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Latest News in Blood Cancer Research

Highlights from the 2012 Annual Meeting of the American Society of Hematology

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This special edition of the Cancer*Care* Connect Booklet Series highlights cutting-edge research presented at the 2012 Annual Meeting of the American Society of Hematology, which took place December 8–11 in Atlanta, Georgia.

Some of the treatments discussed are still in the very early stages of research and may not be available to the general public outside of a clinical trial.

The information contained in this booklet is intended for discussion with your doctor. He or she can let you know whether these advances in the treatment of blood cancers affect your treatment plan and whether a clinical trial is right for you.

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Latest News in Blood Cancer Research

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Editors

Ruben A. Mesa, MD, FACP
Consultant Hematologist; Chair, Division of Hematology & Medical Oncology; Deputy Director, Mayo Clinic Cancer Center, and Professor of Medicine, Mayo Clinic in Arizona

William Bensinger, MD
Professor of Medicine, University of Washington, and Director, Autologous Stem Cell Transplant Program, Fred Hutchinson Cancer Research Center

Oliver W. Press, MD, PhD
Member, Fred Hutchinson Cancer Research Center; Recipient, Dr. Penny E. Petersen Memorial Chair for Lymphoma Research; Professor of Medicine, University of Washington, and Co-Chair, NCI Lymphoma Steering Committee

Carolyn Messner, DSW, MSW
Director of Education and Training, CancerCare

Leukemia

A number of exciting advances in leukemia treatment were reported at the 2012 Annual Meeting of the American Society of Hematology. Some of the new developments presented included a fourth effective targeted treatment for people with resistant leukemia.

Researchers reported doctors can now use a blood test to monitor treatment of chronic myelogenous leukemia (CML) to make sure the medicine is working. Another study showed that by adjusting the dose and the way it is given, a targeted treatment that was taken off the market in 2010 may prove to be a safe and effective treatment for those with leukemia. And a new way to deliver chemotherapy may prove to be more beneficial than the standard technique for older people with newly diagnosed acute myelogenous leukemia (AML).

For those newly diagnosed with acute promyelocytic leukemia (APL), there is a promising new targeted treatment. Researchers are also encouraged by early results reported on two other targeted treatments for acute lymphoblastic leukemia (ALL) that no longer responds to other treatments. And, finally, in what is perhaps the biggest step in treating ALL and chronic lymphocytic leukemia (CLL), researchers are altering patients' own immune system cells to destroy these cancers.

Ponatinib in Resistant Leukemias

The new drug ponatinib (Iclusig) appears to be an effective treatment for people with certain types of leukemia that no longer respond to other drugs. Approved by the U.S. Food and Drug Administration (FDA) in December 2012 for treating resistant leukemias, ponatinib is the newest of the most powerful treatments available for leukemia: imatinib (Gleevec), dasatinib (Sprycel) and nilotinib (Tasigna).

In the PACE clinical trial, 449 people took part. These patients had either resistant CML or a subtype of ALL called Philadelphia chromosome-positive ALL. They received treatment daily with oral ponatinib. Of those with chronic- and acute-phase CML, the cancer in 50 percent to 70 percent of patients responded to treatment. Of those with blast-phase CML or Philadelphia chromosome-positive ALL, the cancer in about 35 percent of patients responded to treatment. Cancer in 70 percent of patients who had a genetic mutation (change) known as the T315I mutation responded to ponatinib. In the past, this mutation has been very resistant to treatment with imatinib, dasatinib and nilotinib.

What Patients Need to Know

For people with resistant leukemia, ponatinib offers a fourth effective targeted treatment. Unlike chemotherapy, targeted treatments usually spare healthy tissues and cause fewer side

effects. The results of the PACE trial are so encouraging that the FDA granted accelerated approval of ponatinib so people can benefit from the drug as soon as possible. Researchers plan to study ponatinib further to confirm that it is a safe and effective treatment for people with leukemia.

Early Monitoring in CML May Help Improve Responses to Treatment

Use of a simple blood test may help doctors be sure they have selected the right treatment for their patients with CML. The cancer in some people with CML may respond best to imatinib, which is still considered the standard treatment. However, the cancer in other people with CML may respond better to one of the newer drugs, such as nilotinib or dasatinib.

