Cautious Approach to Soft Tissue Sarcoma Yields More Favorable Outcomes

by Dawn Chaiaire

A correct and timely diagnosis is the crucial first step in the treatment of any disease, but for patients with soft tissue sarcoma, how the diagnosis is established can be as important as when it is made. According to Robert Benjamin, M.D., chairman of the Department of Melanoma/Sarcoma Medical Oncology at The University of Texas M.D. Anderson Cancer Center, the initial approach to a soft tissue lesion can have a major impact on a patient’s long-term outcome.

“Sarcomas are very rare tumors,” Dr. Benjamin explained, “and in the course of making a definitive diagnosis, the bridges that are necessary to get optimal help for the patient are sometimes burned.”

The American Cancer Society estimates that in 1999 about 7,800 new cases of soft tissue sarcoma will be diagnosed in the United States and 4,400 Americans will die of the disease. The 5-year survival rate ranges from about 15% for patients with metastatic disease to about 90% for those with small, localized lesions.

Unfortunately, only about 50% of soft tissue sarcomas are identified in this early stage, in part because superficially located soft tissue sarcomas are often mistaken for lipomas, which are benign growths of fatty tissue that usually require no treatment.

“Those patients who were initially felt to have lipomas usually have the most treatable sarcomas that could be cured by surgery alone in 80–90% of patients. Yet, the sarcoma sits in place until it either starts to grow or metastasizes, and then the cure rate

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To achieve an adequate margin, a large circle of tissue had to be removed around the transverse biopsy scar on this patient's arm. To close that wound, additional tissue along the length of the arm also had to be removed.

That scenario can be avoided; while the two types of tumors may look and feel similar, fat has peculiar characteristics that make it easily distinguishable on computed tomographic (CT) or magnetic resonance imaging scans.

Ironically, the aggressive pursuit of a diagnosis can also be harmful. For example, an inappropriate or poorly planned excisional biopsy may leave tumor cells behind and prevent the use of state-of-the-art treatment such as preoperative chemotherapy, radiation therapy, or both, followed by definitive surgery.

Patients with high-grade tumors that are larger than 5 cm in diameter routinely undergo preoperative chemotherapy to kill any subclinical metastases and to shrink the primary tumor. Such treatment makes surgery easier to perform and recurrence less likely.

"We have refined the chemotherapy for soft tissue sarcomas considerably over the last 5-10 years," Dr. Benjamin said. "For patients who present with extremity sarcomas, we now have chemotherapy regimens using fairly high doses of Adriamycin (doxorubicin) and ifosfamide that will produce tumor regression in about 80% of patients. Much of the general oncology literature speaks of sarcoma resistance to chemotherapy, but in appropriately selected patients and with appropriately intense treatment, we find that most patients benefit from it."

The effectiveness of chemotherapy is evaluated by measuring the tumor, but this cannot be done if the majority of a tumor has been removed during excisional biopsy. Likewise, if the bulk of a tumor has been removed, preoperative radiation therapy may no longer be possible for the patient, even though it may have been the best option. After surgery the dose of radiation required for tumor control increases, as does the total field size of the area that must be treated.

Poorly designed biopsies can also complicate subsequent surgery and cause larger amounts of tissue to be removed to control recurrence. An inappropriate biopsy "can make all the difference in the world" in how he is able to treat a patient, said Raphael Pollock, M.D., Ph.D., head of M.D. Anderson's Division of Surgery and chief of the Section of Soft Tissue Sarcomas.

According to Dr. Pollock, if the sarcoma is in an extremity, as 70% are, the biopsy incision should be parallel to the long axis of the limb. If it is, definitive surgery can include the biopsy scar in an elliptical en bloc resection. However, if the biopsy incision is perpendicular to an extremity's long axis, a much wider area of tissue must be removed to close the wound properly.

"If we use additional techniques like radiation therapy after the surgery, the total field size, of necessity, must be considerably enlarged to accommodate the larger tissue space that's been violated. So the appropriate biopsy is critical," Dr. Pollock said.
Sarcoma/Osteosarcoma Clinical Trials

Clinical trials currently in progress at The University of Texas M. D. Anderson Cancer Center include the following for patients with sarcoma or osteosarcoma.

