

Researchers were so impressed with this combination that it is being studied in several clinical trials as part of the initial treatment for various forms of NHL.

half before their tumors started to grow again, and a number of patients are still being followed more than two years after treatment.

Because of these positive results, the FDA has approved bortezomib for people with mantle cell lymphoma who have received at least one prior treatment for their cancer. To find out whether this drug can provide further benefits, a number of ongoing clinical trials are looking at bortezomib as part of initial treatment and/or in combination with standard treatment plans.



Multiple Myeloma

Multiple myeloma (also known as myeloma or plasma cell myeloma) is a cancer of the plasma cells. Plasma cells, most of which reside in the bone marrow, are an important part of the immune system that helps fight infection and disease. In 2008, approximately 20,000 people in

the United States will be diagnosed with multiple myeloma. All of the clinical trials discussed in this section are studying treatments for multiple myeloma.

LENALIDOMIDE (REVLIMID) PLUS LOW-DOSE DEXAMETHASONE

The updated findings of a clinical trial conducted by the Eastern Cooperative Oncology Group have provided new options for doctors to choose from in the initial treatment given to people with multiple myeloma. This landmark study has shown remarkable results when lenalidomide is combined with low-dose dexamethasone.

Considered a breakthrough medication for multiple myeloma, lenalidomide seems to work in a number of ways, in part

What's New, What's Important

- The new combination of lenalidomide plus low-dose dexamethasone helps people with multiple myeloma survive longer, with fewer side effects, than the older high-dose approach. This combination has now become a preferred treatment option.
- Adding bortezomib to standard treatments may be an effective way to make the cancer shrink or disappear before and after stem cell transplantation in people with previously untreated multiple myeloma.
- The new drug HuLuc63 looks promising as a treatment that can zero in on multiple myeloma cells.

by helping a person's immune system fight the growth of cancer. The combination of lenalidomide with the steroid medication dexamethasone has been a standard treatment for people whose multiple myeloma has relapsed after at least one treatment. Now, the combination has proved to be an effective choice as a first treatment for people with multiple myeloma.

Researchers from the Mayo Clinic in Rochester, Minnesota, conducted a clinical trial on the combination of lenalidomide and dexamethasone. Nearly 450 people with untreated multiple myeloma took part. All of them received 25 mg of lenalidomide by mouth. Half of them also received the routine treatment of high-dose dexamethasone. The other half received low-dose dexamethasone, a newer approach that has fewer side effects.

More than a year after treatment, more people receiving low-dose dexamethasone plus lenalidomide survived than those given the higher dose of dexamethasone with lenalidomide (96 percent versus 87 percent). Nearly two years after treatment, the same was true; more people in the low-dose group survived than in the high-dose group (87 percent versus 75 percent).

Further, there was less growth in tumor size in the low-dose group than in the high-dose group. Also, as expected, the low-dose group experienced fewer side effects from treatment than did the high-dose group. Infections occurred in seven percent of patients in the low-dose group and in 14 percent of patients in the high-dose group. Thromboembolism, a possibly life-threatening condition in which an abnormal blood clot forms and travels through the body's circulation, occurred in nine percent of patients in the low-dose group and in 25 percent of patients in the high-dose group.



Because of these results, every clinical trial in the United States involving a combination of dexamethasone with lenalidomide for multiple myeloma has now switched to using the lower dose of dexamethasone.

BORTEZOMIB COMBINATIONS

For people with multiple myeloma, a standard of care has often been a procedure called

autologous stem cell transplantation (ASCT). According to encouraging findings from two recent studies in Italy and France, the use of combination treatments containing the new drug bortezomib may be a way to make the cancer shrink or disappear so that more patients can have the procedure. Researchers believe this approach may improve the results of the transplant and may help people with the disease survive longer.