A total of 559 people with CML took part in three clinical trials within a larger study known as GIMENA CML WP. Within three months of starting treatment with imatinib, they all had a blood test to see how their cancers were responding. The results of this test showed that cancer in some of the patients was not responding well to imatinib and that these patients probably would not benefit from further treatment with this drug. With this information, doctors were able to switch to another treatment that would be better for this group.

What Patients Need to Know

Early monitoring of the response to CML treatment was one of the most exciting topics covered at the ASH meeting. With so many drugs to choose from for people with CML, it is often challenging for doctors to select the right one for a given person. Based on the results of the GIMENA CML WP study, doctors can use a blood test to find out whether a patient's cancer is responding to treatment with imatinib. If his or her cancer is responding, doctors can be certain that keeping that

person on that drug is the right choice. If a person's cancer is not responding, he or she can be switched early to another treatment that may have a better chance of success.

Gemtuzumab With Chemotherapy in AML

The combination of a drug called gemtuzumab ozogamicin (Mylotarg) and chemotherapy may prove to be an effective way to treat people with AML. In the French ALFA 0701 clinical trial, more than 275 patients with AML received chemotherapy (daunorubicin [Cerubidine and others] and cytarabine [Cytosar-U and others]) alone or chemotherapy plus gemtuzumab. Three smaller doses of gemtuzumab were given over a week's time, rather than a single large dose given once. Known as fractionated dosing, this approach makes it possible to combine gemtuzumab and chemotherapy with fewer side effects. Those patients who received the combination had fewer complications and lived longer than those who received chemotherapy alone.

What Patients Need to Know

Some researchers are calling these results a "second chance" for gemtuzumab in the treatment of people with AML. This drug was withdrawn from the market in 2010, with questions raised about its effectiveness and side effects. It now appears that by adjusting the dose and the way it is given, gemtuzumab may still prove to be a safe and effective treatment for those with leukemia. In light of the results of the ALFA 0701 clinical trial, this drug is now being reconsidered and studied further to learn how best to use it.

CPX-351 in Newly Diagnosed AML

A new way to deliver chemotherapy may be more effective than the standard way for older people with newly diagnosed

AML. CPX-351 is a new form of cytarabine plus daunorubicin. It is a special formula contained in tiny fat-like particles and given by injection. These drugs are commonly used to treat people with blood cancers and are more effective at killing leukemia cells when given in this formula.

Forty-one people with newly diagnosed high-risk AML took part in a small clinical trial. A person with high-risk AML is defined as someone who is age 70 or older, has more than three abnormal chromosomes (genetic material) or has developed AML as a result of chemotherapy for a previous blood disorder or exposure to a cancer-causing toxin in the environment.

CPX-351 was given to 26 patients; standard-formula cytarabine and daunorubicin was given to 15 patients. Those patients who received CPX-351 had fewer complications than did those who received standard treatment. In addition, high-risk patients given CPX-351 lived longer than did high-risk patients given standard treatment (10.7 months versus 6.1 months).

What Patients Need to Know

Researchers are always trying to find better ways to treat people with AML, and they may have found one in CPX-351. This form of chemotherapy may prove to be more effective than the standard form for high-risk patients. Although CPX-351 is being studied further, researchers are encouraged by the results so far.

ATRA and Arsenic Trioxide in Newly Diagnosed APL

The combination of all-trans retinoic acid (ATRA, or Vesanoid) and arsenic trioxide (Trisenox) is a promising new targeted treatment for people who are newly diagnosed with APL. The standard treatment for APL is chemotherapy plus ATRA, a type of oral vitamin A. Until now, arsenic trioxide has been used for people whose APL returned after previous treatment.

A total of 162 people with newly diagnosed APL took part in a European clinical trial known as APL0406. Some of these patients were given the combination of ATRA and arsenic trioxide, and the others were given ATRA and chemotherapy. Of the 154 patients who have been evaluated so far, cancers in 97 percent of both groups have completely responded to treatment. More than two years after treatment, those who received the new combination lived about as long—and with no more complications—as those who received the standard treatment.

