

Advances in Surgical Management of Lymphedema

New options reduce edema in limbs, improve quality of life for cancer patients with lymphedema

By Bryan Tutt

Lymphedema in the arms or legs can be a debilitating effect of oncologic surgery or radiation therapy. Approaches to managing the condition vary according to its severity and may include surgery. Surgeons at The University of Texas MD Anderson Cancer Center have several techniques that reduce limb volume and restore function in cancer survivors with moderate to severe lymphedema.

"The combination of radiation and surgical removal of the lymph nodes is the most common cause of lymphedema in cancer patients," said Matthew Hanasono, M.D., a professor in the Department of Plastic Surgery. Lymphedema of an upper extremity is seen most often in breast cancer patients who have undergone axillary lymph node dissection and radiation therapy to the axillary nodal basin. Lymphedema of a lower extremity is seen most frequently in patients with bladder, prostate, or gynecological cancers who have undergone pelvic lymph node dissection and radiation therapy to the pelvic nodal basin.

Lymphedema is typically managed

by manual lymphatic drainage (i.e., massage), exercise, and compression garments. However, these techniques are time consuming and do not restore function for all patients.

In the past decade, Dr. Hanasono and his colleagues have shown that lymphovenous bypass and vascularized lymph node transfer are effective surgi-

The affected left arm of a patient with lymphedema resulting from breast cancer treatment is seen before (top left) and after (top right) liposuction debulking of the left arm. The procedure yielded a 1,600-mL reduction in limb volume. The unaffected right arm is shown for comparison (bottom). Images courtesy of Dr. Mark Schaverien.

cal treatments for lymphedema (see "Surgical Options for Lymphedema," *OncoLog*, June 2014). Building on this experience, MD Anderson surgeons are refining treatment for severe lymphedema to reduce limb swelling and improve patients' quality of life by combining these two procedures or using liposuction debulking.

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Noncytotoxic first-line therapy shows promise

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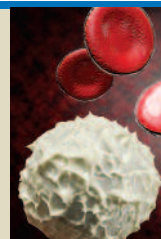
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Surgical Management of Lymphedema

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Combining procedures

Lymphovenous bypass and vascularized lymph node transfer

Lymphovenous bypass surgery, in which the obstructed lymphatic vessels are anastomosed to small adjacent veins, often provides an immediate benefit by improving lymphatic drainage. In many patients, especially those with early-stage lymphedema, lymphovenous bypass can provide a long-lasting benefit. However, in some patients, the effectiveness begins to decrease around 12 months after surgery. In contrast, vascularized lymph node transfer—in which healthy lymph nodes from an unaffected region are transplanted as a vascularized flap—can provide permanent new lymphatic drainage, but these new lymphatic channels do not begin functioning until 6–9 months after surgery.

MD Anderson surgeons have found that performing lymphovenous bypass and vascularized lymph node transfer during the same operation can overcome the limitations of each procedure. “We’ve found that combining these two surgeries can provide both immediate and lasting relief,” said Mark Schaverien, M.D., an assistant professor in the Department of Plastic Surgery. “This can be a very powerful treatment for patients with lymphedema.”

Almost all patients who undergo the combined procedure see improvements such as reduction in the size, tightness, or heaviness of the limb and a reduced frequency of infections in the limb. Total cure, although achieved in some patients, is rare. Patients typically continue to wear compression garments and perform manual drainage after surgery; however, the need for both of these is reduced in most patients.

“After these surgeries, we’ve seen a significant reduction in the amount of time patients have to spend on massage and compression garments to remove fluid from their limbs,” said Edward Chang, M.D., an associate professor in the Department of Plastic Surgery. “Moreover, I’ve had patients who had multiple infections in their affected limb before surgery who do not get

During a lymphovenous bypass procedure, blue dye shows movement through a lymphatic vessel (yellow arrow) into the vein to which it is anastomosed (white arrow). Image courtesy of Dr. Edward Chang.

infections anymore after surgery.”