People with newly diagnosed multiple myeloma took part in the Italian clinical trial. Of nearly 190 patients, about half were treated with bortezomib, thalidomide (Thalomid), and

dexamethasone—a combination known as VTD. The rest were treated with just thalidomide and dexamethasone. These treatments were given before the stem cell transplant.

Before transplantation, more people in the VTD group experienced a complete remission—that is, no evidence of disease—than in the other group (36 percent versus nine percent). After both groups completed the transplantation, more people in the VTD group also experienced a complete remission of their cancer than in the other group (57 percent versus 28 percent). With VTD, the rate of complete remission was four times higher than that seen in the group that didn't receive bortezomib. Doctors believe that complete remission is an indicator that patients may be more likely to survive longer.

MULTIPLE MYELOMA: ON THE HORIZON

Plerixafor Before Transplantation in People With Multiple Myeloma

The addition of a new drug called plerixafor to a protein known as G-CSF (granulocyte colony-stimulating factor) seems to help people with multiple myeloma produce more CD34+ cells quickly. Having an adequate amount of these cells may make it more likely a patient's stem cell transplant will be successful.

HuLuc63 for Multiple Myeloma

Researchers from medical centers in the United States, Israel, and France are studying a new anticancer drug called HuLuc63 and are encouraged by the early results. This new medication belongs to the class of drugs called monoclonal antibodies. HuLuc63 zeroes in on multiple myeloma cells and a substance called CS1, which the tumor cells produce at a higher rate than healthy cells produce.

Researchers are studying HuLuc63 for use as a single treatment and also in combination with other currently approved anticancer drugs such as dexamethasone, bortezomib, and bevacizumab. It appears that HuLuc63 may be combined with these different classes of drugs to enhance its anti-myeloma effects. The studies are ongoing.

The French clinical trial found similar results with bortezomib-based treatment. Nearly 500 people with newly diagnosed multiple myeloma took part in this trial, which paired bortezomib and dexamethasone and compared them with the combination of vincristine (Oncovin, Vincasar, and others), doxorubicin (Adriamycin, Rubex, and others), and dexamethasone, referred to as VAD. As in the Italian study, patients received this treatment before ASCT.

Of the 222 people whose results have been analyzed so far, about 20 percent of those treated with the bortezomib and dexamethasone combination experienced a decrease or complete remission of their cancer, compared with just eight percent of those treated without bortezomib before ASCT. Of the nearly 400 people who then received ASCT, the bortezomib treatment, again, did a better job of shrinking the cancer or making it go into complete remission than did VAD. Forty-one percent of the bortezomib-treated patients experienced a complete remission after finishing treatment versus just 29 percent of the VAD group.



According to the researchers, these results with bortezomib-based treatment led to a decrease in the number of patients who had to have a second transplant. More research is needed over a longer period to see whether these early results translate into longer-term survival for people with multiple myeloma treated with bortezomib and dexamethasone before transplantation.

Glossary

acute myelogenous leukemia (AML) A quickly growing blood cancer in which too many immature white blood cells are found in the blood and bone marrow. Also called acute myeloid leukemia.

autologous stem cell transplant (ASCT) For this procedure, bone marrow is taken from the person with cancer. The marrow contains immature cells, called stem cells, capable of maturing into red blood cells, white blood cells, and other essential cells produced by healthy bone marrow. With the stem cells on reserve, the patient is given high doses of chemotherapy designed to destroy the cancerous bone marrow. The reserved stem cells are then given back to the person in the same way as a blood transfusion. The expectation is that the stem cells will mature into healthy bone marrow cells and help replenish the red and white blood cell counts more quickly.

chronic lymphoblastic leukemia (CLL) A slow-growing blood cancer in which too many lymphoblasts (immature white blood cells) are found in the blood and bone marrow. Also known as chronic lymphocytic leukemia.

chronic myelogenous leukemia (CML) A slow-growing blood cancer in which too many white blood cells are made in the bone marrow. Also called chronic myeloid leukemia.