What Patients Need to Know

APL is treated differently from other types of AML. From the results of the APL0406 study, researchers now know that people with APL may respond well to targeted treatment. Despite its scary-sounding name, arsenic trioxide is a medical

treatment that may well be effective against newly diagnosed APL. In the future, using the combination of ATRA and arsenic trioxide may spare patients from chemotherapy and its side effects without reducing the effectiveness of their treatment. This new combination will be studied further to confirm these early results and help doctors to understand how best to use this treatment for people with APL.

Inotuzumab and Blinatumomab in Resistant ALL

Two targeted treatments—inotuzumab and blinatumomab—are showing encouraging early results for people with ALL that no longer responds to other treatments. These two new drugs are antibodies that work to destroy leukemia cells by helping the body's own immune system clear them from the blood.

In two separate clinical trials, inotuzumab was given weekly to people with resistant ALL. In the first study, 83 people received inotuzumab—49 in a single monthly dose and 34 in smaller weekly doses. The cancer in 50 percent to 60 percent of patients in both groups responded to treatment with inotuzumab. One year after treatment, 20 percent of the people in both groups were still alive. Although side effects were mild in patients in both groups, they were more common in people who received monthly treatment than in those who received the smaller weekly doses. The second clinical trial included 13 people whose type of ALL no longer responded to treatment. Regardless of the dose of inotuzumab used, cancer in 11 of these people (82 percent) responded to treatment.

In another clinical trial, blinatumomab was given to 36 people with a certain type of ALL that no longer responded to treatment. It was given by injection for 28 days. Of

these patients, cancer in 72 percent completely responded to treatment. On average, people in this group lived 14.1 months after treatment, compared with 6.6 months for those whose cancer did not respond to blinatumomab. A worldwide study is being conducted to confirm these early encouraging results.

What Patients Need to Know

Researchers believe that antibody treatment with drugs such as inotuzumab and blinatumomab may make a real difference for people with ALL in the near future. The response rates with these drugs alone are considered to be impressive and an improvement over those with standard treatment for people with resistant ALL. Antibodies combined with chemotherapy have been used effectively to treat people with AML. It is hoped that further studies with both inotuzumab and blinatumomab in larger numbers of patients will show that the same is true for other people with treatment-resistant ALL.

CART19 Cells in Resistant ALL and CLL

A treatment that uses a person's own T cells to fight resistant leukemias such as ALL and CLL is showing promising early results. T cells belong to a group of white blood cells known as lymphocytes, which help the body's immune system fight infections and diseases such as cancer.

Called CART19 cell therapy, this new treatment was studied in a small clinical trial in which nine people with resistant CLL and one person with resistant ALL took part. Researchers have evaluated nine patients so far. The cancer in four of them (three with CLL and the one with ALL) completely responded to the CART19 cells. The cancer has not returned in any of these four people. All four of them did have side effects, such as fever, some nausea and low blood pressure. However, these side effects improved with other treatment.

Treatment with CART19 cells consists of a few steps. First, T cells are taken from the blood of the person with ALL or CLL. Next, the T cells are altered to recognize and attach to a protein called C19, found on most ALL and CLL cancer cells. Then, the altered T cells are given back to the patient. When the person's own T cells recognize the cancer cells, they become energized and destroy the leukemia cells.

What Patients Need to Know

CART19 cells are an exciting new story in leukemia treatment. Researchers are always looking for ways to treat such blood cancers without chemotherapy and its related side effects. These results are from a very early stage of research. With further study of CART19 cells in more patients, doctors will better understand whether this treatment will benefit people with CLL or ALL.

Multiple Myeloma

Speakers at the 2012 Annual Meeting of the American Society of Hematology noted that research on multiple myeloma has been one of the models for developing new drugs to treat cancer. We have made significant progress for people coping with multiple myeloma, improving their survival by several years. Two of the three classes of drugs developed for this diagnosis now have second or third generations, some with fewer side effects. Also, we now have the first oral medicine for multiple myeloma in a class of drugs known as proteasome inhibitors—a particularly effective way of treating this cancer.