Associated with lymph node transfer is the risk of donor site lymphedema. To minimize this risk, reverse mapping of the donor site lymph nodes—a procedure similar to sentinel lymph node mapping, in which a contrast agent is injected and used to find the draining lymph nodes—is performed before surgery to make sure the nodes that drain the nearby extremity are left intact. “With that technique, we’ve had no issues at all,” Dr. Schaverien said. “Donor site lymph node mapping is mandatory here and is being increasingly used elsewhere.”

Lymphovenous bypass and vascularized lymph node transfer with breast reconstruction

The lateral chest wall is the most common donor site for lymph node transfer to treat lymphedema of the leg, and the lymph nodes from the lateral chest wall on the unaffected side can also be used to treat lymphedema of the arm in breast cancer survivors who do not require breast reconstruction. But when a patient requires both lymphedema treatment and breast recon-

struction, lymphatics can be transferred and anastomosed to the affected region along with the transverse rectus abdominis (TRAM) or deep inferior epigastric perforator (DIEP) flap used for breast reconstruction. “The combined lymphovenous bypass and vascularized lymph node transfer surgeries we do are the same whether the lymphedema is in the arm or the leg,” Dr. Hanasono said. “But for the arm, we can combine them with breast reconstruction.”

Vascularized TRAM or DIEP flaps often are the best option for breast reconstruction in patients who do not undergo reconstruction at the time of mastectomy because radiation therapy performed after the cancer surgery often causes tissue damage that makes later reconstruction with implants problematic. “If a patient has had mastectomy and radiation, a tissue flap will probably give us the best result for reconstruction,” Dr. Chang said. “And a patient who has had radiation likely has lymphedema, so we can address this at the same time.”

Combining lymphedema treatment with breast reconstruction allows patients to address both issues without increasing their recovery time or length

of hospital stay. It has become a common practice at MD Anderson for plastic surgeons to perform a vascularized TRAM or DIEP flap breast reconstruction, vascularized lymph node transfer, and lymphovenous bypass all in one operation.

Because of the specialized training and equipment necessary to anastomose lymphatic vessels, the combination of breast reconstruction and lymphedema surgery is not widely available. “It’s a fairly specialized surgery, so it needs to be done by people who are trained to do it and do it frequently,” Dr. Chang said. “A lot of plastic surgeons can do flap reconstructions; very few can offer patients the whole package that addresses their lymphedema at the same time.”

Liposuction debulking

Not all patients are candidates for lymphovenous bypass and vascularized lymph node transfer. In particular, patients with advanced lymphedema may have lymphatics that are too severely damaged to allow restored drainage. Liposuction debulking can offer relief to such patients.

“Many patients and even some physicians don’t realize that lymphedema begins with an accumulation of fluid and then becomes a condition of fat whereby the fat grows in response to proteins in the lymphatic fluid,” Dr. Schaverien said. “So compression therapy alone, although it removes the fluid fraction, will never get the limb back to its baseline size because of the fat fraction.”

Liposuction debulking for lymphedema patients is performed much like liposuction for cosmetic purposes. “Traditionally, lymphedema debulking was done with open procedures that were morbid,” Dr. Schaverien said. “Now we do it with liposuction with minimal scarring and minimal morbidity.”

Liposuction debulking can reduce the volume of the affected limb and restore function. Although the patient must continue to wear compression garments for life, the reduced limb size and improved function typically remain stable.

“After these surgeries, we’ve seen a significant reduction in the amount of time patients have to spend on massage and compression garments to remove fluid from their limbs.”

– Dr. Edward Chang

Choosing the right treatment

Ideally, patients with lymphedema are diagnosed and sent to a lymphedema-certified physical therapist for treatment before the condition becomes severe. Some patients who present as soon as their swelling occurs have complete resolution of their lymphedema with compression therapy and manual drainage within 6 months. Those whose lymphedema does not respond to such therapy may be eligible for surgery; and the earlier surgery is performed, the better the outcome.

