

RESEARCH AND PROFESSIONAL BRIEFS

Clinical pathway nutrition management for outpatient bone marrow transplantation

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During more than two decades of autologous bone marrow transplantation, medical management has generally required patient hospitalization for at least a month with follow-up management in an outpatient setting (1). Follow-up clinic appointments continue from 2 to 4 months and include close monitoring of laboratory data, body weights, and the patient's ability to thrive as an outpatient. As a result of research, new technology, and clinical experience, however, Stanford University Medical Center's autologous bone marrow transplant program is primarily conducted in the day hospital (a 23-hour-stay unit). In

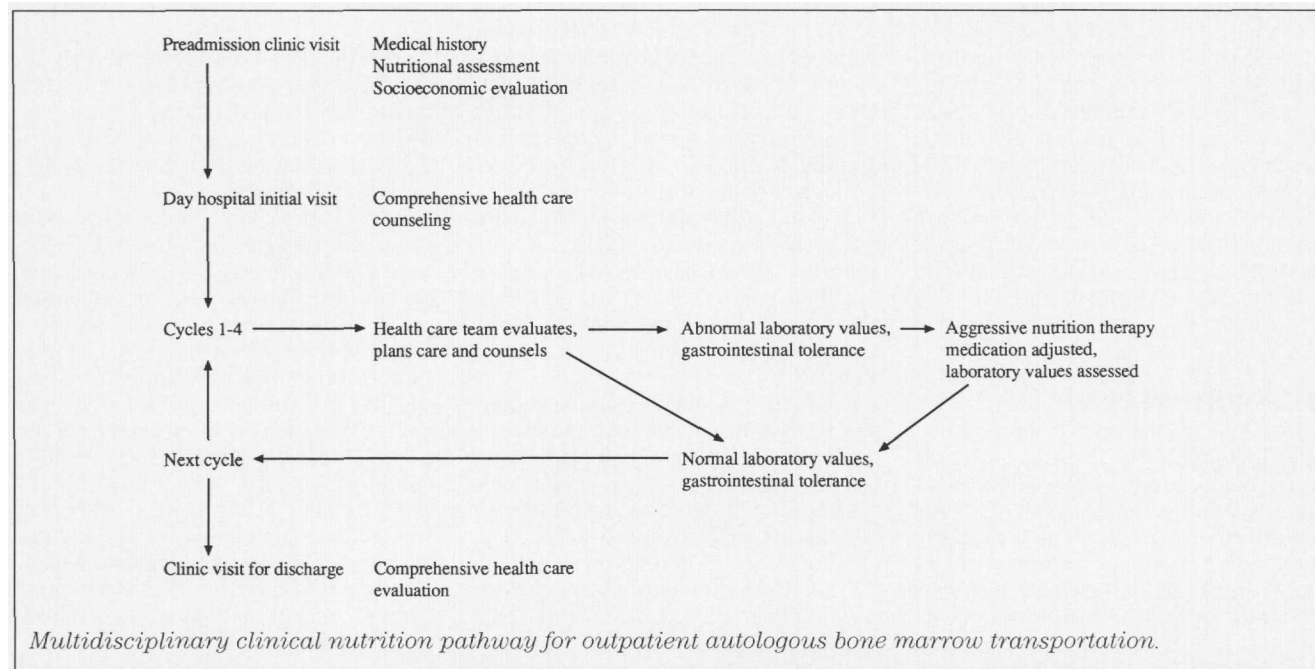
some cases, autologous bone marrow transplantation has moved completely to the outpatient setting; for example, patients with breast cancer or Hodgkin's disease are treated in a multicycled (four cycles) high-dose chemotherapy program followed by peripheral blood stem cells rescue with each cycle (2). Regardless of white blood cell count, these patients are managed in the outpatient day hospital unless they require admission for a complication such as a neutropenic fever or infection. A multidisciplinary clinical pathway, including discipline-specific pathways, has been developed at Stanford University Hospital to manage patient care in this population (see the Figure). This article describes the clinical nutrition care section of the multidisciplinary pathway, which is aimed at identifying nutritional risks and developing patient-specific nutrition intervention.