Another class of drugs known as monoclonal antibodies is now being studied for multiple myeloma. When used to treat the blood cancers leukemia and lymphoma, these types of drugs have led to exciting progress. Because most people with multiple myeloma eventually will need a new form of treatment to continue managing their cancer, researchers are studying combinations of drugs that appear to be more beneficial.

MLN9708 and Carfilzomib in Newly Diagnosed Multiple Myeloma

Two new drugs—MLN9708 and carfilzomib (Kyprolis)—appear to be effective treatments for people with newly diagnosed multiple myeloma. These medications, which are designed to block the growth of tumor cells, were studied in two different clinical trials.

In the first clinical trial, a combination of MLN9708, lenalidomide (Revlimid) and dexamethasone was given once

a week to 65 patients. Of the 53 people who have been evaluated so far, the cancer responded to this treatment combination in 90 percent. Only seven people had to stop treatment due to side effects. The combination treatment also is being studied in people whose multiple myeloma resists other drugs.

In the second study, a four-drug combination treatment known as CYCLONE—carfilzomib, cyclophosphamide, thalidomide (Thalomid) and dexamethasone—was given to 38 people with newly diagnosed multiple myeloma. In the 27 patients whose results have been evaluated so far, the cancer responded in 96 percent after four cycles of treatment.

Although 16 percent of patients had to reduce their dose because of side effects, no one experienced severe peripheral neuropathy (nerve damage), which has been a challenge for

some people taking bortezomib (Velcade). Bortezomib is a standard drug used to treat multiple myeloma.

What Patients Need to Know

Researchers are very excited about MLN9708 and carfilzomib, which are proteasome inhibitors. Carfilzomib, an injection, was approved by the FDA for people whose multiple myeloma does not respond to other treatments such as bortezomib and thalidomide. MLN9708 is the first proteasome inhibitor that can be taken by mouth, making it convenient for patients to use. Along with carfilzomib, MLN9708 tends to cause fewer side effects than bortezomib, such as peripheral neuropathy. More clinical trial results are expected.

Elotuzumab and Daratumumab in Resistant Multiple Myeloma

According to the recent results of two small clinical trials, elotuzumab (HuLuc63) and daratumumab (HuMax-CD38) are promising options for people whose multiple myeloma no longer responds to other treatments.

In the first study, the combination of elotuzumab, lenalidomide and low-dose dexamethasone was given to 73 people with resistant multiple myeloma. Half of these patients received a low dose of elotuzumab, while the other half received a higher dose. The cancer responded in 92 percent of those treated with the low dose of elotuzumab, compared with 76 percent of those treated with the high dose of elotuzumab. Twenty-one months after treatment, the cancer in more than 50 percent of all 73 patients was still responding to elotuzumab.

A second clinical trial, which is still ongoing, studied the use of daratumumab in 32 people whose multiple myeloma no longer responded to at least two different treatments. The cancer in about 20 percent of these patients responded to treatment with daratumumab alone. Researchers consider these results promising, especially in people with multiple myeloma whose cancer did not respond to other treatments.

What Patients Need to Know

Most people with multiple myeloma eventually will need a new treatment to continue managing their cancer. Both elotuzumab and daratumumab belong to a class of drugs called monoclonal antibodies. They are the second generation after rituximab (Rituxan), the first drug in this class, which altered the way lymphoma is treated. Researchers believe that the 92 percent response rate seen so far with the elotuzumab combination is remarkable, especially when compared with lenalidomide and dexamethasone. When these drugs are taken after other treatments no longer work, 50 percent to 60 percent of cancers respond.

Pomalidomide in Resistant Multiple Myeloma

Based on the results of a recent clinical trial, pomalidomide (Pomalyst) is emerging as a major new drug for people with advanced multiple myeloma.

