Patients with Highly Invasive Cutaneous Melanoma Need Selective, Focused Evaluations Before Surgery

Perhaps President Reagan's experience with basal cell carcinoma will keep a few more palefaces out of the sun. The same caution—to stay away from UV light, although that is only one suspected cause—applies to cutaneous melanoma, the skin cancer that is more invasive, more difficult to control, and rising in incidence at a faster rate than almost any other cancer.

Although the occurrence of cutaneous melanoma is doubling every six to 10 years, the natural history of the disease has become somewhat less threatening in the last two decades, typical melanomas being thinner, less invasive, and therefore more curable. A national survey of more than 4,500 melanoma patients treated during 1980 demonstrated that 87% of patients had clinically localized—that is, early—disease. In 39% of these patients, the melanomas were less than 0.76 mm thick, a size associated with a 90% or higher rate of cure.

As Charles M. Balch, M.D., head of the Division of Surgery at UT MDAH, noted, "The natural history of this disease has changed dramatically and so must our treatment strategies and diagnostic approaches.”

Balch described the usual patient with melanoma as a man or woman with a fair complexion and a tendency to sunburn after relatively brief exposure to bright sunlight. A patient with melanoma has a 3% to 5% risk of developing a second primary melanoma and thus joins a "high-risk group of patients who should be followed for metastatic disease and second primary tumors.” Patients with familial melanomas or with the dysplastic nevus syndrome are identifiable high-risk groups, Balch wrote in reviewing the clinical management of cutaneous melanoma in Texas Medicine (83:70-78, 1987).

Balch advised physicians to obtain biopsies whenever they see subtle changes in any pigmented skin lesion, which may include growth in diameter or contour of a mole, change in color, bleeding, itching, ulceration, development of a palpable lymph node, or a combination of these. A melanoma's features are "usually more subtle when it is in a more curable stage," he wrote.

As to metastatic melanoma, no other cancer in humans has as variable a history because melanoma may spread to virtually any organ or tissue. But there are patterns. The regional lymph nodes are the most common sites of metastasis, and the most common first sites of distant metastasis are skin, subcutaneous tissue, and lung. Liver, bone, and brain are common sites of first relapse, Balch wrote.

Selective Tests

Instead of a broadside of tests, patients should at first undergo careful history-taking and physical examination, Balch advised. More expensive radiologic or nuclear scans are not indicated, he said, unless there are signs or symptoms suggestive of metastatic disease as discovered by a simple, cost-effective series of screening exams. The metastatic survey should be selective:

- Chest roentgenogram for lung metastasis, which may be suspected but usually has no symptoms—confirmed, if necessary, by lung tomograms or CT scan.
- Serum alkaline phosphatase and lactic dehydrogenase assays and examination for liver mass or ascites in the case of liver symptoms of weight loss, anorexia, and upper abdominal pain—followed by liver sonar or abdominal CT scan if indicated.
- Physical examination in the case of suspected subcutaneous or skin metastasis or second primary melanomas—followed by biopsy examination.
- Complete history and physical examination for brain symptoms of headache, numbness, motor weakness, followed by brain CT scan if indicated.
- Alkaline phosphatase assay for localized pain of bone metastasis, and then bone scan and bone X-ray for confirmation.
- Urinalysis for hematuria indicating kidney or bladder metastasis, and then intravenous pyelogram or cystoscopic examination or both if indicated.

Surgical Management

Primary melanomas are removed by wide excision, except for lentigo maligna melanomas, which have a low recurrence rate continued on page 2
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and do not need wide surgical margins. Overall, the primary melanomas have a recurrence rate of only about 3%, although tumors with a thickness of 4 mm or more, ulceration, or location on foot, hand, scalp, or face have higher rates of local recurrence.

Metastasis occurs most frequently in the regional lymph nodes, and it will be clinically evident from enlarged, firm, non-tender nodes or be hidden as microscopic metastases in lymph nodes, Balch explained.

In patients with clinically enlarged nodal metastases, the treatment is radical lymphadenectomy because partial lymph node dissection or simple excision is inadequate. "Since the surgeon's ability to detect nodal metastases by clinical criteria is not optimal," Balch noted, "a philosophy of limited excision for only clinically detectable nodes will often compromise both the palliative and curative goals of surgical treatment."