To determine whether a patient is likely to benefit from surgery and which procedure should be used, an extensive work-up is performed. “The clinical signs and symptoms and even the duration of the lymphedema are poorly predictive of the actual condition of the lymphatic vessels,” Dr. Schaverien said. “So we do an extensive work-up to determine which surgical treatment is best suited for the patient.” Duplex ultrasonography is performed to rule out venous thrombosis as the cause of the swelling, and lymphoscintigraphy determines whether the patient’s lymphatics are amenable to lymphovenous bypass and lymph node transfer.

Dr. Chang and colleagues devised a lymphedema staging system to help select the appropriate management strategy for each patient. The staging system is based on the degree of dermal backflow and the patency and contractility

of lymphatic vessels on indocyanine green lymphangiography. Stage I lymphedema is characterized by minimal dermal backflow, several patent vessels, and slightly impaired contractility; stages II, III, and IV are characterized by increased dermal backflow and reduced vessel patency and contractility; and stage V is characterized by no dye movement at all.

“We individualize the treatment algorithm to the patients,” Dr. Schaverien said. “Patients often have a combination of procedures during the course of their treatment.”

In addition to the patient’s lymphedema stage, financial concerns may affect whether a patient can undergo surgical treatment for lymphedema. Dr. Schaverien said, “Liposuction is very uncommonly performed for lymphedema treatment in the U.S., mainly due to the lack of insurance coverage. However, we’ve been very successful in getting the operation approved once we explain how it benefits the patient.”

Many insurance companies also consider the combined lymph node transfer and lymphovenous bypass procedure experimental and are reluctant to cover it, according to Dr. Chang. “The combined procedure is relatively new,” Dr. Chang said, “but it’s not experimental in our opinion because we’ve had more than a year of follow-up in some patients, and we’re showing that the surgery benefits patients with lymphedema.” ■

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FURTHER READING

Nguyen AT, Chang EI, Suami H, et al. An algorithmic approach to simultaneous vascularized lymph node transfer with microvascular breast reconstruction. *Ann Surg Oncol*. 2015;22:2919–2924.

Noncytotoxic First-Line Therapy for Mantle Cell Lymphoma

First-line therapy with targeted and immunotherapy agents produces high response rates in mantle cell lymphoma

By Sarah Bronson

Mantle cell lymphoma (MCL) is a rare disease that is seldom encountered by the average community oncologist and infrequently studied independently of other B cell lymphomas. Especially lacking have been studies of treatment for newly diagnosed MCL patients, many of whom develop resistance to or cannot tolerate cytotoxic first-line treatments. The University of Texas MD Anderson Cancer Center, however, is now evaluating a noncytotoxic combination of targeted and immunotherapy agents for first-line treatment of MCL in clinical trials.

As a tertiary care center, MD Anderson sees more patients with MCL than does any other hospital in the country, and researchers saw this as an opportunity. “We have attracted a critical mass of patients with MCL, and this enabled us to design clinical trials that are purely for MCL; so we are now regarded as the authority in this disease,” said Michael Wang, M.D., a professor in the Department of Lymphoma and Myeloma and the co-leader of MD Anderson’s B Cell Lymphoma Moon Shot Program.

Most MCL trials test novel interventions in patients with relapsed disease, but two ongoing trials from MD Anderson are focusing on previously untreated patients. “For MCL, the first therapy is the most important,” Dr. Wang said. “If you do well with the first-line therapy, you can eliminate almost all of the MCL cells. They won’t have the opportunity to develop resistance, and the remission can last longer.”

Standard first-line therapy

Standard first-line treatments for MCL include high-dose chemotherapy regimens such as hyperfractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone (hyper-CVAD) with or without stem cell transplant. Such intensive therapies given up front lead to low rates of recurrence and to overall survival times of several years.

However, these intensive regimens can be too toxic for many patients, especially older patients. Thus, the standard first-line therapy for elderly MCL patients is bendamustine plus rituximab. This combination is less toxic than intensive therapies, but the response rate is lower and the responses less durable than those from more intensive regimens.