Taking part in this study were 455 patients whose multiple myeloma no longer responded to bortezomib, lenalidomide or thalidomide. About 300 of these people received pomalidomide and low-dose dexamethasone. The others in the clinical trial received high-dose dexamethasone alone. Of those who received the combination treatment, cancers in about 21 percent responded. With dexamethasone alone, three percent of cancers responded. The time it took for the

cancer to continue growing was twice as long in the people whose treatment included pomalidomide compared with those treated with dexamethasone alone (3.6 months versus 1.8 months). Also, the patients treated with pomalidomide plus low-dose dexamethasone lived longer than those who received high doses of dexamethasone only.

What Patients Need to Know

Researchers are encouraged by the benefits offered by pomalidomide in combination with low-dose dexamethasone. Pomalidomide joins the ranks of other drugs called immunomodulators, such as thalidomide and lenalidomide. This type of drug works by helping the body's immune system to fight cancer. Pomalidomide has recently been approved by the FDA. Based on the results of this and other recent studies, combination treatment with pomalidomide may change the way people with resistant multiple myeloma are treated in the future.

Pomalidomide Combination Treatments in Resistant Multiple Myeloma

The results of three recent clinical trials support the use of pomalidomide in combination with several other drugs for treating people whose multiple myeloma had stopped responding to bortezomib or lenalidomide, or both.

In the first small study, pomalidomide was combined with carfilzomib and dexamethasone. A total of 32 patients with advanced multiple myeloma took part. Of the first 30 people evaluated, the cancer in 15 of them (50 percent) responded to treatment.

In the second clinical trial, pomalidomide was combined with dexamethasone and an antibiotic, clarithromycin

(Biaxin). In previous clinical trials, clarithromycin has been used successfully in combination with both thalidomide and lenalidomide to treat multiple myeloma. In this study, 97 people with advanced multiple myeloma took part. The cancer in more than half of these people responded favorably to treatment. About 90 percent of the patients benefitted somewhat from treatment. The response to treatment took less than two months and lasted longer than eight months in most patients.

In the third clinical trial, pomalidomide was given with cyclophosphamide (a standard chemotherapy drug) and prednisone (a steroid) to 52 people with advanced multiple myeloma. Cancer in 38 of these people (73 percent) responded to treatment with this combination. The cancer disappeared completely in six people (16 percent). As in the second study, the response occurred within two months.

What Patients Need to Know

In the past, there have been few effective ways to treat multiple myeloma that no longer responds to first treatments. So the results with these new pomalidomide combinations are encouraging news for people with this resistant type of cancer. Researchers also found that the time it took for the cancer to continue growing was longer with the new combinations than would be expected with pomalidomide or dexamethasone alone. Further studies on these and other combination treatments with pomalidomide should help doctors learn which patients with resistant multiple myeloma would benefit most from such treatment.

Lymphoma

For people with lymphomas, there were a number of exciting developments in treatment reported at the 2012 Annual Meeting of the American Society of Hematology. New combinations of drugs for people with newly diagnosed non-Hodgkin's lymphoma (NHL) and mantle cell lymphoma allow them to avoid chemotherapy and the side effects that can result. A new type of targeted treatment joins an anti-cancer drug with an antibody to help the immune system destroy cancer cells. Researchers believe that these types of drugs may become good alternatives to chemotherapy in the treatment of B-cell lymphomas that no longer respond to medication. Another new class of drugs targets a substance that helps cancerous B cells grow and multiply in slow-growing NHLs.

Targeting lymphoma cells in this way may change the way doctors treat lymphoma. It's important to note that many of the new treatments reduce the number of side effects for patients, leading to an improved quality of life. And by using PET scanning, doctors can find out which people being treated for Hodgkin's lymphoma need radiation after chemotherapy and which people do not need radiation. In this way, many patients can be spared both the short- and long-term side effects of radiation.

Rituximab and Bendamustine in Newly Diagnosed NHL and Mantle Cell Lymphoma

The combination of rituximab (Rituxan) and bendamustine (Treanda) appears to be an effective alternative to rituximab and chemotherapy for people with certain newly diagnosed lymphomas. Bendamustine has already been approved by the FDA for the treatment of CLL and slow-growing NHLs that no longer respond to rituximab.