Management of suspected microscopic metastases in the regional lymph nodes is more difficult, he explained, because the central question concerns the optimal timing of surgery. The procedure can be done immediately to remove any suspected tumor, especially an intermediate-thickness melanoma measuring up to 4 mm, or it can be delayed until nodal metastases are large enough to be detected by palpation.

After presenting all sides of the argument for early or for later surgical intervention, Balch noted that, since the cure rate for delayed lymph node dissection is so poor—25% survival at 10 years—"many surgeons advocate immediate excision of the regional lymph nodes in selected patients to remove nodal micrometastases before they can disseminate. In this setting, surgical decisions depend on knowing which prognostic factors can reliably identify patients at risk for occult metastatic disease."

Balch is now principal investigator of a surgical trial that will involve more than 800 patients in 57 institutions in the United States and Canada and address issues of the most appropriate extent and timing of surgical intervention. More than 500 patients are already participating in the study.

Balch noted that, unfortunately, adjuvant therapy for regional metastasis of cutaneous melanoma, including immunotherapy, chemotherapy, and radiation therapy, have not been notably successful after operations. This underscores the need for regular follow-up examinations—every three to four months for the first two years, every six months through the fifth year, and yearly thereafter—to examine these patients for recurrent disease.

Distant Metastasis

For patients who have advanced melanoma, Balch explained, treatment depends on site and number of lesions, rate of growth, previous treatment, and the patient's age, overall condition, and wishes. Balch stressed consideration of the benefit-risk ratio of treatment intended to relieve the patient's symptoms, saying that the benefit-risk balance must be even stronger in the case of asymptomatic patients with distant metastases. Treatment choices include no treatment; surgical excision of the melanoma for palliative effect, which may be sustained for three to five years in some cases; palliative radiotherapy, which Balch said is effective for superficial metastatic disease of the skin or soft tissues where lesions can be treated with high-energy photon beams from a linear accelerator; chemotherapy and immunotherapy, which have their greatest potential benefit in patients with symptomatic visceral disease.

Dacarbazine (DTIC), Balch pointed out, is the only drug currently available that has had significant activity in melanoma, most studies having shown 15% to 20% response rates. "Often," Balch said, " chemotherapy is used only in patients whose lesions are not amenable to surgery or radiation therapy, and only sparingly in asymptomatic patients."

Physicians who desire additional information may write Charles M. Balch, M.D., Division of Surgery, Box 112, The University of Texas M. D. Anderson Hospital and Tumor Institute at Houston, 1515 Holcombe Boulevard, Houston, Texas 77030.
Adjuvant Chemotherapy Improves Survival of Patients with Stage II and III Breast Cancer

The overall survival for breast cancer patients has improved in the last decade. According to Aman Buzdar, M.D., of the Medical Breast Unit at UT M. D. Anderson Hospital and Tumor Institute (UT MDAH), great progress has been made, especially for patients with stage II and III disease, thanks to the development of more aggressive adjuvant chemotherapy regimens. In addition, modest gains have been made in patients with disseminated disease. Buzdar, along with his colleagues at UT MDAH and other institutions, has been involved in several studies examining the effect on patient survival of alternating the drugs in a chemotherapy regimen, administering higher doses of drugs over a shorter period of time, and matching chemotherapy to certain pathologic prognostic factors of the patient.

According to Buzdar, the most aggressive chemotherapy regimen used to date is the combination of 5-fluorouracil, doxorubicin (Adriamycin), and cyclophosphamide (FAC), with doxorubicin being the most active agent of the combination. Studies in breast cancer treatment are currently evaluating ways to improve the effectiveness of this regimen and seem to be meeting with success.

Combination Chemotherapy

Combination chemotherapy for the treatment of metastatic breast cancer has been proved effective in several studies conducted by a diverse group of researchers. In 1985 Buzdar, along with Michael Ross, M.D., and their colleagues, published the results of a retrospective study that compared survival of patients with metastatic breast cancer for three decades: the 1950s, 1960s, and 1970s. The aim of the study was to determine if the use of combination chemotherapy in the 1970s had an impact on survival in patients with evidence of metastatic disease. Most of the patients in the 1950s and the 1960s were treated with single-agent chemotherapy, endocrine therapies, or both; by the 1960s, most were receiving single-agent chemotherapy. Patients in the 1970s were predominantly treated with combination chemotherapy regimens that usually included doxorubicin.