Even young patients, who often can tolerate intensive therapies, experience acute or long-term adverse effects from cytotoxic therapies. “For every 10 patients we treat with standard intensive therapy, we lose one patient to toxicity. That is not acceptable,” Dr. Wang said. Also, remissions in MCL patients are not always durable. One reason for this may be that the cytotoxic drugs given intravenously as standard first-line therapy sometimes cannot eliminate the many MCL cells that reside in the bone marrow and lymphatic tissues.

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Ibrutinib plus rituximab

The surviving MCL cells could potentially be eliminated by exploiting a

Positron emission tomography scans taken before (left) and after (right) treatment with six cycles of ibrutinib and rituximab show a dramatic reduction in systemic mantle cell lymphoma. Image courtesy Dr. Michael Wang.

phenomenon called compartmental shift, in which a drug induces a transient migration of cancer cells to the peripheral blood from other parts of the body, such as the bone marrow or lymph nodes. Once in the peripheral blood, the cancer cells are more vulnerable to intravenous anticancer drugs.

The oral targeted agent ibrutinib, which inhibits B cell receptor signaling by targeting Bruton tyrosine kinase, has been observed to induce compartmental shift in MCL. Furthermore, Dr. Wang and his colleagues have shown that combining ibrutinib with intravenous rituximab, which destroys B cells by binding to CD20 on the cells' surface, improves the activity of both drugs in patients with relapsed or refractory MCL. On the basis of these findings, Dr. Wang's group hypothesized that the drug combination would be effective against newly diagnosed MCL. This targeted-immunotherapy drug combination also represents a less toxic alternative to standard treatment regimens for MCL.

Trial for younger patients

To exploit the potential of ibrutinib plus rituximab as a first-line therapy that can allow patients to undergo fewer cycles of cytotoxic drugs, Dr. Wang and his colleagues are currently enrolling patients aged 65 years or younger with newly diagnosed MCL in a single-center phase II clinical trial (No. 2014-0559). Most patients treated thus far have had advanced disease, and all had good performance status and organ function.

The patients are treated in two steps: first, during a chemotherapy-free "window," they receive oral ibrutinib and intravenous rituximab; then, they receive consolidation chemotherapy comprising rituximab plus hyper-CVAD alternating with rituximab, methotrexate, and cytarabine. The ibrutinib and rituximab are given for two to 12 cycles, depending on response; and consolidation chemotherapy is given for four to eight cycles, depending on whether complete remission is achieved at the end of the chemotherapy-free step.

"If we take advantage of the window of time before the start of cytotoxic chemotherapy to administer targeted, biological therapy, then less chemotherapy will be needed. This could both decrease the toxicity of treatment and increase survival time," said Dr. Wang, the trial's principal investigator.

The preliminary results have affirmed expectations. Among patients treated thus far with ibrutinib and rituximab, the overall response rate (complete plus partial responses) has been 100%, and the complete response rate has been 73% and is still rising, allowing most of the patients to undergo only four cycles of consolidation chemotherapy. The most common adverse events due to the targeted therapy have been fatigue, myalgia, diarrhea, and oral mucositis, all at low grades; and common adverse events due to the chemotherapy have included anemia, lymphocytopenia, thrombocytopenia, and leukopenia. Further follow-up is needed to determine survival outcomes, but after a median follow-up of 9 months, no patient has died or had disease progression or recurrence.

"This has been the first time a first-line chemotherapy-free regimen has had an overall response rate of 100% in young patients with MCL," Dr. Wang said. The early success of the trial led to the addition of another 50 patients to the trial's projected recruitment.

Trial for older patients

Older patients with MCL typically receive less intensive—and thus less effective—therapy than younger patients. As a result, survival times in these older patients are usually shorter, only 3–5 years. To prolong survival without compromising safety in this older group, Dr. Wang and colleagues designed an international randomized controlled phase III trial for 550 patients 65 years or older with newly diagnosed MCL (No. 2013-0056). Jorge Romaguera, M.D., a professor in the Department of Lymphoma and Myeloma, said, "Because of its low toxicity and high efficacy profile, ibrutinib is the perfect drug to add to the established first-line

therapy for elderly patients with newly diagnosed MCL."