- Trial of doxorubicin, cisplatin, and methotrexate with and without ifosfamide, with and without muramyl tripeptide phosphatidyl ethanolamine (MTP-PE) for treatment of osteosarcoma (CCG94-7921). *Physician: Norman Jaffe, M.D.*

Study participants must have malignant high-grade osteosarcoma of bone diagnosed no more than 1 month before entering the study. They must have normal organ function, adequate cardiac function, no history of pericarditis or myocarditis, and no previous chemotherapy or radiation therapy. Patients who had a biopsy sample taken from the primary or metastatic areas for diagnosis may take part; those who had a complete or partial resection at the time of diagnosis may not take part. Patients who have undergone ablative surgery may participate, although they will not be evaluable for histological response. In addition, patients who have low-grade osteosarcoma, parosteal or periosteal carcinoma, radiation-induced sarcoma, or osteosarcoma in premalignant bony lesions (e.g., Paget's disease) may not take part. Patients who have received treatment for another malignancy are also ineligible for the study.

- Actinomycin-D and vincristine with or without cyclophosphamide and radiation therapy for newly diagnosed patients with low-risk embryonal/botryoid rhabdomyosarcoma (CCG99-D9602). *Physician: R. Beverly Raney, Jr., M.D.*

The chemotherapy drugs actinomycin-D, vincristine, and cyclophosphamide will be given on an outpatient basis. Patients who do not receive radiation therapy will return to M. D. Anderson Cancer Center up to once a week for 12 weeks; those who do receive radiation therapy will return every weekday for 3-5 weeks. Chemotherapy may be given by a family physician, but radiation therapy should be given only at M. D. Anderson. Patients above 21 years of age having embryonal rhabdomyosarcoma (EMB), the botryoid or spindle-cell form of EMB, or embryonal ecomesenchymoma and who have not received treatment may take part in this study. Those having tumor-involved regional lymph nodes or a primary site other than the orbit may not participate.

- Topotecan and cyclophosphamide followed by multimodal, multiagent therapy for children and adolescents with newly diagnosed stage IV/clinical group IV rhabdomyosarcoma, an IRS-V pilot (CCG96-D9501). *Physician: R. Beverly Raney, Jr., M.D.*

To be eligible for this study, patients must be under 21 years of age and have bidimensionally measurable, pathologically proven rhabdomyosarcoma or undifferentiated sarcoma. Patients must also be registered on the study within 42 days of the definitive diagnosis. Women who are pregnant or breast-feeding may not participate.

Furthermore, if hemostasis is not adequately maintained during excisional biopsy, the entire extremity is placed at risk for tumor dissemination, and, in rare instances, a much more radical resection, such as amputation, may be required to control disease.

In most cases, problems stemming from a biopsy can be avoided if a less drastic method is used for diagnosis. Sarcomas can usually be diagnosed by needle biopsy such as fine-needle aspiration (FNA). FNA is less invasive and less painful than other biopsies and can produce results in 2–3 hours. However, FNA requires expertise in the placement of the needle and the ability to make a diagnosis from the appearance of individual cells. To ensure that tumor cells are sampled, imaging techniques such as CT and sonography can be used to guide placement of the needle into the tumor. Image-guided FNA, said Dr. Pollock, “is capable of giving us the pathologic diagnosis for almost all sarcoma patients whom we treat. It’s actually very rare that we end up needing to do excisional or incisional biopsies.”

In the rare instances that require excisional biopsy, it can be effective if the tumor is small and if the tumor and a wide margin of surrounding normal tissue are removed. Unfortunately, many sarcomas may appear to be encapsulated when they are actually surrounded by a pseudocapsule of normal tissue compressed by the sarcoma’s rapid growth. Dr. Pollock said that removal of an apparently encapsulated tumor leads to local recurrence in 90% of cases because the sarcoma sends tentacles of cells out through the pseudocapsule. “So if you just enucleate the tumor, you’re leaving those tentacles of cells behind and not treating them in any way,” he said. “They’ll promptly grow out as tumors themselves, which is why you need a margin around the tumor.”

Dr. Benjamin recommended that patients who have a nonlipomatous soft-tissue lesion (as determined by imaging) greater than 5 cm in diameter and deep in the superficial fascia of an extremity be referred to a center that specializes in FNA and other needle biopsy diagnostic techniques. This will enable the planning of definitive surgery or multidisciplinary treatment if sarcoma is diagnosed. The same rule of thumb applies to patients with retroperitoneal masses, which are almost always malignant.

“The best solution is, if you see a mass that might be a sarcoma, refer it to a sarcoma center,” Dr. Benjamin said.