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NUTRITION FACTORS

The gastrointestinal toxicities and side effects of antibiotics and chemotherapy (ie, mucositis, esophagitis, gastritis, nausea, vomiting, and diarrhea), which often have a cumulative effect during the four chemotherapy cycles, present a challenge to providing optimal medical nutrition therapy in the outpatient setting. As a patient progresses through the four cycles, temporary recovery from the side effects of one treatment cycle is quickly followed by the start of the next cycle (3-8). Nutrition needs of bone marrow transplant patients include high energy (at least basal energy expenditure \times 1.5), fluid (3.0 L/day), and protein (1.6 to 2.0 g/kg body weight) intake (3,9-12). We have found that management with antiemetics, antidiarrheal agents, and medical nutrition therapy can make a crucial difference in the overall outcome and length of time between treatment cycles. For example, close monitoring is required during the neutropenic phase, when the white blood cell count enters the nadir. If the granulocyte count is less than $0.1 \times 10^9/L$, a low-microbial diet and other neutropenic precautions, such as antibiotics, are indicated to decrease risk of infection (13).

Advantages of outpatient treatment for the patient include independent living and self-administration of antiemetics, food, and liquids. Persons with a good support system and adequate resources, knowledge, and coping skills have the potential to thrive in an outpatient situation. Close patient monitoring,



Multidisciplinary clinical nutrition pathway for outpatient autologous bone marrow transportation.

Table
Clinical pathway for bone marrow transplant outpatient care

Nutrition assessment indicators	Health care practitioner	Pre-admission clinic visit	Day hospital ^b (baseline)	Cycles 1-4 ^a	Outcome goal
Anthropometric	Dietitian				
Height (stature)		X ^c			
Weight		X	X	X	±5% usual weight
Medical history	Physician	X			Meets eligibility criteria
Physical status	Physician	X			Meets baseline criteria
Laboratory values	Physician orders				
Albumin		X	X	X	>30 g/L ^d
Electrolytes		X	X	X	Within normal limits
Total bilirubin		X	X	X	≤25.7 μmol/L ^d
Creatinine		X	X	X	≤141 μmol/L ^d
White blood count		X	X	X	Monitor range
Weight history	Dietitian	X	X	X	±5% body weight at admission
Diet recall	Dietitian	X	X	X	≥2/3 Recommended Dietary Allowance
Nutrition education	Dietitian	X	X	X	Demonstrate comprehension
Low microbial diet information	Dietitian	X	X	X	Demonstrate comprehension
Estimate energy and protein needs	Dietitian	X			Diet plan to meet needs
Socioeconomic evaluation	Social worker	X	X	X	Maintain quality of life
Tolerance of therapy	Nurse				Stanford BMT ^e rating scale:
Esophagitis		X	X	X	Acceptable range
Mucositis		X	X	X	Acceptable range
Xerostoma		X	X	X	Acceptable range
Dysgeusia		X	X	X	Acceptable range
Nausea		X	X	X	Acceptable range
Vomiting		X	X	X	Acceptable range
Diarrhea		X	X	X	Acceptable range

^aCycles 1-4=cycles of high dose chemotherapy followed by bone marrow transplantation, beginning with cycle 1 and ending with cycle 4.

^bDay hospital=unit for bone marrow transplant patients staying ≤23 hours for care.

^cX=action taken by identified staff member.

^dTo convert g/L albumin to g/dL, divide by 10. To convert μmol/L total bilirubin to mg/dL, divide by 17.1. To convert μmol/L creatinine to mg/dL, divide by 88.4.