The patients in the double-blind trial received six cycles of a standard regimen of bendamustine and rituximab plus either ibrutinib or placebo. The objective of the trial was to prolong progression-free survival and, potentially, overall survival.

Results of the trial, which has completed enrollment, could lead to the approval of ibrutinib as a first-line treatment for MCL. Dr. Wang said, "If the primary objective is achieved, this will be the new standard for elderly MCL patients around the world."

Next steps

Although the trial of ibrutinib and rituximab in younger patients has achieved excellent responses, even the patients who received only four cycles of consolidation chemotherapy experienced some significant adverse effects. Another trial aimed at reducing this remaining toxicity is being planned. Also, laboratory studies are planned to identify molecular correlates of the outcomes in the trial of ibrutinib plus rituximab in younger patients, and long-term follow-up is needed to ensure that the patients' responses are durable.

The use of ibrutinib plus rituximab will, Dr. Wang expects, change practices in MCL treatment. "This approach reduces the use of first-line cytotoxic chemotherapy while improving efficacy and greatly reducing toxicity," he said. And in the longer term, he anticipates that the impact of these MCL trials on cure rates and survival outcomes will contribute to MD Anderson's goal of dramatically increasing the cure rate for B cell lymphomas. ■

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For more information about clinical trials for patients with lymphoma, visit www.clinicaltrials.org.

Reports from the Survivorship Research Symposium

Research on BK virus, heart failure, and aspiration in cancer survivors

By Bryan Tutt

Clinicians and researchers from throughout the United States gathered at The University of Texas MD Anderson Cancer Center in February to discuss emerging trends in cancer survivorship. “The field has bloomed to the point that we need to discuss the science of survivorship,” said Ethan Dmitrovsky, M.D., MD Anderson’s provost and executive vice president, in his opening remarks at the Fifth State of the Science Cancer Survivorship Research Symposium.

Among the research discussed at the symposium were three reports of preliminary research done at MD Anderson to address major health issues in cancer survivors.

BK virus affects survival after stem cell transplant

BK virus occurs in an estimated 70% of allogeneic stem cell transplant recipients. Although typically indolent in healthy individuals, BK virus can become active and cause hemorrhagic cystitis, nephritis, and ureteral stenosis in immunocompromised patients such as those who have undergone allogeneic stem cell transplant. To assess the characteristics associated with BK virus and its effect on survival after stem cell transplant in cancer patients, researchers conducted a retrospective review of nearly 2,500 patients who underwent allogeneic stem cell transplant for any malignancy from 2004 to 2012. “Currently, there are no protocols for screening and preventing the virus in these patients,” said Ala Abudayyeh, M.D., an assistant professor in the Section of Nephrology in the Division of Internal Medicine, who led the study.

Because patients typically are tested for BK virus only if they develop urinary symptoms, only 901 of the study’s 2,477 patients had been tested for BK virus; of these 901 patients, 629 tested positive.

The researchers conducted multivariable analyses to compare the characteristics and outcomes of the patients who tested positive for the virus with those of patients who tested negative as well as the untested patients.

Compared with BK virus–negative and untested patients, BK virus–positive patients had worse overall survival outcomes. Among BK virus–positive patients, higher viral loads were associated with worse overall survival outcomes.

The researchers also found that risk factors for symptomatic BK virus included diagnosis with a solid tumor, receipt of myeloablative conditioning regimens, and an HLA (human leukocyte antigen) mismatch between the donor and patient. Using these three factors, Dr. Abudayyeh and colleagues developed a grading scale to identify allogeneic stem cell transplant recipients at high risk of complications related to BK virus.

Currently, the researchers are working to validate the scale in another retrospective patient cohort. Because experimental treatments for BK virus are now available (see “Virus-Specific T Cells Treat Posttransplant Infections,” *OncoLog*, March 2017), Dr. Abudayyeh hopes the scale will lead to the establishment of screening criteria that will enable patients with BK virus infections to be diagnosed and treated before severe symptoms occur.

