Evaluating Cancer Patients for Rehabilitation Potential

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The Karnofsky performance scale is the most widely used method of quantifying cancer patients’ ability to function. It has also been used to measure patients’ function before and after treatment. Because identifying problems with function is the cornerstone of rehabilitating patients with cancer, we developed a table that relates the functional independence measure with the Karnofsky scale. This approach encourages oncologists to consider inpatient or outpatient rehabilitation services for a broader range of cancer patients. We assessed 70 cancer patients undergoing rehabilitation to identify similarities between the functional independence measure used at our facility and the Karnofsky scale. In activities we considered vital, only 14% of patients were independent with ambulation on admission and, at discharge, 80% were independent or supervised with ambulation. Toilet transfers and bowel and bladder continence improved by the time of discharge. Three months after they were discharged, 28 of the 37 patients had maintained their discharge function level or had improved. Of the original group, 19 had died.


In the United States, cancer is diagnosed in one of three persons, and one of five of these will die of the disease. Advances in the medical treatment of cancer—largely in the form of chemotherapy—plus refinements in surgical techniques, total parenteral nutrition, and more precise methods of administering radiotherapy have contributed to the increased longevity of cancer patients. Many of these patients have residual impairments or pain that seriously affects their daily activities, quality of life, or potential for returning to school or work.

Lehmann evaluated hospital records of more than 800 patients with a diagnosis of cancer and attributed the failure of rehabilitation intervention to the lack of rehabilitation consultation. The primary barriers were that functional problems were not identified and appropriate referral was not made as physicians were unfamiliar with the concept of rehabilitation.1

When a diagnosis of cancer is made, an overwhelming number of issues will confront the patient, family, and caregivers. Major problems are the unknown prognosis, the uncertain response to treatment, and direct or remote effects of the cancer itself. Will there be residua from radical surgical procedures, and what may be the toxic side effects of chemotherapy? How will these affect the patients’ performance of daily activities, their jobs or education, or their family relationships? How about pain? How is the stress to patient and family managed?

Assessment Methods

Evaluating function is the cornerstone of cancer rehabilitation. It allows clinicians to identify physical and functional problems, set realistic goals, and prescribe rehabilitation.2 Ideally, problems in functioning are identified in the acute care hospital so that a patient is introduced to the system and directed to rehabilitation early in the course of the disease. Further assessments may be made so that as the disease remits, stabilizes, or progresses, problems may be noted and programs prescribed (Figure 1).

Many functional assessment tools are available, but the Functional Independence Measure (FIM) (Figure 2) has been found to be effective with cancer patients. The FIM measures self-care, mobility, ambulation, bowel and bladder continence, communication, cognition, social interaction, and emotions. It does not measure pain, community activities, or availability of family support. It allows the identification of problems in basic “survival skills” and provides a method for measuring progress.

Because of the unstable nature of many patients with cancer, a program of physical, occupational, and speech therapy is provided for a number of weeks or months (Figure 3). The potential of rehabilitation services is to stabilize the patient’s condition, to make him or her more comfortable and ready to enter another system of care, and to improve the quality of life in the remaining months or years of life. The patient, the patient’s family, and the oncologist must be knowledgeable about each other’s role and about the resources available in the community. Many rehabilitation agencies have developed contracts with oncologists so that inpatient and outpatient rehabilitation services may be provided for the patient with cancer in need of such services. As more oncologists recognize the need for rehabilitation services, the coordination of these services will become more and more important in providing a safe and comfortable pathway to the end of life.

Figure 1.—Functional assessment for rehabilitation of cancer patients is shown in its various stages. OPD = outpatient department, OT = occupational therapy, PT = physical therapy.

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cancer, the prognosis is important in selecting patients. Dietz classified cancer patients into the categories of treatment: preventive, restorative, supportive, and palliative.3

The preventive (stage I) stage is the point at which preventing deconditioning and contractures is paramount. Appropriate management is in an acute care hospital or at the outpatient level. At the restorative stage (stage II), patients can be expected to return to their premorbid state without substantial disability. These patients may benefit from an orthosis or a prosthesis. The supportive stage (stage III) occurs when the disease has been controlled, even though there is known residual disease. Patients can be expected to return home and remain active even though functioning below the premorbid level. They often can return to work for an appreciable time. At the palliative stage (stage IV), an active rehabilitation program is not appropriate. This may be considered the hospice level.