hyperCVAD A complex and intensive combination of a number of anticancer medications: cyclophosphamide, vincristine, doxorubicin, and dexamethasone. Doctors alternate these drugs with high doses of cytarabine and methotrexate. The “hyper” stands for hyperfractionated, which means that the drugs are given in small doses, more often. This treatment plan is often combined with rituximab.

lymphocytes A type of white blood cell that is an important part of our infection-fighting immune system. When these cells become abnormal, they can give rise to some forms of leukemia and lymphoma.

mantle cell lymphoma A relatively uncommon form of B-cell lymphoma, which is a type of non-Hodgkin's lymphoma. It gets its name from the mantle zone, which is the outer edge of the lymph nodes (a linked system of small bean-shaped structures throughout the body that helps filter out and destroy bacteria and other toxic substances) where changes take place that lead to this cancer.

monoclonal antibodies These proteins are designed to circulate through the blood, attach themselves to tumor cells, and kill them in various ways. They also can be used to deliver treatment such as radioactive particles that destroy the tumor.

multiple myeloma Cancer of the plasma cells, most of which reside in the bone marrow.

non-Hodgkin's lymphoma (NHL) Any of a large group of cancers of the lymph cells of the immune system. NHLs can occur at any age and are often marked by enlarged lymph nodes and less commonly by fever and weight loss. There are many different types of NHL, which can be divided into aggressive (fast-growing) and indolent (slow-growing) types.

Philadelphia chromosome An abnormality of chromosome 22 in which part of chromosome 9 is transferred to it. Bone marrow cells that contain the Philadelphia chromosome are typically found in chronic myeloid leukemia.

proteasome inhibitors This class of drugs blocks structures inside the cell called proteasomes, which break down proteins that have become damaged or have outlived their usefulness. When such medications block the proteasomes of cancer cells, they become easier to kill with other anticancer drugs.

radioimmunotherapy A treatment that allows radiation to be delivered directly to tumor cells while most healthy cells are spared. In this treatment, a radioactive substance is linked to monoclonal antibodies, proteins that are injected into the body and circulate through the blood. These proteins locate and kill tumor cells with the radiation they carry.

refractory When a cancer does not respond, or returns very quickly, after treatment. Such cancers are sometimes called “resistant” to treatment.

relapsed When a cancer returns after remission.

remission The length of time when a cancer has responded to treatment or is under control. Remission can be partial or complete. Complete remission means that cancer cells cannot be detected by any of the available tests for that cancer, though there still may be undetectable cells at the microscopic level. Partial remission means the tumor has shrunken significantly (by 50 percent in some types of cancer) but still remains.

second-line treatment Treatment that is given when initial treatment (first-line therapy) doesn’t work or has stopped working and the cancer has returned.

stem cell transplant For this procedure, stem cells are given to a patient with the intent that they will mature into healthy bone marrow cells and help replenish red and white blood cells after intensive treatment. Stem cells can be given from one’s own system (autologous stem cell transplant) or from another person (allogeneic stem cell transplant).

Resources

CancerCare

1-800-813-HOPE (4673)

www.cancer.org

American Cancer Society

1-800-227-2345

www.cancer.org

Cancer.Net

(Patient website of the American Society of Clinical Oncology)

www.cancer.net

National Cancer Institute

1-800-422-6237

www.cancer.gov

National Library of Medicine (MedlinePlus)

www.medlineplus.gov

International Myeloma Foundation

1-800-452-2873

www.myeloma.org

The Leukemia & Lymphoma Society

1-800-955-4572

www.leukemia-lymphoma.org

Lymphoma Research Foundation

1-800-500-9976

www.lymphoma.org

Multiple Myeloma Research Foundation

1-203-229-0464

www.multiplemyeloma.org

National Marrow Donor Program

1-800-627-7692

www.marrow.org

To find out about clinical trials:

Coalition of Cancer Cooperative Groups

www.CancerTrialsHelp.org

National Cancer Institute

www.cancer.gov/clinicaltrials



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