**For more information, contact Dr. Benjamin at (713) 792-3626 or Dr. Pollock at (713) 792-6928.**
not take part. Also, patients must have had no previous chemotherapy or radiation therapy.

- Evaluation of paclitaxel in the treatment of recurrent or persistent leiomyosarcoma of the uterus (GOG 131-C). 
  **Physician:** Thomas W. Burke, M.D.

  Patients in this study will return to M. D. Anderson once every 3 weeks to receive the chemotherapy drug paclitaxel (Taxol). To be eligible for the study, patients must have histologically proven, measurable, recurrent or persistent leiomyosarcoma refractory to curative therapy or established treatments. Patients must have received unsuccessful therapy, have disease that is considered incurable, and not be eligible for a higher priority GOG protocol. In addition, patients must also have no side effects from previous surgery, radiotherapy, or chemotherapy and no significant infection. Patients must also wait at least 3 weeks from their previous therapy to enter the study. Patients who have abnormal cardiac conduction must have had stable disease for the previous 6 months. Those who have received previous therapy with paclitaxel or more than one previous chemotherapy regimen, have a concomitant malignancy other than of the skin (except for melanoma), or have unstable angina or had a myocardial infarction within the previous 6 months are ineligible for the study.

- A phase I study of preoperative concurrent chemoradiation and intraoperative radiation therapy in the treatment of retroperitoneal sarcoma (ID95-225). 
  **Physician:** Peter W. T. Pisters, M.D.

  To be eligible for this study, patients must have histologically or histologically proven grade 2 or 3 sarcoma. They must be at least 18 years of age and have had no previous abdominal radiation therapy, no evidence of other serious uncontrolled medical conditions, and normal renal function. The study chairman may choose to exclude patients who have a prior history of malignancy. Patients must maintain adequate food intake and be free from nausea and vomiting. Women must not be pregnant and should refrain from breast-feeding.

- A phase I study of preoperative concurrent chemoradiation for high-risk extremity and trunk soft tissue sarcomas (ID97-335). 
  **Physician:** Peter W. T. Pisters, M.D.

  Patients in this study will return to M. D. Anderson daily to undergo radiotherapy. Assessment of the patient's chemotherapy and dosing will be done weekly. To be eligible, patients must have cytologically or histologically proven, large, resectable soft tissue sarcoma of an extremity or the trunk. The sarcoma may be measurable or nonmeasurable. Patients who have received previous doxorubicin-based chemotherapy may take part only if the total dose was no greater than 450 mg/m². Admission of patients who have a previous history of malignancy to the study must be approved by the study chairman. Those who have a history of previous irradiation to the area of the primary tumor or the radiation field in this study, which includes the perineum and scrotum or vaginal introitus, may not take part. In addition, patients having uncontrolled coexisting medical conditions and women who are pregnant or breast-feeding may not take part.

- A pilot study of intraperitoneal hyperthermic chemotherapy for the treatment of sarcomatosis and peritoneal mesothelioma (IDP98-176). 
  **Physician:** Kelly K. Hunt, M.D.

  Patients must have cytologically, radiographically, or histologically proven sarcomatosis or peritoneal sarcomatosis to participate in this study. The primary tumor must be intact or have been resected in a previous surgery. Patients who underwent previous laparotomy may not take part for 2–4 weeks after the surgery. Also, patients who received previous chemotherapy may not take part in this study until at least 4 weeks after therapy. Patients who have ascites may participate. Those who have uncontrolled medical problems including but not limited to diabetes, hypertension, and cardiovascular disease; ongoing sepsis or chronic infection; evidence of an impending obstruction on x-ray images; or known previous toxic effects of platinum-based chemotherapy may not take part. Whether patients having significant cardiac disease or a history of it take part will be decided by the principal investigator. Women who are pregnant may not participate.

- Phase II study of recombinant interferon-alpha and etoposide in patients with relapsed osteosarcoma (P96-221). 
  **Physician:** Eugenie S. Kleinerman, M.D.