The median survival time was 22 months for patients in the 1970s and 12 months for patients in the 1960s; patients in the 1960s did not have a significantly longer survival time than patients in the 1950s. Although there were possible biases inherent in the study, the results showed that patients treated in the 1970s had an improvement in median survival of 9 to 12 months compared with patients treated in the previous two decades (see Fig. 1). Buzdar and his colleagues concluded that combination chemotherapy, though not significantly affecting mortality rates, definitely prolonged the survival of breast cancer patients.

Recent studies show that median follow-up of patients treated in the late 1970s was 28-32 months, suggesting continued improvement in median survival for patients with metastatic disease. While there is currently only a slight potential for cure, Buzdar says "long-term unmaintained remissions do occur in about 3-4% of the patients with metastatic disease. We are keeping patients alive much longer with chemotherapies than we did 8-10 years ago."


Adjuvant Chemotherapy Trials

Research has shown that the most effective use of chemotherapy in high-risk patients (patients with stage II and III disease) is as an adjuvant to primary local treatments (surgery and irradiation). In 1986, Buzdar and his colleagues published the results of a ten-year adjuvant chemotherapy trial for breast cancer patients. Beginning in 1974, patients with stage II and III disease received FAC chemotherapy after mastectomy (and in some cases after postoperative irradiation). The five-year survival for the study group was compared with the five-year survival for a consecutive series of patients with stage II and III disease seen at UT MDAH two years immediately preceding the initiation of the FAC trial (historical control group). The historical control continued on page 4
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The data for this ten-year follow-up trial clearly show that adjuvant chemotherapy (FAC combinations) was effective in reducing mortality in high-risk patients. In patients 50 years of age, the FAC combination was effective in reducing the mortality by 54%; in patients older than 50, the reduction in mortality was 37%. (See Table 1 for a comparison of estimated disease-free survival rates for the study and control groups.)

Subsequent prospective adjuvant FAC chemotherapy trials have also highlighted the relative ineffectiveness of postoperative irradiation and nonspecific immunotherapy with bacille Calmette-Guerin (BCG) and have confirmed the effectiveness of FAC regimens in improving patients' survival. NIH consensus data make it clear that tamoxifen has not been effective in reducing mortality in patients younger than 50 regardless of estrogen receptor (ER) status. In patients who were older than 50 and ER positive, however, the use of tamoxifen reduced mortality at 5 years by 19%.

Alternate Drugs and Shorter Therapy

Researchers at UT MDAH have also examined the role of shorter-duration combination chemotherapy in their patients. "We used to continue chemotherapy for two years," says Buzdar, who with his colleagues at UT MDAH started an adjuvant chemotherapy trial in 1980 that addressed the issues of shorter treatment time and alternate drug combinations. It was their hope that the patient's survival could be improved by making the duration of treatment shorter and more intense and by altering the combination after a certain length of time. In the study (which has recently been completed with a five-year follow-up), vincristine and prednisone were added to the FAC therapy of patients with stage II and III disease; the patients received this chemotherapy for 6 months, after which all patients with ER-positive or unknown status were randomized to receive either tamoxifen alone for 6 months or tamoxifen and additional chemotherapy with methotrexate and vinblastine (TMV), which constituted a year of chemotherapy. All ER-negative patients received 6 months of additional chemotherapy with methotrexate and vinblastine (MV).

Patients with ER-positive tumors who received alternative chemotherapy with additional drugs (TMV) had a lower risk of recurrence than patients who received tamoxifen following the initial chemotherapy phase; the difference in recurrence rate was not significant, however, when patients whose ER status was unknown were included in the analysis. ER-positive patients treated with additional alternate chemotherapy had superior disease-free survival compared with patients who received tamoxifen after completion of the FAC regimen.