Heart failure medications can be withdrawn in some cancer survivors after recovery from chemotherapy-induced left ventricular dysfunction

Chemotherapy-induced left ventricular dysfunction can occur acutely or many years after cancer treatment. Al-



Dr. Ala Abudayyeh describes her research on BK virus infections in stem cell transplant patients at the Fifth State of the Science Cancer Survivorship Research Symposium.

though heart failure medications—beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, or angiotensin receptor blockers—can restore left ventricular ejection fraction in patients with chemotherapy-induced left ventricular dysfunction, how long such patients must remain on heart failure medication is unclear because the general guidelines for these medications are based on clinical trials that excluded cancer patients.

In an ongoing clinical trial, Recovery of Left Ventricular Dysfunction in Cancer Patients (RECAP, No. 2012-0379), cancer survivors with chemotherapy-induced left ventricular dysfunction whose left ventricular ejection fraction has recovered (i.e., left ventricular ejection fraction of at least 50% for at least 6 months) are being weaned off their heart failure medications. Patients who had ongoing heart disease or a history of myocardial ischemia, diabetes, palpitations, or hypertension were excluded from the trial, which recently completed enrollment.

Patients in the trial are gradually weaned off their beta-blockers, ACE inhibitors, or angiotensin receptor blockers under close supervision and then monitored by echocardiography and symptom questionnaires at regular intervals. Although the trial is still on-

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Types of Immunotherapy for Cancer

Understanding different approaches to immunotherapy



You've probably seen news articles about breakthroughs in immunotherapy for cancer patients. But the word "immunotherapy" can be used to describe many different kinds of treatment.

Some immunotherapy drugs help a specific part of the body's immune system—often white blood cells such as T cells, B cells, or natural killer (NK) cells—to attack a specific type of cancer cell; other treatments promote a more general immune response.

Below we describe some common types of immunotherapy. Please note that these are general descriptions only, and the side effects of these treatments are not discussed. If you have questions about a particular drug, please talk to your doctor.

Monoclonal antibodies

Antibodies, a natural part of the immune system, are proteins that bind to other proteins called antigens that are found on the surface of some cancer cells or pathogens (invading agents such as bacteria or viruses). Monoclonal antibodies are drugs created to work like natural antibodies.

Most monoclonal antibodies used in cancer treatment bind to specific antigens on cancer cells. This binding either neutralizes the cancer cells to prevent the cancer from spreading or signals the immune system to find and kill the cancer cells. For example, the monoclonal antibody rituximab binds to certain types of leukemia and lymphoma cells to help the body's NK cells destroy them.

Immune checkpoint inhibitors

A special type of monoclonal antibody is the new class of drugs called immune checkpoint inhibitors. These drugs block the action of immune checkpoint proteins, which are found on the surface of many T cells. The purpose of immune checkpoints is to stop T cells from attacking healthy cells

in the body. But some types of cancer can activate these immune checkpoints to protect themselves from T cells.

The U.S. Food and Drug Administration (FDA) has approved drugs that target the immune checkpoints CTLA-4 (cytotoxic T lymphocyte antigen 4) and PD-1 (programmed cell death protein 1). The CTLA-4 inhibitor ipilimumab is approved to treat melanoma, and the PD-1 inhibitors pembrolizumab and nivolumab both are approved to treat non-small cell lung cancer and other cancers. Other immune checkpoint inhibitors target PD-L1, the ligand (a protein molecule that binds to another protein) on some normal or cancer cells that binds to PD-1 on T cells. The PD-L1 inhibitor atezolizumab is approved to treat bladder cancer. And new immune checkpoint inhibitors are being studied in clinical trials to treat various cancers.

Therapies made from immune cells

Some promising cancer treatments are made from a patient's own immune cells. Blood is drawn from the patient and sent to a laboratory, where certain immune cells are removed and in some cases genetically modified. The number of cells is then expanded in the laboratory, and the cells are infused back into the patient's bloodstream.