  Patients in this study will receive the chemotherapy drugs interferon-alpha and etoposide on an inpatient basis. Their length of stay at M. D. Anderson will be either 5 days or 3 weeks. To be eligible, patients must have a primary diagnosis of histologically proven osteosarcoma and must have undergone previous unsuccessful chemotherapy. They must also be between 5 and 70 years of age and have a life expectancy of at least 12 weeks. In addition, patients must not have received chemotherapy, immunotherapy, hormonal therapy, or radiation therapy within 3 weeks of entering the study, and they must have recovered from acute toxic effects of previous therapy. Patients who have brain metastases may take part if the metastases have been controlled for 6 months and are not life-threatening. Patients having a serious intercurrent illness, such as congestive heart failure or cardiomyopathy, are ineligible. Also, women who are pregnant or lactating may not take part.
Orthopaedic Surgeons Save Limbs, Restore Function for Patients with Bone Tumors

by Dawn Chalaire

At The University of Texas M. D. Anderson Cancer Center, the successful treatment of primary bone and soft tissue tumors and bone metastases is just the beginning of what is often a long relationship between the Orthopaedic Center and its patients.

“We’re very tuned in to the functional outcome of patients,” said Alan Yasko, M.D., chief of the Section of Orthopaedic Oncology in the Department of Surgical Oncology. “Early on, we’re concerned with patient survival, local tumor control, and reconstructive surgery with minimal risk of complications. Later, long-term survivors become more of a non-oncologic orthopaedic issue. That’s why our research efforts are focused on trying to restore limb function with predictable durability.”

In the past, many patients with malignant tumors in an arm or leg had to have an amputation as part of their cancer treatment. Now, more than 95% of the patients treated in the Orthopaedic Center are able to undergo limb-saving procedures in which sections of tumor-involved bones and joints are removed and replaced by prostheses or allografts. Dr. Yasko credits the center’s success to an improved understanding of tumors, better imaging techniques, and the support of radiologists, pathologists, and chemotherapists.

“We’ve had a lot of patients who have been told that amputation is their only option, and the overwhelming majority of those don’t end up with an amputation,” Dr. Yasko said. “Because of our experience, we are able to spare limbs without compromising the overriding objective of tumor control.”

The increasing number of patients who are able to undergo limb-saving procedures has led to the expansion of research into new methods of restoring limb function. Currently, most bone and joint replacements are prosthetic. Dr. Yasko said that prosthetic replacements are used early in the course of cancer management at M. D. Anderson because they have an infection rate of less than 1%, which means that after reconstructive surgery, the majority of patients can resume chemotherapy quickly and with fewer interruptions. Some centers use osteoarticular allografts obtained from a national bone bank for reconstruction. The allografts eventually become incorporated into the native bone, and, unlike metallic prostheses, they do not become loose over time or need to be replaced. However, with the allografts, the risk of infection and complications early in the postoperative course is fairly significant.

“Therefore, if you do well with the allograft, then perhaps it is the more favorable approach,” Dr. Yasko said. “However, if you don’t do well, then you get into a problem with compromising the patient’s systemic therapy. So we have opted to go with the more predictable and lower-risk reconstruction that will restore function immediately, and then if problems arise, they will be dealt with after the patients have completed their chemotherapy course,” Dr. Yasko said.

For the past four years, Dr. Yasko has been collaborating with bioengineers at Rice University in Houston and mechanical engineers in private industry to develop bone graft substitutes and techniques for engineering new bone. In particular, they are investigating the use of injectable, biocompatible, biodegradable polymers to restore bone and the use of growth factors and cell transplantation techniques to help guide bone tissue growth.

The injectable bone graft substitute would be used to fill irregular defects in bone where a tumor has been surgically scooped out or to augment healing at tradi-

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tional graft junctions. It could also replace large segments of bone by manipulating the growth of new bone tissue.

“One approach of tissue engineering is to try to deliver to that locale those elements that you need to stimulate new bone formation. So if you have a proper osteoconductive scaffold and the necessary cell population and can introduce growth factors that will induce those cells to form new bone, then you have created a milieu that is ideal for new bone formation,” Dr. Yasko said.

Carrying the concept one step further, the researchers are also looking at using the polymers they are developing not only to help bone heal and stimulate new bone growth but also as delivery vehicles for chemotherapy agents and antibiotics.

“You can imagine that if we had a material that would not only restore bone stock but also, at the same time, deliver chemotherapy agents as a local adjunct and antibiotics locally to minimize or to help guard against infection, then we have really addressed three major problems: local tumor control, early complications associated with reconstructions, and long-term anatomy and functional restoration,” Dr. Yasko said.

Dr. Yasko and the other researchers are also working to develop novel methods of reconstruction following complex pelvic resections, new methods of soft tissue attachment to optimize function after large-segment bone resection, and prototypes for “growing” prostheses that will allow for expansion or lengthening of the prosthesis without surgery for children who have undergone resection of tumors in the extremities.