Patients with ER-negative disease treated with additional chemotherapy had lower disease-free survival rates than those who had ER-positive disease. Buzdar notes that the addition of vincristine and prednisone to the FAC combination did not enhance the therapeutic efficacy of the regimen. A summary of estimated disease-free survival at 5 years for patients in this study is shown in Table 2.

| TABLE 1 |
| Comparison of Estimated Disease-Free Survival and Survival Rates at 10 Years in First Study and Control Group |

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Patients</th>
<th>Percent Disease-Free</th>
<th>P</th>
<th>Percent Alive</th>
<th>P*</th>
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<tbody>
<tr>
<td>All pts</td>
<td>FAC</td>
<td>222</td>
<td>49</td>
<td>&lt; .01</td>
<td>55</td>
<td>&lt; .01</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>186</td>
<td>33</td>
<td>&lt; .01</td>
<td>34</td>
<td>&lt; .01</td>
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<tr>
<td>Stage II</td>
<td>FAC</td>
<td>147</td>
<td>55</td>
<td>&lt; .01</td>
<td>63</td>
<td>&lt; .01</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>116</td>
<td>36</td>
<td>&lt; .01</td>
<td>38</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Stage III</td>
<td>FAC</td>
<td>75</td>
<td>38</td>
<td>.02</td>
<td>41</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>70</td>
<td>28</td>
<td>.02</td>
<td>26</td>
<td>.02</td>
</tr>
</tbody>
</table>

*P values were one-tailed test

| TABLE 2 |
| Summary of Estimated Disease-Free Survival at 5 Years by Estrogen Receptor Status and Maintenance Treatment of Third Study |

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>T Percent Disease-Free</th>
<th>TMV Percent Disease-Free</th>
<th>MV Percent Disease-Free</th>
</tr>
</thead>
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<tr>
<td>ER</td>
<td>122</td>
<td>66</td>
<td>113</td>
</tr>
<tr>
<td>Positive</td>
<td>90</td>
<td>67</td>
<td>76</td>
</tr>
<tr>
<td>Unknown</td>
<td>32</td>
<td>65</td>
<td>37</td>
</tr>
</tbody>
</table>

ER = estrogen receptor status
T = patients receiving tamoxifen
TMV = patients receiving tamoxifen, methotrexate, and vinblastine
MV = patients receiving methotrexate and vinblastine

The Importance of ER Status

With regard to the ER status of patients in these studies, Buzdar points out that similar observations have been reported by other investigators: in spite of adjuvant chemotherapy, patients with ER-negative tumors had inferior disease-free survival rates compared with the rates in patients with ER-positive tumors. Because ER-negative patients usually have more aggressive disease, they tend to do poorly in comparison with ER-positive patients.

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Diagnostic Radiologists Use Expandable Metallic Stents for Symptom Relief in Selected Patients

A growing number of diagnostic radiologists are shifting the focus of their practice toward intervention. Interventional radiologists use various methods—for instance, direct chemotherapy to the tumor or blocking of the tumor's blood supply—to treat tumors that are too far advanced for resection but confined to a local area. Their main goal may not be to cure the cancer but to relieve the patient's symptoms and "get him in shape" for further radio- or chemotherapy or surgery. Cesare Gianturco, M.D., an adjunct professor in the Department of Diagnostic Radiology at The University of Texas M.D. Anderson Hospital and Tumor Institute at Houston, develops medical instruments with this aim in mind.

Older Procedures Problematic

In the past, angioplasty or balloon dilatation has been employed to open tubular structures occluded by fibrosis or tumor. These procedures were problematic, however, because often after treatment the vessel would close again. Furthermore, surgery was required to rebuild the vessels. To combat these problems, in 1984 Gianturco invented the expandable metallic stent, a wire frame that bypasses or opens collapsed vessels and closed passages and then keeps them open.

The Gianturco stent (Figure 1) is made of stainless steel wire 0.0375 to 0.045 cm in diameter. The wire is first bent in a zigzag, and then its two ends are attached to one another, forming a cylindrical frame 2.5 to 3 cm in diameter. An extra wire, or barb, is soldered to the stent to prevent its migration. Depending on the length of wire used, the larger is the angle of the zigzags, the greater the diameter of the stent, and the stronger its expansile force. The stents are usually 2 to 3 cm long, but if a longer passageway is needed, two or more stents can be connected to one another with a wire strut, forming a double or longer stent and spreading the expansile force without weakening it. Double stents also have barbs to keep them in place.