In a recent clinical trial, 436 people were treated for newly diagnosed NHL or mantle cell lymphoma. About half of them received rituximab and bendamustine, and the others received rituximab with standard chemotherapy (cyclophosphamide, vincristine and prednisone, with or without doxorubicin).

Of the 419 patients evaluated so far, cancers in 94 percent of those who were treated with rituximab and bendamustine responded, compared with 84 percent of cancers in those given rituximab and chemotherapy. The cancer was completely gone in 31 percent of those patients on rituximab and bendamustine versus 25 percent of those on rituximab and chemotherapy. For people with mantle cell lymphoma, the results with rituximab and bendamustine were even more encouraging: 51 percent of cancers responded to this

combination; 24 percent of cancers responded to rituximab plus chemotherapy. In another study, patients who were treated with rituximab and bendamustine had a better quality of life than did those who were treated with rituximab and chemotherapy.

What Patients Need to Know

Researchers are always pleased when they discover they can effectively treat people with cancer without having to use chemotherapy. This means they can help people avoid the unnecessary side effects to healthy tissues. The combination of rituximab and bendamustine appears to be at least as effective as—and maybe even better than—standard chemotherapy in treating those with slow-growing lymphomas such as NHL and mantle cell lymphoma.

Brentuximab Vedotin and Chemotherapy in Newly Diagnosed Lymphomas

According to early clinical trial results, the combination of brentuximab vedotin (Adcetris) and chemotherapy appears to be a promising way to treat people with two different types of newly diagnosed lymphomas: Hodgkin's lymphoma and a type of NHL called systemic anaplastic large cell lymphoma (sALCL). Brentuximab has already been approved by the FDA for treating people whose lymphoma no longer responds to other treatment.

In one study, 51 patients with newly diagnosed advanced Hodgkin's lymphoma were treated with brentuximab and chemotherapy—either AVD (doxorubicin, vinblastine and dacarbazine [DTIC-Dome and others]) or ABVD (AVD plus bleomycin). Of the 47 people evaluated so far, cancer in 96 percent of them completely responded to the new treatment.

In another clinical trial, 39 patients with newly diagnosed sALCL or other types of lymphomas were treated with brentuximab and chemotherapy (cyclophosphamide, doxorubicin and prednisone). Of the 26 people treated with brentuximab and chemotherapy and evaluated so far, the cancer in all 26 responded. And for 88 percent of these people, the cancer was completely gone, including in all seven patients with other types of lymphomas. More than half of those who received brentuximab and chemotherapy experienced nausea, fatigue, diarrhea and nerve damage.

What Patients Need to Know

Researchers now know that people who have certain types of newly diagnosed lymphomas may also benefit from treatment with brentuximab plus chemotherapy. Brentuximab belongs to a new type of targeted treatment called an antibody drug conjugate. This treatment joins an anti-cancer drug with an antibody that targets a protein known as CD30. (The

antibody helps the body's immune system destroy cancer cells.) This approach appears to be an exciting new way to treat blood cancers. Larger studies of the combination of brentuximab and chemotherapy are being planned to confirm how best to use it for people with certain types of newly diagnosed lymphomas.

DCDS4501A and DCDT2980S in Resistant B-cell NHLs

In addition to brentuximab vedotin, two other antibody drug conjugates, still known only by their numbers, may prove to be effective for people who have resistant B-cell NHLs. The drugs are referred to as DCDS4501A and DCDT2980S.

In one small clinical trial, 33 people were given an injection of DCDS4501A every 21 days. The lymphoma in all of these patients no longer responded to prior treatment. About half had follicular lymphoma, the most common slow-growing NHL. Based on early results so far, the cancer shrank by more than 50 percent in five patients and by more than 80 percent in two patients.

In another small study, 35 patients were given DCDT2980S. All of these people had already received rituximab, and their lymphoma no longer responded to treatment. More than half of these people had diffuse large B-cell lymphoma (DLBCL) or follicular lymphoma. Again, based on early results so far, the cancer shrank by more than 75 percent in two of three patients who took DCDT2980S. The follicular lymphoma in one patient partially responded to treatment with this new drug.