In addition to Dr. Yasko’s research in bone reconstruction, orthopaedic surgeons Patrick Lin, M.D., and Kristin Weber, M.D., are investigating the molecular approaches to systemic tumor control. The center is in the process of recruiting a fourth orthopaedic surgeon who has a primary interest in the spine and sacrum to complement the spine tumor efforts of the Department of Neurosurgery.

Even as their research efforts expand, the orthopaedic surgeons remain committed to patient service and are usually able to see patients within 24 hours. Despite pressures from HMOs and other organizations, Dr. Yasko said that physicians should not feel obligated to make a diagnosis before referring patients to M. D. Anderson. In many cases, a consultation—even a phone consultation—to get an opinion regarding the best way to evaluate a patient before referral probably serves patients best.

“Because of the rarity of the tumors, the majority of orthopaedic surgeons will not treat or attempt to treat these tumors. Most of the time, they won’t do a biopsy out of concern that they may compromise the patient’s ultimate care, principally as it relates to whether we can save an extremity or whether we have to amputate the extremity,” Dr. Yasko said.

FOR MORE INFORMATION, contact the Orthopaedic Center at (713) 792-6235 or Dr. Yasko at (713) 794-5242.

What’s to Eat?
Encouraging children to eat well for a healthier future

by Alison Ruffin and Vickie Williams

Farewell lazy, carefree days of summer—
it’s back-to-school time!

During this schedule-juggling time of year, eating healthy meals can be a challenging assignment for busy families. Doctors at The University of Texas M. D. Anderson Cancer Center want to ensure that parents and students learn one lesson: there is an important link between good nutrition and good health.

“We can reduce a child’s risk for cancer in the future by teaching him or her to make healthy food choices today, which, we hope, will become a good habit that will last for a lifetime,” says Tom Baranowski, Ph.D., a behavioral nutrition researcher at M. D. Anderson.

Of particular interest is the recent finding that eating 5 servings of fruits and vegetables per day may reduce by about 30% the risk for lung, prostate, bladder, esophageal, colorectal, and stomach cancers. Most children consume less than 2.5 servings of these foods per day.

Bernard Levin, M.D., vice president for cancer prevention at M. D. Anderson, says learning to appreciate the health benefits of eating well should begin at an early age.

“It’s important for children to know that, in addition to providing long-term health benefits, nutritious meals and snacks taste good and are enjoyable to eat,” he explains. “With a little planning, 5 or more daily servings of fruits and vegetables can be incorporated easily into a family’s diet.”

Families need to evaluate and restructure their diets to ensure that everyone is getting the proper nutrition, urges Dr. Baranowski. Children should be included in meal planning and preparation. “Encourage children to get in the kitchen and mix something up,” he says. “Also be sure they take at least one bite of what might be a new food for them.”

Replacing high-fat, high-sugar foods with nutrition-packed alternatives that will provide long-term health benefits is a family project that will earn everyone an A+.

FOR A FREE COPY of the brochure “M. D. Anderson’s Road Map to Cancer Prevention,” call (713) 794-4237.
Breast Cancer: Understanding the Risks

Among North American women, breast cancer is the most common cancer (other than skin cancer) and is the second leading cause of cancer-related deaths, after lung cancer. No one knows exactly why breast cancer strikes some women and not others, but several risk factors may increase the likelihood. These risk factors can be divided into two categories: controllable and uncontrollable.

Controllable risk factors

High-fat, high-calorie diet: Studies show that women in populations that consume a high-fat diet are more likely to die of breast cancer than women in populations that consume a low-fat diet. Obesity has been suggested as a breast cancer risk factor in several studies, and more recent data point to the risks associated with a high-calorie diet.

Alcohol: Although moderate alcohol consumption (up to two drinks per day) has been shown to decrease the risk of coronary heart disease in middle-aged adults, women who have an average of one alcoholic drink per day have a slightly higher risk of breast cancer than nondrinkers, and the risk increases with the amount of alcohol consumed.

Sedentary lifestyle: Studies indicate that strenuous exercise in youth might provide life-long protection against breast cancer and that even moderate physical activity as an adult can lower breast cancer risk.

Age at first live birth: Having the first full-term pregnancy after age 30 or never giving birth can increase the risk of breast cancer.