The stent is placed in the patient's vein through a percutaneous catheter. First the frame is compressed and slipped into the catheter tube. Then the catheter is inserted normally into the vein in which the stent is to be placed. The stent is pushed out of the catheter into the vessel, where it expands, with an instrument called an introducer; the introducer holds the stent in place at the tip of the catheter while the catheter is withdrawn until the stent is released into the vessel. Since percutaneous placement is not a surgical procedure, the patient requires only a local anesthetic. If the stent is to be placed in a patient's tracheo-bronchial tree, the same procedure is followed, but a bronchoscope is used instead of a catheter.

Initial Tests Showed Promise

The expandable metallic stents were initially tested in 1984 at The University of Texas System Cancer Center in experimental animals. The stents were placed in normal vessels first to gauge tissue reactions. Since the results of those experiments were encouraging, Chusilp Charnsangavej, M.D., and Sidney Wallace, M.D., of the Department of Diagnostic Radiology at UT MDAH, used five single stents to treat a patient for superior vena cava syndrome and myocutaneous graft collapse in the tracheobronchial tree. The patient experienced immediate symptom relief, although she died three weeks later of myelosuppression.

Expandable metallic stents have been placed in 10 patients so far to treat stenosis of the superior vena cava or blockage of the tracheobronchial tree, and the results have been good in every case but one, a patient with mediastinal osteogenic sarcoma metastases wrapping around the tracheobronchial tree. "The tumor was too hard to open up," Charnsangavej laments. In no case, however, have the stents caused clotting or thrombosis; in fact, new epithelium formed around every stent in the vena cavae, and mucosal secretions covered every stent in the tracheo-

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bronchial trees. Charnsangavej speculates that the continual flow of blood over the stent is what keeps the vessels from developing thromboses.

Gianturco fashioned all of the first expandable metallic stents himself. He continues to make most of them now, but some laboratory technicians also build them. Charnsangavej expects that Cook, Inc., in Bloomington, Indiana, will eventually acquire the patent for the Gianturco stent.

Use in Humans Still Experimental

Until the United States Food and Drug Administration sanctions the Gianturco stent, only physicians at UT MDAH may use it, under conditions approved by the UT MDAH Surveillance Committee. The FDA requires years of testing before it endorses a new product such as this one. Stents similar to Gianturco's are currently being utilized in Europe; by doctors in Portland, Oregon; and at Shadyside Hospital in Pittsburgh, Pennsylvania.

Expandable metallic stents have also been tested, with favorable results, in the bile ducts of dogs at the UT System Cancer Center, but they are not used in the bile ducts of patients here yet. Some physicians in Europe are placing such stents in human bile ducts, and they report positive results. At least four other groups are also interested in employing the Gianturco stents to treat bile duct occlusions.

Researchers are now endeavoring to develop a stent similar to Gianturco's for use in arteries. Because arterial stents employ a balloon as well as the wire frame, they are called "balloon-assisted" expandable metallic graft stents. Gianturco himself is testing such a stent in dog arteries at UT MDAH. Arterial stents are also being tested in the coronary arteries of dogs at Emory University.

Despite the success of the Gianturco stent, many questions remain. For instance, does the stent cause late complications? Although no late complications have been noted yet, the longest survival time so far is still only 6 months. How much expansile force does the stent need to exert? Too much force could cause the stent to perforate the structure, whereas too little force could keep the stent from making the tube patent. Can the extrinsic force that the stent must combat be measured? More experimentation is needed to answer these questions and confirm the good results seen up to now.

Physicians who desire additional information may write Chusilp Charnsangavej, M.D., Department of Diagnostic Radiology, Box 57, The University of Texas M. D. Anderson Hospital and Tumor Institute at Houston, 1515 Holcombe Boulevard, Houston, Texas 77030.

Nutritional and Psychological Aspects of Feeding Children Who Have Cancer

by Cheryl Mokrzecky, M.S., R.D., L.D.
Dietitian
Nutrition and Food Service

Because children with cancer are developing and maturing throughout their illness and treatment, their nutritional needs are quite different from those of healthy children and adults. Moreover, malnutrition at a time of rapid growth can cause physical and intellectual delays in development as well as behavioral changes. The major factors that contribute to malnutrition in children with cancer are related to the disease, the side effects of treatment, and psychological factors such as family stress. Dietitians at UT M. D. Anderson Hospital (UT MDAH) work with patients and families to maintain optimum nutritional status, growth, and development in the child.