^eBMT=bone marrow transplant.

which is traditionally provided for inpatients, is missing. For example, patients who are unable to maintain an adequate daily fluid intake or manage antiemetic medications may become dehydrated and require hospitalization. Nutrition assessment, diet modification, and alteration of the nutrition care plan should be a part of each ambulatory visit. Both patients and bone marrow transplant staff find this system advantageous and beneficial in all aspects of patient care.

NUTRITION INTERVENTION

Patients are evaluated in a clinic setting before initiation of the first chemotherapy cycle, before each of the subsequent cycles, and after the last cycle. Patients are referred to a dietitian during the initial visit if there is a history of weight loss, if nutritional concerns or questions arise, or if the case manager or physician determines it appropriate or necessary. The complete nutrition assessment is

performed in the day hospital during the initial preparative stage just prior to cycle 1. Overall nutrition status, potential nutrition risks, and nutrition goals are addressed. Nutrition education is provided through verbal and written information, and includes guidelines for a low-microbial diet. When documentation is completed in the medical record, the pathway has begun. Follow-up and close monitoring are performed daily to weekly and reevaluation of nutrition status documentation at least weekly.

Frequency of day hospital visits during the four cycles depends on therapy tolerance, weight history, present weight status, laboratory values, and clinical evaluation. If weight loss, laboratory abnormalities, or gastrointestinal tract intolerances are identified, more aggressive nutrition intervention is used. Medical nutrition intervention during the treatment cycle may include modification of diet, addition of nutritional supplements,

completion of a food record of daily intake with daily evaluation, and/or further instruction to meet outcome goals. The degree of intervention may vary with each cycle, although the pathway followed is the same.

A daily treatment plan with specific goals and objectives is created. These goals and objectives may, however, vary or require adjustments for individual needs as the patient progresses through the pathway. The revised treatment plan focuses on getting the patient back on the overall treatment schedule. The majority of patients do not deviate from the path. If a patient does experience difficulty following the plan, then the pathway may need to be changed. This may require a simple change, reworking the pathway, or collaborating with other team members to achieve the desired outcome. In time, clinical experience and advances in therapeutic plans may also change.

To create an effective clinical nutri-

tion pathway, dietitians must have complete comprehension of the diagnosis and medical therapy. A clinical nutrition pathway is designed on the basis of anticipated or predetermined medical treatment plans and clinical experience. The Figure outlines the clinical pathway for outpatient multicycled chemotherapy autologous stem cell transplantation. The pathway begins with the initial outpatient clinic appointment and is identical for each of the four cycles of high-dose chemotherapy and for infusion of autologous stem cells.

MULTIDISCIPLINARY ACTIVITY

We have found that a clinical nutrition care pathway is essential for providing continuity and effective medical nutrition therapy (14). Pathways are directed via standing orders that include each discipline. Each discipline conducts a monthly quality assurance program to evaluate timeliness and outcome standards. The clinical nutrition pathway in the Table illustrates the interaction among health care professionals and the outcome assessment for nutrition intervention. Each discipline documents intervention and assessment in the medical record. These scheduled nutrition outcome measures allow the medical team to view the multidisciplinary history of the patient's care. Frequent communication regarding the patient's nutritional adequacy enhances the awareness and knowledge of the patient's nutrition status and its relationship to overall outcome needed by all members of the health care team.

APPLICATION

A clinical nutrition pathway functions as a tool to improve quality of care and patient satisfaction, and to meet outcome goals. It also serves to communicate to all disciplines the role of the dietitian and medical nutrition therapy in patient and outpatient management. Overall, this clinical pathway facilitates medical management by providing medical nutrition therapy to an outpatient population that is receiving a cycled high-dose chemotherapy program including peripheral blood stem cell rescue during each cycle.