Hormone replacement therapy: Studies suggest that long-term hormone replacement therapy (HRT) may slightly increase a woman's risk of developing breast cancer; however, HRT also has important benefits, including helping to prevent osteoporosis and possibly reducing or postponing the risk of having a heart attack or stroke.

Uncontrollable risk factors

Age: Simply getting older increases a woman's chances of developing breast cancer. Over 75% of women in whom breast cancer is diagnosed are over the age of 50.

Family history: Having a mother, daughter, or sister with breast cancer increases a woman's risk of developing the disease. Also, breast cancer that is linked to a genetic cause may occur at a younger-than-average age.

Age at first menstrual period: Women who began menstruating before age 12 have a slightly increased risk of breast cancer.

Previous breast biopsies: Women who have had benign (noncancerous) breast disease that required a biopsy have an increased risk of breast cancer, especially if the biopsy showed a change in breast tissue known as anaplasia. Not all conditions leading to biopsy contribute to an increased risk, however.

Other breast diseases: Noninvasive cancers such as ductal carcinoma in situ and lobular carcinoma in situ are associated with an increased risk of invasive breast cancer.

Radiation therapy: Women who received radiation therapy to the chest for Hodgkin’s disease or other types of cancer, especially at a young age, are at increased risk for developing breast cancer.

Detection and prevention

Just because you have some risk factors for breast cancer does not mean that you will develop the disease; the known risk factors account for only a small fraction of all cases of breast cancer.

There are steps that you can take to lower your risk and ensure that breast cancer will be detected at a more curable stage. Your doctor will counsel you about your personal breast cancer risk factors and recommend a schedule of screening examinations.

Beginning at age 40, all women should have a mammogram every year. All women should do a monthly breast self-examination as well as have an annual clinical breast examination by a health professional. If you have a strong family history of breast cancer, you may wish to be tested for an inherited gene mutation. If a mutation is found, more frequent exams to monitor the early signs of cancer can be scheduled.

If you are at high risk for developing breast cancer, you may be interested in participating in a multinational breast cancer prevention trial, the study of tamoxifen and raloxifene (STAR). To participate, you must be at least 35 years old, postmenopausal, and have an increased risk of breast cancer as determined by a risk assessment form.

For more information about the STAR program or to participate, please call (713) 792-8064 or (800) 392-1611.
High-Dose Chemotherapy Deserves More Study

Aman Buzdar, M.D.
Professor, Department of Breast Medical Oncology

A series of phase III trials that cast doubt on the effectiveness of high-dose chemotherapy (often referred to as bone marrow transplantation) may leave breast cancer researchers in a catch-22: At a time when continuing research is critical for defining the role of high-dose chemotherapy, recruiting patients and convincing insurance companies to pay for clinical trials may become more difficult.

High-dose chemotherapy—doses that are 5 to 30 times higher than standard doses—supported by bone marrow or peripheral blood stem cell transplantation is considered an established therapy for many tumor types. In several early phase I and II studies, high-dose chemotherapy produced a higher complete remission rate than standard-dose regimens in patients with metastatic breast cancer, and the tumors completely disappeared in 30–50% of patients whose cancer was already responding to standard therapy.

Once the data from the early studies became available, some hospitals began using high-dose chemotherapy as standard care for breast cancer as if its value had been proven. The remissions were short-lived, however, and four of five phase III studies presented earlier this year at the annual meeting of the American Society of Clinical Oncology showed no significant difference in survival rates among patients given high-dose chemotherapy and those given standard-dose chemotherapy.

The bottom line is that high-dose chemotherapy is still under investigation, and it should be administered only under the strict guidelines of a research protocol. I can say emphatically that at M. D. Anderson Cancer Center, high-dose chemotherapy is not considered standard care for any subset of patients with breast cancer in any stage.

We, however, will continue to investigate the role of high-dose chemotherapy in breast cancer treatment. The aims of our phase II studies are to: (1) improve treatment safety, (2) increase the duration of remissions, (3) develop novel drugs and novel treatment combinations, and (4) identify a subset of patients who can benefit from high-dose chemotherapy. If we have encouraging results from these studies, we will begin phase III studies to compare high-dose chemotherapy with standard chemotherapy.

I tell every patient with breast cancer who asks about high-dose chemotherapy that it is still a research treatment. However, we cannot make progress unless women are willing to participate in research studies, so I encourage patients who understand the risks to participate in studies that are well designed and well controlled. With their help, I am optimistic that in the next few years, we will develop treatments that will result in better disease control for patients with breast cancer.