Nutritional Assessment

At UT MDAH, nutritional status is assessed by a nutrition history and a combination of anthropometric and biochemical measures. Weight and height measurements, serum albumin levels, and a determination of current food intake are used for initial screening. For children, the primary anthropometric measurement is the ratio of weight to height, a measurement that relates body mass to stature. This measurement is compared, on growth grids, to standards developed by the National Center for Health Statistics (NCHS) for a reference population. Age is plotted along the axis, and height or weight values are plotted along the abcissa. This shows how children rank in size in relation to other children of the same age and sex.

In our hospital, the dietitian uses the following weight-to-height percentage formula to identify patients at nutritional risk:

\[
\text{Weight } \% = \frac{\text{Patient's weight}}{\text{Patient's height}} \times 100,
\]

continued on page 7.
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where \( S = \frac{\text{NCHS 50th percentile weight for age}}{\text{NCHS 50th percentile height for age}} \)

Patients whose weight-to-height percentage is less than 90%, according to this formula, are considered at risk for malnutrition (Donaldson SS, Wesley WN, De Wys W, et al: A study of the nutritional status of pediatric patients. Am J Dis Child, in press). However, interpretation of a child's growth is best when observed over a period of time rather than from a single measurement. Malnutrition should be suspected in any child who does not grow properly.

Dietary evaluation, which is an important adjunct to clinical and biochemical assessment, provides information about the patient's current level of nutrient intake and family eating patterns. It includes a nutrition history and food frequency determinations, as well as information about the use of nutritional or vitamin supplements, vegetarianism, or other dietary practices that may suggest potential nutritional problems.

There is no single biological parameter to assess nutritional status, but dietitians at UT MDAH use measurement of serum albumin to evaluate the adequacy of a patient's protein status. Hypoalbuminemia may be an indicator of malnutrition.

Patients who exhibit abnormalities in one or more nutritional parameters should be monitored frequently during treatment. Awareness of the fact that some tumors profoundly affect nutritional status can aid in identifying patients who require early nutritional intervention.

The incidence of malnutrition in patients with cancer tends to be highest in children who have advanced or metastatic disease. Moreover, children who are diagnosed with Ewing's sarcoma or neuroblastoma are at great risk for malnutrition. Adolescents, in general, may be at a high risk for malnutrition due to their increased metabolic requirements.

Effects of Cancer and Cancer Treatment

Most children with cancer undergo chemotherapy as their primary treatment. The agents used may produce severe gastrointestinal side effects such as nausea, vomiting, diarrhea, mucositis, and dysgeusia. During chemotherapy administration, children should be encouraged to take clear liquids such as gelatin desserts, broth, clear frozen desserts, and carbonated beverages, since these are usually well-tolerated on a queasy stomach. Fluids with electrolytes should be given to replace body fluids lost because of vomiting and diarrhea. Eating dry foods such as crackers or toast may help alleviate the feeling of nausea.

The corticosteroid hormones, used alone or in combination with chemotherapy, also have adverse nutritional effects. These agents increase catabolism of lean body mass. Patients may have difficulty in meeting the increased protein and calorie needs associated with these agents, even though their appetites may increase. Finally, the fluid and electrolyte disturbances accompanying steroid administration may cause edema that masks the loss of lean body mass.

Eating Disorders

A child's eating may also be affected by less obvious factors such as family stress, depression, or a struggle for control within the family.

When a child has cancer, the family's normal routine is disrupted in many ways. Parents often have to function separately, since one parent may continue to work and care for siblings at home while the other parent stays with the sick child in the hospital. The stress imposed by this situation may magnify problems that existed before the child's illness.

Families often participate in a child's health care by feeding the child. Since weight loss and cachexia represent illness and normal growth signifies health, parents may become preoccupied with their child's eating. Extreme concern about a child's weight may mask the parent's fear that the child will die. If the child's normal eating pattern is disrupted, the parent often feels hopeless, having lost influence in an activity that he or she had been able to control before the child's illness. As the parent experiences a sense of failure, efforts to force the child to eat increase. Unfortunately, the focus on eating may actually depress the child's appetite and food intake.