References

1. Aker SN. Bone marrow transplantation: nutrition support and monitoring. In: Bloch AS, ed. *Nutrition Management of the Cancer Patient*. Gaithersburg, Md: Aspen Publication; 1990:199-225.
2. Burns JM, Tierney DK, Long GD, Lambert S, Carr B. Critical pathway for administering high-dose chemotherapy followed by peripheral blood stem cell rescue in the outpatient setting. *Oncol Nurs Forum*. 1995;22:1219-1224.
3. Keenan AMM. Nutritional support of the bone marrow transplant patient. *Nurs Clin North Am*. 1989;24:383-393.
4. Phillips GL. Side effects of conditioning regimens. In: Deeg IJ, Klingeman HG, Phillips GL, eds. *A Guide to Bone Marrow Transplantation*. 2nd ed. Berlin, Germany: Springer-Verlag; 1992:105-119.
5. Schubert MM, Sullivan KM, Truelove EL. Head and neck complications of bone marrow transplantation. In: Peterson ED, Sonis SB, Elias EG, eds. *Head and Neck Management of the Cancer Patient*. Boston, Mass: Martenus Nijhoff; 1986:401-427.
6. Boock CA, Reddick JE. Taste alterations in bone marrow transplant patients. *J Am Diet Assoc*. 1991;91:1121-1122.
7. Wolford JL, McDonald GB. A problem-oriented approach to intestinal and liver disease after bone marrow transplantation. *J Clin Gastroenterol*. 1988;10:419-433.
8. Shuhart MC, McDonald GB. Gastrointestinal and hepatic complications. In: Forman SJ, Blume KG, Thomas ED, eds. *Bone Marrow Transplantation*. Boston, Mass: Blackwell Scientific Publications; 1994:454-481.
9. Herrmann VM, Petruska PJ. Nutrition support in bone marrow transplant recipients. *Nutr Clin Pract*. 1993;8(1):19-27.
10. Cunningham BA, Lessen P, Aker SN, Gittere KM, Cheney CL, Hutchinson MM. Nutritional considerations during marrow transplantation. *Nurs Clin North Am* 1983;18:585-596.
11. Driedeger L, Durstall CD. Bone marrow transplantation: dietitian's experience and perspective. *J Am Diet Assoc*. 1987;87:1387-1388.
12. Weisdorf SAS, Schwarzenberg SJ. Nutritional support of bone marrow transplant recipients. In: Forman SJ, Blume KG, Thomas ED, eds. *Bone Marrow Transplantation*. Boston, Mass: Blackwell Scientific Publications; 1994:327-336.
13. Moe GL. Low microbial diet for patients with granulocytopenia. In: Bloch AS, ed. *Nutrition Management of the Cancer Patient*. Gaithersburg, Md: Aspen Publication; 1990:199-225.
14. Hedberg AM, Wojner AW. Nutrition: a critical variable. In: Cameron AM, ed. *Incorporating Nutrition Care into Critical Pathways for Improved Outcomes*. Houston, Tex: St Luke's Episcopal Hospital/Ross Products Division, Abbott Laboratories; 1994: 16-24.

Attitudes of registered dietitians toward personal overweight and overweight clients

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Studies show that students in health fields (1-4) and health professionals (5-9) in the United States have disparaging attitudes toward persons who are overweight. However, to our knowledge no study has assessed the attitudes of registered dietitians toward themselves when they perceive themselves to be overweight (hereafter referred to as *personal overweight*). Additionally, little is known about dietitians' attitudes toward overweight clients (10,11).

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The objectives of this exploratory survey were to describe the attitudes of dietitians toward personal overweight and overweight clients and to determine whether perceived body weight or body mass index (BMI) influences dietitians' attitudes toward personal overweight and overweight clients.

METHODS

Subjects

A purposive sample of 596 registered dietitians who counsel overweight clients was sought from the presidents of state dietetic associations (numbers were proportional to the number of American Dietetic Association members residing in that state). This study was approved by the Committee on Human Research at the University of Vermont.

Survey Instrument

Data were collected using a mailed questionnaire following the method of Dillman