Based on the clinical situation—the diagnosis, the effects of treatment, and complications, the functional assessment, and the Dietz oncology classification—realistic goals may be set. This system allows the primary care physician or oncologist to advise the patient and family of reasonable expectations and discharge planning needs. It is important not to foster false hopes.

Oncology rehabilitation differs little from rehabilitation of other disorders. The team must be flexible and have the ability to manage changes in a patient’s status due to the disease or its treatment, however. Emotional considerations require mature, confident team members. Pain is more frequently a factor in cancer patients than in other diagnostic categories, and team members must be familiar with various modalities and techniques for pain management.

The basic treatment plans in physical therapy, occupational therapy, and speech therapy may have to be modified but are essentially the same as for other diagnoses. They include a strengthening and endurance program, neuromuscular reeducation, gait training, and a program to help the performance of activities of daily living. Patients in the restorative and the supportive stages will benefit from rehabilitation. Patients with hemiplegia; aphasia, dysarthria, and dysphagia from brain neoplasms; spinal cord compression resulting from primary or metastatic lesions; or severe deconditioning following surgical treatment or

**Figure 2.** The Functional Independence Measure is a general assessment tool useful for determining whether cancer patients should be referred for rehabilitation.

**Figure 3.** The age distribution of the cancer patients studied is shown.

**Figure 4.** The mean Functional Independence Measure (FIM) and Karnofsky Performance Status scores of the cancer patients studied are shown.

**Figure 5.** Discharge destinations are shown for the cancer patients studied.
chemotherapy all may have impairments that can be improved by rehabilitation.

**Patient Selection**

Fairlawn Rehabilitation Hospital is a free-standing, 80-bed, acute rehabilitation hospital. The Oncology Rehabilitation Program is staffed by a multidisciplinary team consisting of a physiatrist, a medical oncologist, rehabilitation nurses, physical therapists, occupational therapists, speech pathologists, a social worker, a pastor, and a neuropsychologist, with psychiatric and neurologic consultation available. Each patient admitted is evaluated by a predmission nurse, and the patient’s diagnosis, FIM, and Dietz stage are presented to the admission committee. Every effort is made to admit only patients in Dietz stages II and III who will have achievable goals. Pain management is an important goal.

A group of 70 consecutive patients admitted for oncology rehabilitation were retrospectively reviewed as part of our evaluation program and, based on FIM scores on admission, were given what we considered equivalent Karnofsky Performance Scale (KPS) index scores (Table 1). In the sample, the range of FIM scores on admission was 37 to 117, equivalent to KPS scores of 30 to 70. These scores also were documented at discharge. A 90-day follow-up evaluation was done by telephone or by follow-up examination by the oncology physiatrist.

**Results**

Of the 70 patients in our program, 38 were women. The age distribution is shown in Figure 3. The average age was 71 years.

The average admission FIM score was 81, with a corresponding KPS score of 50. At discharge the average scores were FIM, 100 and KPS, 60 (Figure 4). At 90-day follow-up, 19 patients had died and 14 were lost to follow-up. Of the 37 patients remaining, 27 (73%) had maintained or improved their ability to function. The median length of hospital stay was 28 days, which compared favorably to that of stroke patients.

The destinations of patients discharged from oncology rehabilitation are shown in Figure 5. The number of patients discharged to home compares favorably with other diagnostic categories when age, diagnosis, and stability of the disease process are considered.

Initially, the perception was that only high-level patients were admitted to rehabilitation. Of the 70 patients admitted to our rehabilitation program, however, only 21 (30%) were independent in toilet transfers, 10 (14%) were independent with ambulation, and 26 (38%) had bladder continence. These are areas that are frequently overlooked when discharge from an acute care hospital is planned or that could require discharge to a nursing home.

At the time of discharge from the rehabilitation program, 35 (50%) were independent in toilet transfers, 56 (80%) were independent or supervised with ambulation, and 61 (87%) were bladder continent. Bowel programs were established so that 64 (91%) were continent (Figure 6).

Although 12% is an acceptable transfer rate for a free-standing rehabilitation hospital, 24% (17) of these patients required transfer back to an acute care hospital, reflecting the instability of many cancer patients. Of those requiring transfer, 6 had cancer of the lung, 3 had deep vein thrombosis, and the diagnoses for the rest ranged from dehydration because of intractable vomiting to gastrointestinal bleeding to pneumonia.

Admission FIM scores ranged from 65 to 101 (KPS 40 to 50), and, at admission, all of these patients were in the Dietz III category.