What Patients Need to Know

Researchers believe that DCDS4501A and DCDT2980S may become good alternatives to chemotherapy in the treatment

of B-cell lymphomas that no longer respond to treatment. One of the most appealing things about treatment with antibody drug conjugates is that these drugs tend to cause fewer side effects than standard chemotherapy. However, it is important to remember that these promising results are from very early clinical trials, and research on the drugs is continuing.

Combination Treatment With CAL-101 in Resistant NHLs

Combining a new drug, unofficially called CAL-101, with other anti-cancer drugs may prove to be an effective way to treat people with slow-growing NHLs. CAL-101 belongs to a new class of drugs called PI3 kinase delta inhibitors. They target PI3 kinase delta, a substance that helps cancerous B cells to grow and multiply.

Seventy-six people with NHL took part in a small clinical trial with CAL-101. For many of these patients, their lymphoma no longer responded to other treatment. When CAL-101 was combined with rituximab, bendamustine or both, the cancer completely disappeared in 13 percent, 16 percent and 30 percent of the patients, respectively. One year after treatment, the cancer had not continued to grow in more than 75 percent of people in all treatment groups.

What Patients Need to Know

Researchers consider these results to be impressive responses in most patients with different types of slow-growing NHLs, including small lymphocytic lymphoma, follicular lymphoma and marginal zone lymphoma. The benefits of all three treatments (CAL-101 with rituximab, bendamustine and/or both drugs) seem to last for some time, which is also encouraging. Larger clinical trials with these CAL-101

combination treatments are being conducted to confirm these early findings.

Ibrutinib in Resistant Follicular Lymphoma

Ibrutinib is a promising new drug that is getting a lot of attention in the treatment of people whose lymphoma no longer responds to other medications. It works by targeting Bruton's tyrosine kinase, an important molecule that helps lymphoma cells survive and multiply.

According to the results of a small clinical trial, 16 people whose follicular lymphoma no longer responded to treatment received one of two different doses of ibrutinib. More than 50 percent of the 16 patients responded to the new drug, and the benefits lasted for more than a year. It took the cancer almost 20 months to continue growing in those who received the higher dose of ibrutinib. However, more than 25 percent of the patients treated with ibrutinib had diarrhea, fatigue, nausea, cough or muscle pain.

What Patients Need to Know

The response of resistant follicular lymphoma to ibrutinib is encouraging. The results seen so far show that this new drug may become a more effective treatment than the standard treatments now used. Targeting lymphoma cells with a drug like ibrutinib may change the way doctors treat this blood cancer in the near future.

Eliminating Unnecessary Radiation Treatment With PET Scanning in Hodgkin's Lymphoma

By using PET scanning (an imaging technique used to find cancer cells in the body), doctors can find out which people

being treated for Hodgkin's lymphoma need radiation after chemotherapy. In this way, many people with Hodgkin's lymphoma can be spared radiation and its short- and long-term side effects.

More than 600 patients with newly diagnosed early-stage Hodgkin's lymphoma took part in the RAPID trial in the United Kingdom. All of them received three cycles of chemotherapy, which included doxorubicin, bleomycin, vinblastine and dacarbazine. Then, about 570 people had a PET scan. The PET scan showed no trace of cancer in 75 percent of them; these patients were considered to be PET-negative. Of the 420 PET-negative patients, half of them went on to receive radiation, and the others did not.

Nearly four years later, 194 of the patients who received radiation were still alive, and their cancers had not continued to grow. Similarly, 190 of the patients who were spared radiation were still alive, and their cancers had not continued to grow. Between 97 percent and 100 percent of both groups of PET-negative patients had lived three years after treatment.

What Patients Need to Know

In treating people with Hodgkin's lymphoma, sometimes radiation is not necessary. Researchers now know that people with early-stage Hodgkin's lymphoma who are PET-negative after chemotherapy have an excellent outlook without any further treatment. According to the results of the RAPID trial, it appears that radiation may be reserved for those who would benefit from it, such as people who are PET-positive after chemotherapy. Any time that doctors can safely spare some of their patients the short- and long-term side effects of radiation therapy, they prefer to do so.

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