Struggles for control in pediatric patients, especially in adolescents, may be manifested in eating disorders. Children with cancer sometimes develop anorexia nervosa in a subconscious attempt to reduce their feelings of dependence and loss of freedom and individuality. Some patients use eating as a way to gain attention from their parents.

Nutritional Support During Therapy

Nutritional support using oral supplements, tube feedings, or parenteral nutrition can prevent weight loss and aid in maintaining or regaining nutritional status.

Meeting the nutritional needs of anorectic children with adequate quantities of nourishing food can be a challenge. If a child has one or more of the following problems, he or she may need nutritional supplementation:

1. Arrest in expected weight gain
2. Evidence of malnutrition as indicated by abnormal biochemical parameters
3. Difficulty chewing or swallowing food
4. Persistent nausea and vomiting
5. Inadequate dietary intake

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Conclusions

Currently at UT MDAH, Buzdar and his colleagues are evaluating the role of high-dose intensification with autologous bone marrow support in patients with metastatic disease. Patients are initially treated with doxorubicin combinations (FAC). After two or three cycles of chemotherapy, patients who show a complete or partial response have their bone marrow extracted and stored. These patients are treated with an additional few cycles of the FAC regimen and high-dose chemotherapy with bone marrow support. This study is currently ongoing and is being conducted with UT MDAH's bone marrow transplant team.

Patients with stage II and III disease are currently being entered in a prospective study comparing the efficacy of tamoxifen administration for five years with the FAC regimen. In stage I patients (with negative nodes) they are evaluating four cycles of doxorubicin chemotherapy compared with no further treatment after local therapy.

Physicians who desire additional information may write Aman U. Buzdar, M.D., Department of Medical Oncology, Box 78, The University of Texas M. D. Anderson Hospital and Tumor Institute at Houston, 1515 Holcombe Boulevard, Houston, Texas 77030.

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High-protein, high-calorie foods such as peanut butter, nuts, cheeses, milkshakes, instant breakfast, or nutritional supplements can provide concentrated sources of nutrients. Small, frequent feedings may be more effective in increasing total intake. Acceptance of nutritional supplements may depend on the patient’s taste perception. The senses of taste and smell may be affected by treatment, and foods that children enjoyed prior to treatment may lose their appeal or taste bad. Children then associate those foods with the side effects of treatment and avoid them. These are called learned food aversions. In view of this phenomenon, dietitians at UTMDAH frequently encourage children to consume their favorite foods only while they are feeling well.

When all efforts to support a child’s nutritional status through the oral route have failed, nutrition via the enteral route is the preferred method of feeding, if the gastrointestinal tract is functional. When compared to parenteral nutrition, enteral feedings have a lower risk of complications and are less expensive. Tube feedings given during the night and discontinued during the day can allow the child to carry on normal daily activities. Tube feeding formulas for children over two years of age can be chosen from the enteral products for adults. Intolerance to a tube feeding may be manifested by nausea, vomiting, diarrhea, abdominal cramping, or bloating. These can usually be alleviated by adjusting the rate or the strength of the feeding; however, continued intolerance may require a change in formula. Feedings may be administered as a continuous infusion by a pump or as bolus feedings given over a period of 20-30 minutes.

Parenteral nutrition may be given to replenish or maintain nutritional status when the gastrointestinal tract is dysfunctional. However, parenteral nutrition is more costly and requires more complex monitoring than enteral feeding.

Providing aggressive nutritional support as soon as nutritional deterioration is detected or anticipated can prevent malnutrition. It is much easier to minimize or prevent malnutrition than to reverse a severely malnourished state. Children who are able to maintain adequate nutrition throughout their therapy feel better, have fewer complications, and are able to continue chemotherapy with fewer delays (van Eys J, Cancer Res, 1982; 42(Suppl):7475-7515).

Physicians who desire additional information may write Nutrition and Food Service, Box 58, The University of Texas M. D. Anderson Hospital and Tumor Institute at Houston, 1515 Holcombe Boulevard, Houston, Texas 77030.