It is the policy of the rehabilitation program not to transfer cancer patients to an acute care hospital if death is imminent. Special relationships have been set up among the patient, the family, and the rehabilitation team, and, with the patient and

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**TABLE 1.—Karnofsky Performance Scale Index**

<table>
<thead>
<tr>
<th>General Category Description</th>
<th>Specific Criteria</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to carry on normal activity, no special care needed</td>
<td>Normal, no complaints, no evidence of disease</td>
<td>100</td>
</tr>
<tr>
<td>Unable to work, able to live at home and care for most personal needs, varying amount of assistance needed</td>
<td>Able to carry on normal activity, minor signs or symptoms of disease</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Normal activity with effort, some signs or symptoms of disease</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Cares for self, unable to carry on normal activity or to do work</td>
<td>70</td>
</tr>
<tr>
<td>Unable to care for self, requires institutional or hospital care, or equivalent disease may be rapidly progressing</td>
<td>Requires occasional assistance from others, but able to care for most needs</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Requires considerable assistance from others and frequent medical care</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Disabled, requires special care and assistance</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Severely disabled, stay in hospital indicated; death not imminent</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Very sick, stay in hospital necessary; active supportive treatment necessary</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Moribund</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Dead</td>
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</table>

*From Mor et al.*

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**TABLE 2.—Primary Diagnoses in 70 Patients in an Oncology Rehabilitation Program**

<table>
<thead>
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<th>Primary Cancer Site</th>
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<th>Primary Cancer Site</th>
<th>Patients, No.</th>
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<td>Endometrium</td>
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</tr>
<tr>
<td>Lung</td>
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<td>Ureter</td>
<td>2</td>
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<td>Prostate</td>
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<td>Thyroid</td>
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<td>Esophagus</td>
<td>1</td>
</tr>
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<td>Colon</td>
<td>3</td>
<td>Larynx</td>
<td>1</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>2</td>
<td>Unknown</td>
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</tr>
<tr>
<td>Multiple myeloma</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 6.**—Key functional activities are assessed before and after the hospital stay of cancer patients.
family's permission, these patients remain in the rehabilitation program until they die. Of our 70 patients, 3 died. Cardiopulmonary failure occurred in two patients and severe bone marrow suppression with sepsis in the third. Cancer of the prostate with spinal cord compression was the diagnosis in two of the patients. Cancer of the bladder with bony metastases was the other diagnosis.

**Diagnoses**

The primary diagnoses are shown in Table 2. The average age of the group with brain tumors was 50, with a range from 22 years to 74 years. All were admitted from a university hospital neurosurgical service, with an average FIM score on admission of 71. Only 1 of the 22 patients was able to walk independently on admission. Of this group, 16 were discharged home, 4 were transferred to acute care hospitals, and 2 were discharged to nursing homes. At three months' follow-up, 10 had shown continued improvement in function, 3 had lost some function, and 9 were lost to follow-up.

Of patients with primary lung cancer, eight were discharged home and six required transfer to an acute care hospital. At 90-day follow-up, three had improved and two had lost function; nine were lost to follow-up.

**Discussion**

Even though this was not a controlled study, we are satisfied that there is a substantial population of patients with cancer who could benefit from rehabilitation. By using KPS scores, remediable problems can be identified and appropriate patients can be selected (Table 3).

The fact that 49 (70%) of our patients maintained or improved their functional status after 90 days is important. Cancer patients are capable of making notable gains in function and maintaining them. Considering the large percentage of patients who on admission were dependent with ambulation and toilet transfer and had bladder incontinence, the successful discharge-to-home rate was encouraging. Ambulation, transfers, and continence determine the success or failure of a home program. This may be overlooked when a patient is discharged from an acute care hospital. If oncologists, primary care physicians, and oncology nurses are aware of the use of the Karnofsky Performance Scale as an aid in selecting patients for rehabilitation consultation, quality of life will be improved for many cancer patients. There will be risks: The patient who appears to be doing well on initial assessment may have complications develop that interfere with rehabilitation and make it inappropriate. The team must be willing to accept this. With proper patient selection, results should be satisfactory. Rehabilitation evaluation must be done by a professional with experience in cancer rehabilitation.

Essentially, as used in oncology, the Karnofsky Performance Scale is a measure of time to death. When used as an adjunct in selecting appropriate patients for rehabilitation, it can be a measure of life.

**REFERENCES**