The first such treatment to be approved by the FDA was sipuleucel-T for prostate cancer. Sipuleucel-T is made from the patient's dendritic cells, which help T cells find cancer cells or pathogens. Clinical trials of other den-

dritic cell-derived cancer therapies are ongoing. Also under way are clinical trials of modified T cells for the treatment of various cancers. These newer treatments are not yet approved by the FDA.

The problem with treatments made from a patient's own cells is the time and expense required to custom-make the treatment for each patient. Sipuleucel-T, for example, takes about 3 days to prepare and costs about \$93,000 per patient. Experimental therapies using NK cells from donated umbilical cord blood, which could be stored for use in any patient rather than being custom-made, are in the early stages of testing.

Cytokines

Cytokines such as interleukins and interferons are chemicals that the body produces to control the immune system. Synthetic versions of certain cytokines can be injected into patients to stimulate the immune response against cancer or other diseases. For instance, interleukin-2 is approved to treat kidney cancer and melanoma, and interferon-alfa is approved to treat various cancers.

Multimodality treatment

Although immunotherapy has had impressive results against some types of cancer, it's important to remember that no one therapy works against all kinds of cancer and that most cancers require a combination of treatments—multiple drugs, often combined with surgery and/or radiation therapy. As promising as immunotherapy drugs are, they are only one piece of the cancer treatment puzzle. ■

—B. Tutt

FOR MORE INFORMATION

- Ask your physician
- Call askMDAnderson at 877-632-6789
- Visit www.mdanderson.org

Survivorship Research Symposium

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going, early results are promising. Anecita Fadol, Ph.D., an assistant professor in the Department of Nursing and the trial's principal investigator, said, "We're seeing that heart failure medications can be withdrawn in selected patients and those patients will maintain their left ventricular ejection fraction."

Expiratory muscle exercise reduces aspiration in head and neck cancer survivors

Radiation therapy for cancers of the head and neck often leaves patients with swallowing dysphagia and chronic aspiration, which increases the risk of pneumonia. A strategy to reduce aspiration, expiratory muscle strength training (EMST), has been shown to benefit patients who aspirate or are at risk to aspirate because of conditions such as Parkinson disease, stroke, or amyotrophic lateral sclerosis. An ongoing clinical trial (No. 2015-0238) is investigating whether EMST can also benefit head and neck cancer survivors with chronic aspiration due to radiation therapy.

EMST is done using a hand-held device, into which the patient blows to open a spring-loaded valve. This resistance training is designed to build the patient's expiratory force and enable the patient to cough out liquid that is aspirated, thus reducing the risk of pneumonia. Data from the prior studies suggest that EMST also decreases aspiration by building muscles related to swallowing.

The trial in cancer survivors is led by

Katherine Hutcheson, Ph.D., an associate professor in the Department of Head and Neck Surgery. The primary endpoints of the trial are to clarify the relationship between aspiration and expiratory function and to evaluate the clinical benefit from EMST in patients with chronic aspiration resulting from radiation therapy for head and neck cancer.

Before launching the trial, Dr. Hutcheson and colleagues obtained pilot data from a series of 64 patients with head and neck cancer, all of whom were evaluated for swallowing and expiratory function after completing radiation therapy and 26 of whom underwent EMST. In their study of patients' expiratory function, the researchers found that patients who aspirated had lower than normal respiratory force. Furthermore, the 23 patients who completed the EMST protocol (three did not complete the exercise program) had 57% improvement in mean maximum expiratory pressure from baseline. In addition, 30% of these patients had a reduction in their aspiration severity, as measured by a barium swallow study.

"EMST appears to be well tolerated with excellent adherence," Dr. Hutcheson said. "Patients also had improved scores on quality-of-life questionnaires." ■

FOR MORE INFORMATION

Physicians can contact MD Anderson's Office of Cancer Survivorship at survivorship@mdanderson.org.

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